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# Firebase: A Platform for your Web and Mobile Applications

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**ABSTRACT**

*The purpose of this study is to introduce everyone with Google firebase API and its features. Firebase is a Google provided API for database storage and syncing into your android, IOS or web application. A real-time database is one which stores data to database and fetches data from it very quickly but Firebase is not just a real-time database, it is much more than that. Firebase provides us with many SDKs for the different platforms such as node.js and python for server side and android, ios, web for client side. This article covers an overview on how to use firebase as a backend for your Web application development. Google Firebase has many features like Authentication, database, storage, hosting, notification, analytics, dynamic links, remote config, test lab.Analytics feature enables the application developer to understand how users are using his application.Authentication allows developers to store users and integrate with authentication providers such as Facebook, Google, Github. Firebase Supports Cloud Messaging allowing developers to send notifications to its users.*

***Keywords- AdMob, Authentication, Firebase, Real-time database***

## I. INTRODUCTION

Firebase is a backend platform for building Web, Android and IOS applications. It offers real time database, different APIs, multiple authentication types, hosting platform and much more. Firebase frees developers to focus crafting fantastic user experiences. They don't need to manage servers. You don't need to write APIs. Firebase is your server, your API and your data store, all written so generically that you can modify it to suit most needs. Firebase can power your app's backend, including data storage, user authentication, static hosting and more. Focus on creating extraordinary user experiences. Firebase will take care of the rest. Build cross-platform native mobile and web apps with our Android, IOS and JavaScript SDK's. You can also connect Firebase to your existing backend using server-side libraries or it's REST API.

## II.HEADINGS

**1. Introduction**

**2 .Why to use Firebase**

**3. Services of Firebase**

3.1 Analytics

3.2 Development

## III. WHY TO USE FIREBASE

✓ **Forget about infrastructure**

The developer doesn't have to worry about the backend of the application; it just has to provide an interactive UI for the users of the application.

✓ **Make smart, data-driven decisions**

During the development of the application, the developer is supported by many of the services provided by Firebase. So the developer doesn't have to think about storage of data, and use the data as requires.

✓ **Free to start, scale with ease**

Firebase is absolutely free to start; all its services are provided to the developer without any charges. But as the application grows there are charges involved in it.

✓ **Work across platforms**

Firebase is providing support for many platforms such as Web, Android and IOS. There is scope for C++ and Unity is well.

## IV. SERVICES OF FIREBASE

### A. Analytics: -

This feature enables the application developer to understand how users are using his application. The SDK capture events and properties on its own and also allows you to get custom data. The dashboard provides details like your most active user or what feature of your application is used most. It also provides you with summarized data.

- Designed for apps
- Event and user centric
- Connects across Firebase
- Free and Unlimited

### B. Development

i. **Firebase Authentication: -**Authentication feature in firebase let you let only authorized users access your application. Firebase provides login through Gmail, Github, twitter, facebook and also let the developer create custom authentication.

- Authentication & account management
- Supports:
  - Email & password
  - Social providers
  - Existing authentication systems

ii. **Firebase Real-Time Database: -**Database in firebase is a cloud-based database and does not need SQL-based queries to store and fetch data. Database is highly reliable and superfast means that data is updated and synchronized in no time and data is maintained even user lose internet connection.

- Cloud-hosted No-SQL database
- Synchronization & conflict resolution
- Access directly from your app

iii. **Firebase Cloud Messaging: -**Firebase cloud messaging lets you to deliver messages to different platforms at no cost. Messaging is also used for notifications purposes.

- Firebase Cloud Messaging
- Enable Push Notifications
- Based on GCM(Google Cloud Messaging)

iv. **Firebase Hosting: -**Firebase is also used for hosting purposes. Firebase delivers web content very fast and content is always delivered securely.

- Serve static assets (images)
- SSL (Security) by default
- Free custom domains

v. **Firebase Storage: -**Firebase also provides storage facility. It can store and retrieve content like images, videos and audio directly from client SDK. Uploading and downloading is done in the background. Data stores are safe and the only authorized user can access it.

- Easy file storage
- Handles poor connectivity
- Backed by & accessible from Google Cloud Storage

### C. Grow

i. **Firebase Notifications: -** This feature lets you create attractive push notifications. You can send to particular users or to all the users. Fast and Easy to create and send a notification.

- Lets you re-engage users quickly and easily
- No additional coding required
- Messages can be sent to particular devices or all devices
- Integrates with analytics

ii. **Firebase Remote Config: -** This feature is very helpful for your application to test your application before applying any updates to it. You can test a user's behavior by inspecting its use with your application.

- Run A/B experiments or change app behavior
- Control custom key-value pairs from the Console
- Changes propagate instantly

iii. **Firebase Dynamic Links: -** By using this feature you can check whether your application is responsive amongst all the platforms or not, It display similar in Android, IOS and web or not.

- Customize different user experiences via a single URL
- Works across platforms
- Preserves URL state, even through app install flow

### D. Earn

i. **Ad Mob: -** This feature allows you to earn through your application. It is supported across many platforms and easy to implement in your application.

- Earn through your application
- Easy to link with your application
- Supports cross platform (ios as well as android)

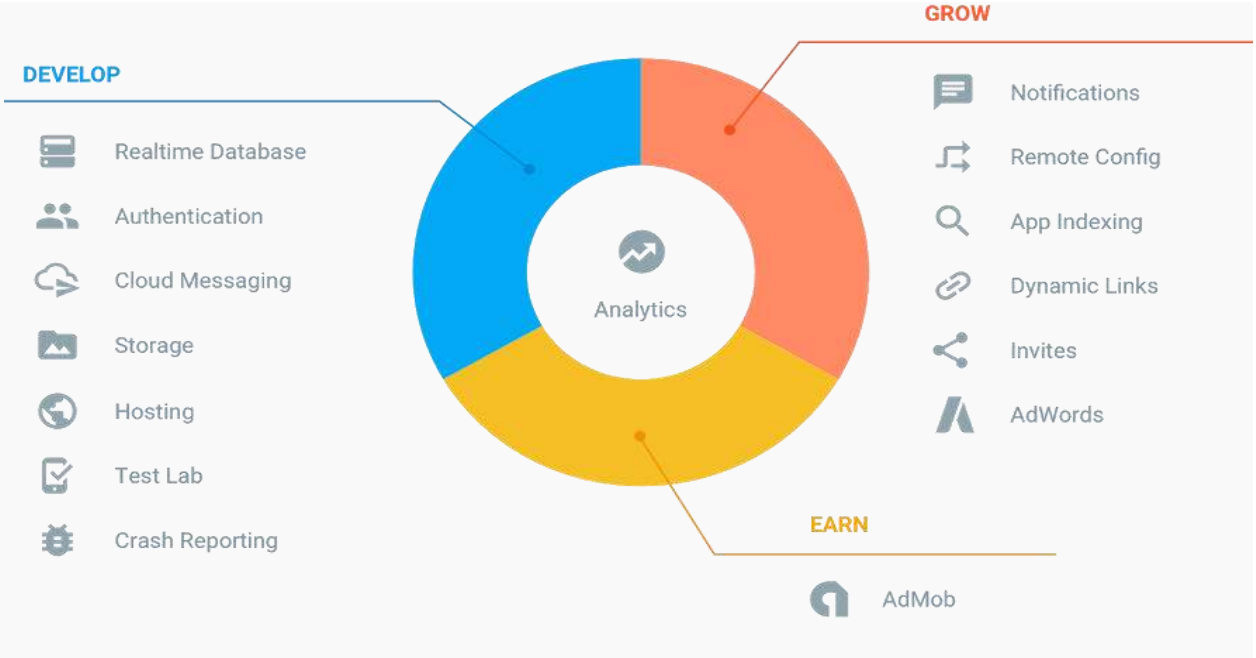


**Fig.1**

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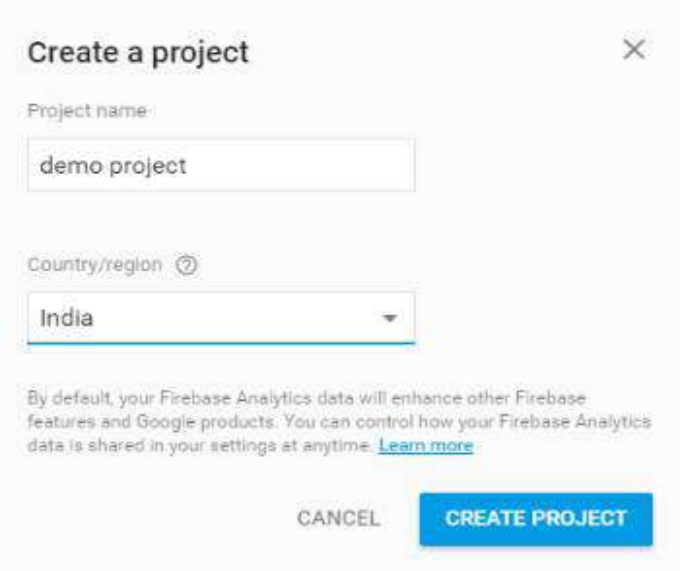


## V. ADDING FIREBASE TO YOUR WEB-PROJECT

To add Firebase to your app, you'll need a Firebase project, the Firebase SDK, and a short snippet of initialization code that has a few details about your project.

i. Create a Firebase project in the Firebase Console, if you don't already have one.
ii. If you already have an existing Google project associated with your app, click **Import Google Project**. Otherwise, click **Create New Project**.
iii. If you already have a Firebase project, click **Add App** from the project overview page.
iv. Click **Add Firebase to your web app**.
v. Note the initialization code snippet, which you will use in your application.

- The snippet contains initialization information to configure the Firebase JavaScript SDK to use Authentication, Cloud Storage, the Real time Database, and Cloud Firestore. You can reduce the amount of code your app uses by just including the features you need. The individually installable components are:
    - firebase-app - The core firebase client (required).
    - firebase-auth - Firebase Authentication (optional).
    - firebase-database - The Firebase Real-time Database (optional).
    - firebase-firestore - Cloud Firestore (optional).
    - firebase-storage - Cloud Storage (optional).
    - firebase-messaging - Firebase Cloud Messaging (optional).

## VI. USING FIREBASE REAL-TIME DATABASE FOR WEB APPLICATION

The Firebase Real time Database is a cloud-hosted database. Data is stored as JSON and synchronized in real time to every connected client. When you build cross-platform apps with our IOS, Android, and JavaScript SDKs, all of your clients share one Real time Database instance and automatically receive updates with the newest data.

**Basic write operations**

For basic write operations, you can use set() to save data to a specified reference, replacing any existing data at that path. For example a social blogging application might add a user with set() as follows:

```
function writeUserData(userId, name, email, imageUrl) {
  firebase.database().ref('users/' + userId).set({
    username: name,
    email: email,
    profile_picture : imageUrl
  });
}
```

**Read data once**

In some cases you may want a snapshot of your data without listening for changes, such as when initializing a UI element that you don't expect to change. You can use the once() method to simplify this scenario: it triggers once and then does not trigger again.

```
var userId = firebase.auth().currentUser.uid;
return firebase.database().ref('/users/'+
userId).once('value').then(function(snapshot){
  var username =(snapshot.val()&& snapshot.val().username)||'Anonymous';
  // ...
});
```

## VII. FIREBASE OVER PARSE SERVER APPLICATIONS

- Firebase is provided by Google while Parse Server is provided by Facebook.
- The purpose of Firebase is for Fast Real Time Applications, And of Parse Server is for Static Backend Services.
- Setup for Firebase is fast, easy and automatic while for Parse Server there is manual Setup.
- Firebase stores data in JSON format and uses Google Cloud Storage, Parse Server usually uses MongoDB.
- In Firebase, Notifications is supported for cross platforms while in Parse Server it is only for Android and IOS.
- Firebase provides Google Hosting which is free up to 100 simultaneous connections, Parse Server provides self hosting and Parse hosting without any limits.
- Firebase is ideal for Real Time Applications while Parse Server is ideal for general purpose applications.

| | Firebase | Parse Server |
|---|---|---|
| **Provider** | Google | Facebook |
| **General Purpose** | Fast Real Time Applications | Backend Services |
| **Setup** | Fast & Easy | Manual Setup |
| **Storage** | Stores in JSON format and uses Google Cloud Storage | According to DB (MongoDB) |
| **Notifications** | Cross Platform | Only for Android, IOS |
| **Hosting** | Google Hosting, Free up to 100 simultaneous connections | Self hosting and Parse hosting providers, No limits |
| **Ideal For** | Real time applications | General Purpose applications |

**Table 1**

## VIII. CONCLUSION AND FUTURE SCOPE

In this paper, it has been discussed about Google provided firebase API and its unique features. It has been conveyed how to add firebase to our web project and how to use different features in our android application according to our need. Google is adding new features to firebase continuously; Ad Sense for firebase is in beta phase. So in future, we can study those new features and how to implement them in our android application and why to keep using firebase than any other database service out there. Developers can save time on developing a server for their applications and just use firebase instead. Firebase is coming with a new feature called as cloud Firestore which can be used to storage for large data. Future research can be focused on authentication service provided by Firebase, how to implement authentication in your applications, authentication analysis for cross platform development. Research can also be focused on firebase cloud functions and how to host our own servers on Firebase Platform.

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