



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



Accredited by NBA – AICTE and Accredited by NAAC – UGC with ‘A+’ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECT213-IoT SYSTEM ARCHITECTURE

II B.E. ECE / IV SEMESTER

UNIT 4 – CLOUD PLATFORMS FOR IoT

TOPIC 1 –IOT CLOUD PLATFORMS



IoT



UNIT-I	BASICS OF IoT	9
Introduction to Internet of things, Various sensors and sensing techniques. Technological trends in IoT. Impact of IoT on society. Review of various IoT application domain including agriculture, healthcare, manufacturing, device management, and vehicle to vehicle communication and wearable computing devices.		
UNIT-II	MICROCONTROLLER AND INTERFACING TECHNIQUES FOR <u>IoT</u> DEVICES	9
Introduction to Arduino, NodeMCU-Basics of Embedded C Programming for Arduino-Arduino Libraries: Library Adding and Removing- Embedded devices: Sensors and actuators -Analog Sensor Interfacing-Digital Sensor Interfacing-PWM Technique-Serial Communication- Application that uses sensor data for decision making process		
UNIT-III	ACTUATORS AND <u>IoT</u> NETWORKING DEVICES	9
Programming and Interfacing of Actuators: Liquid Crystal Display- Relay -DC Motor with L298N Motor Driver Controller-Servos. <u>IoT</u> Networking devices Programming and Interfacing: GSM Modem-HC05 Bluetooth Transceiver-ESP8266 Wi-Fi Module.		



IoT



UNIT-IV	CLOUD PLATFORMS FOR IoT	9
Virtualization Concepts and Cloud Architecture-Cloud Computing Benefits-Cloud Services:IFTTT-Study of IoT Cloud Platforms-Things speak API & MQTT-Data Visualization with Things Speak-Interfacing ESP8266 with Web Services		
UNIT-V	IoT APPLICATIONS	9
Home Automation With Android application and Google Assistance; Internet of Robotic Things (IoRT): Introduction to stationary and mobile robots; Applications of IoT in robotics; Architectures for IoRT; Examples and case studies; Open issues and challenges.		



IOT CLOUD PLATFORMS



CONNECTIONS

LED +-----□ D0 NODEMCU

LED - -----□ GND

NODEMCU



Firebase



OVERVIEW:



- Using the **IoT hardware & cloud platform**, we can control the **IoT devices** including LEDs from any part of the world. This mini [IoT Based Projects](#) deals with **LED Control using Google Firebase Console & NodeMCU ESP8266** WIFI Module.
- There are various methods of controlling of the LED such as using **Web Server** or **Webpage**, **Blynk Application** and using other **API based services**. But here we will only focus on [Google Firebase](#)



IOT BASED LED CONTROL USING GOOGLE FIREBASE & ESP8266



IOT CLOUD PLATFORMS



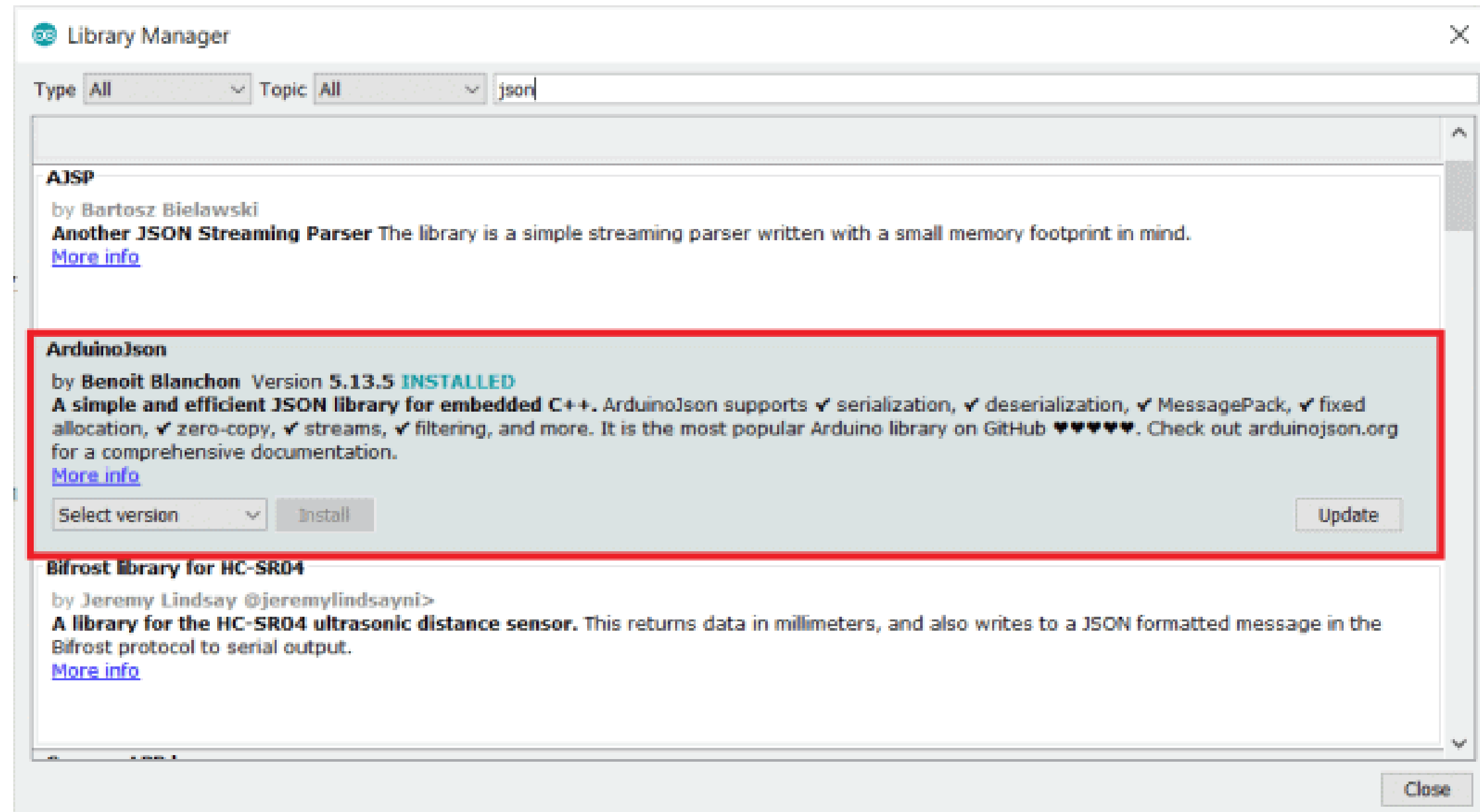
- Google Firebase** is a Google-backed application development software used for **creating, managing, and modifying data** generated from any **android/IOS application**, web services, IoT sensors & Hardware. To learn more about the **Google Firebase Console**,



INSTALLING FIREBASE & JSON LIBRARY



1. ArduinoJSON Library





INSTALLING FIREBASE & JSON LIBRARY



2. Download Google FirebaseExtended Library

[GitHub - FirebaseExtended/firebase-arduino: Arduino samples for Firebase.](#)



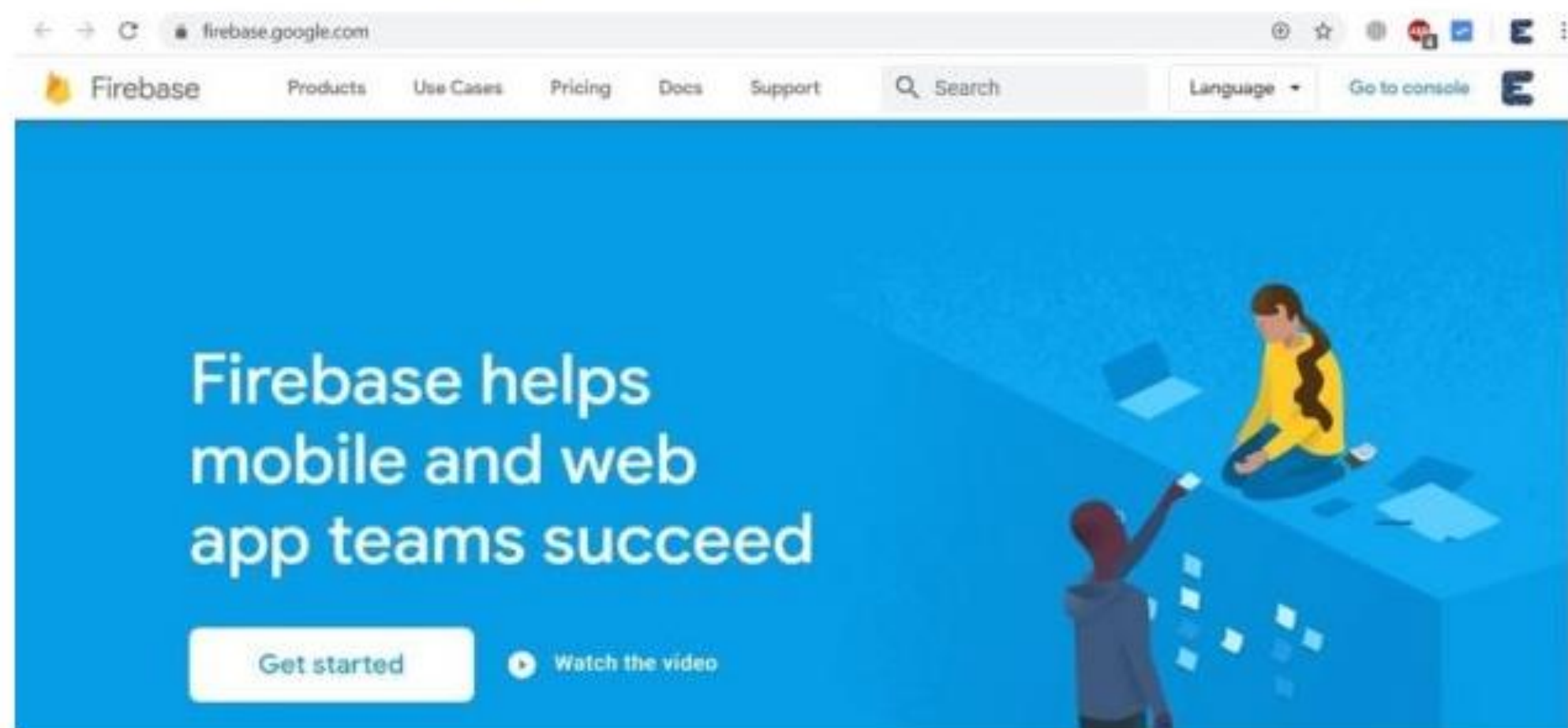


SETTING UP GOOGLE FIREBASE



Step 1: If you have Gmail id then you are already Sign Up for firebase. But if you don't have Gmail id then first Sign Up for Gmail: <https://gmail.com/>

Step 2: Now visit <https://firebase.google.com/> and click on **Go to Console** on the Top Right.





IOT CLOUD PLATFORMS



Step 3: Click on "Create a Project".





SETTING UP GOOGLE FIREBASE



Step 4: Give your "Project name", then tick the "I Accept the Firebase Terms" & finally Click on "Continue".

console.firebase.google.com/u/0/?pli=1

X Create a project (Step 1 of 3)

Let's start with a name for your project®

Project name

my1stproject

my1stproject-34e8e

I accept the [Firebase terms](#)

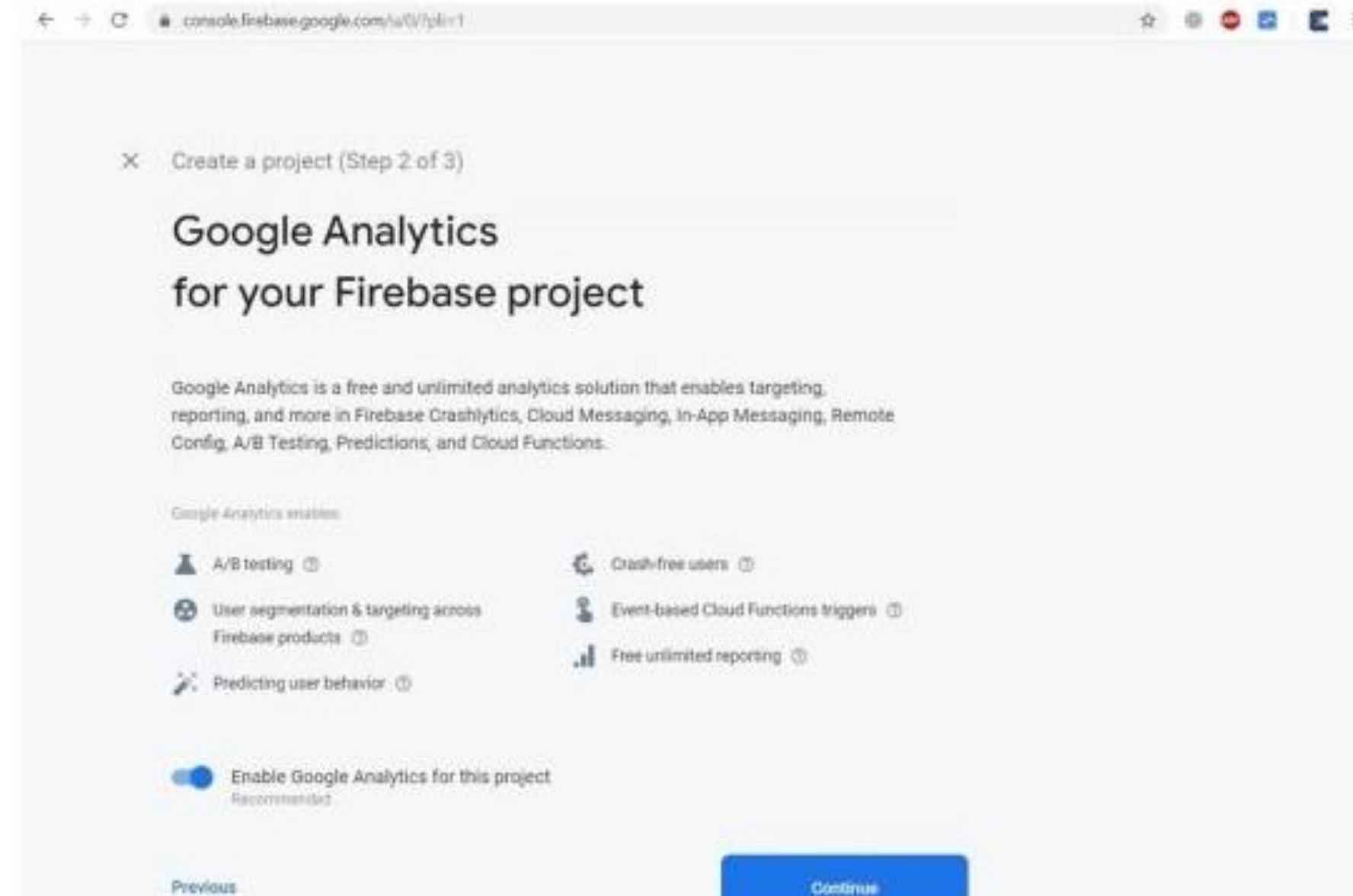
Continue



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Step 5: Now, another window will appear. So click on "Continue".

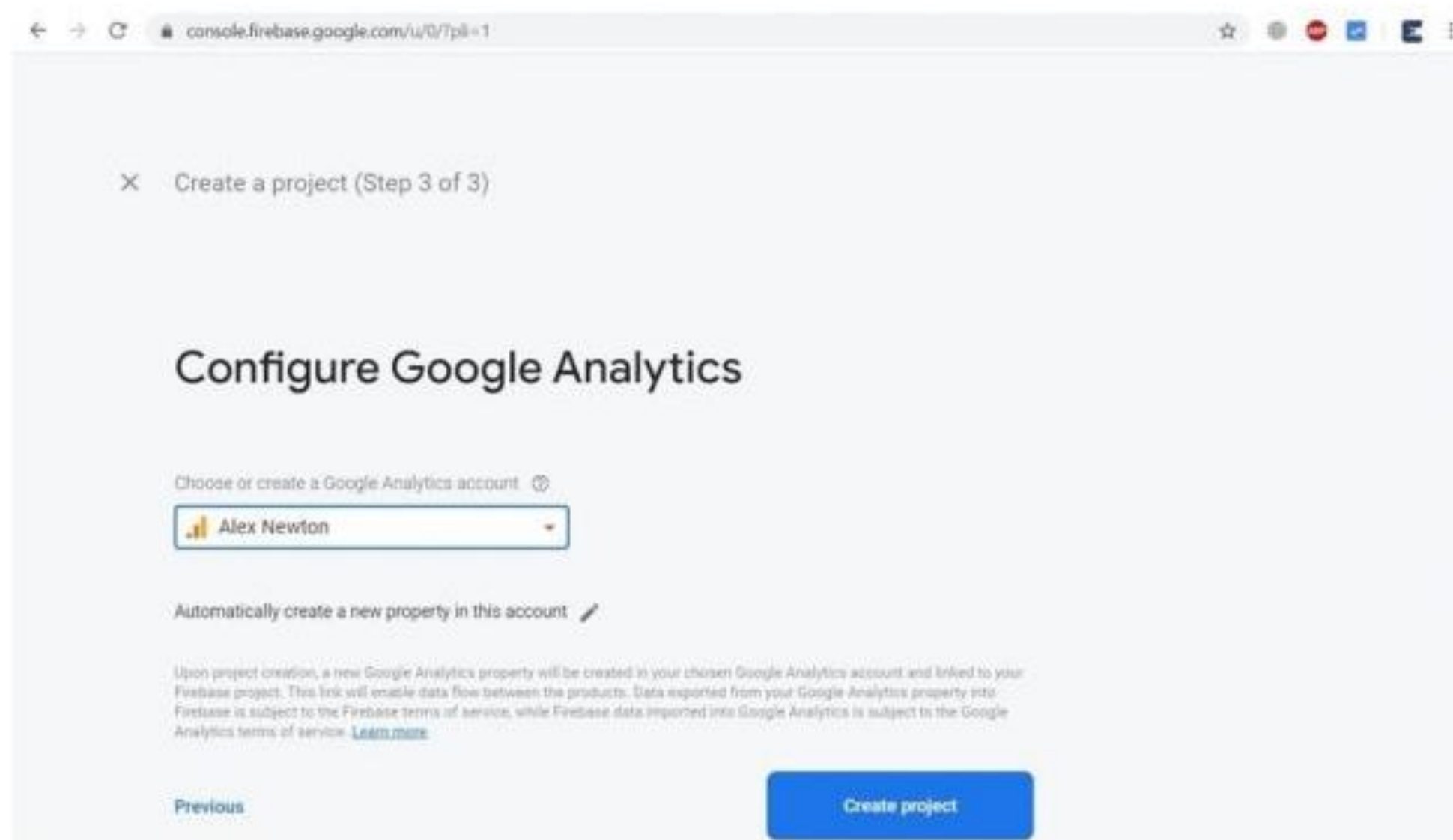




SETTING UP GOOGLE FIREBASE



Step 6: Select the “google Analytics Account” that is made using the Gmail ID. And then click on “Create Project”.

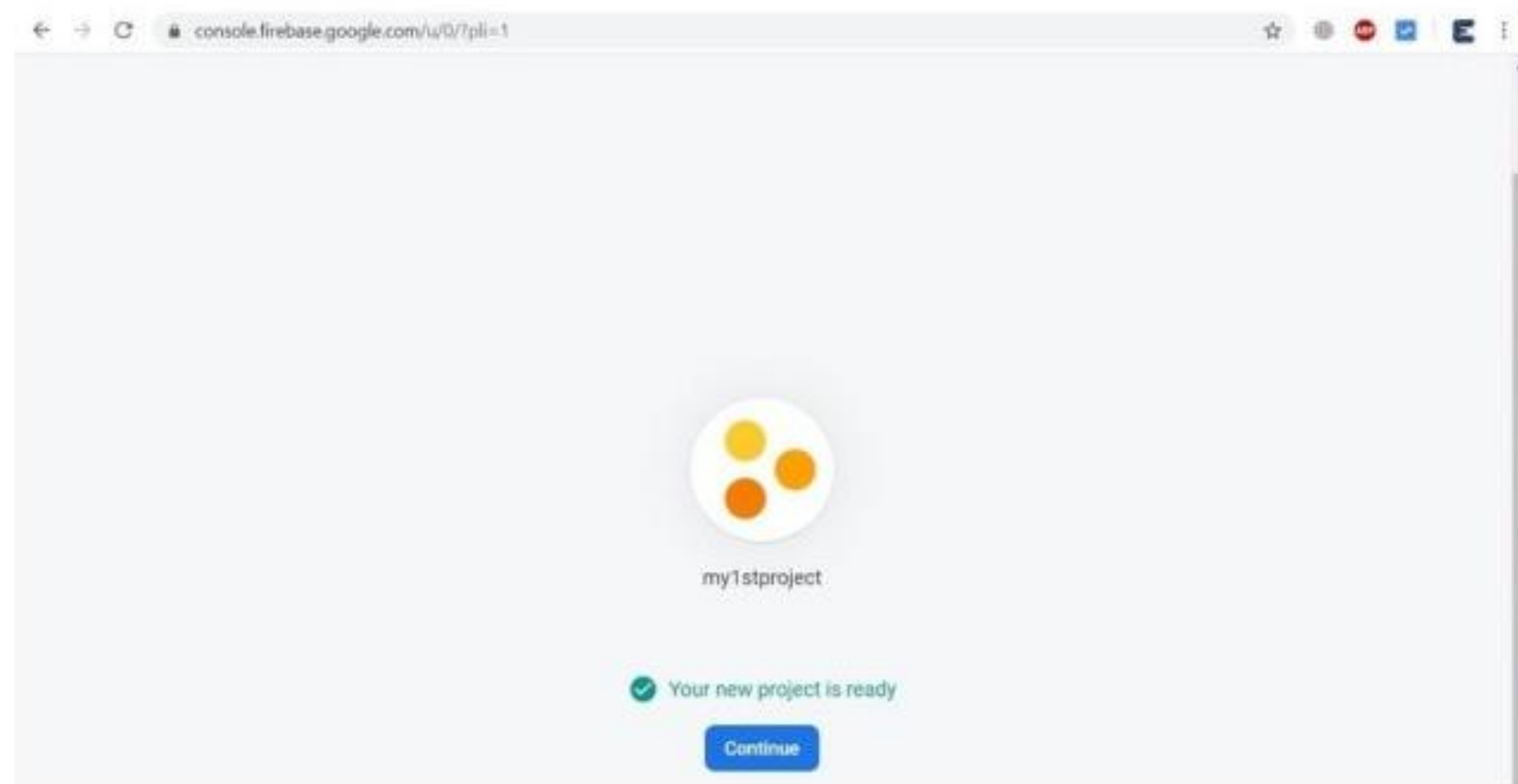




SETTING UP GOOGLE FIREBASE



Step 7: Your project is ready now. So you will get the following window. Click on "Continue".





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Step 8: Now click on "Project Setting".





SETTING UP GOOGLE FIREBASE



Step 9: Under Project Setting, Click on "Service Accounts". Copy the secret key from below. The code is required in the Arduino Code.

console.firebase.google.com/u/0/project/my1stproject-34ef8e/settings/serviceaccounts/databasesecrets

my1stproject

Settings

General Cloud Messaging Integrations **Service accounts** Data privacy Users and permissions

Manage service account permissions

Database Secrets

Database secrets are currently deprecated and use a legacy Firebase token generator. Update your source code with the Firebase Admin SDK. [Learn more](#)

Create custom database authentication tokens using a legacy Firebase token generator. At least one secret must exist at all times. [Learn more](#)

Add secret

Database	Secret
my1stproject-34ef8e	Ke1qJV41sp9XRX24PGF2pTxy9Ba8H5D9X3ELdRXL



SETTING UP GOOGLE FIREBASE



Step 10: Click on "Create Database".





SETTING UP GOOGLE FIREBASE



Step 11: Choose "Start in Test Mode" and then click on "Next".

console.firebase.google.com/w0/project/my1stproject-34e8e/database

Create database

1 Secure rules for Cloud Firestore 2 Set Cloud Firestore location

After you define your data structure, you will need to write rules to secure your data.
[Learn more](#)

Start in production mode
Your data will be private by default. Client read/write access will only be granted as specified by your security rules.

Start in test mode
Your data will be open by default to enable quick setup. Client read/write access will be denied after 30 days if security rules are not updated.

```
rules_version = '2';
service cloud.firestore {
  match /databases/{database}/documents {
    match /{document=} {
      allow read, write: if
        request.time < timestamp.date(2020, 6, 15);
    }
  }
}
```

Warning: Anyone with your database reference will be able to read or write to your database for 30 days

Enabling Cloud Firestore will prevent you from using Cloud Datastore with this project, notably from the associated App Engine app

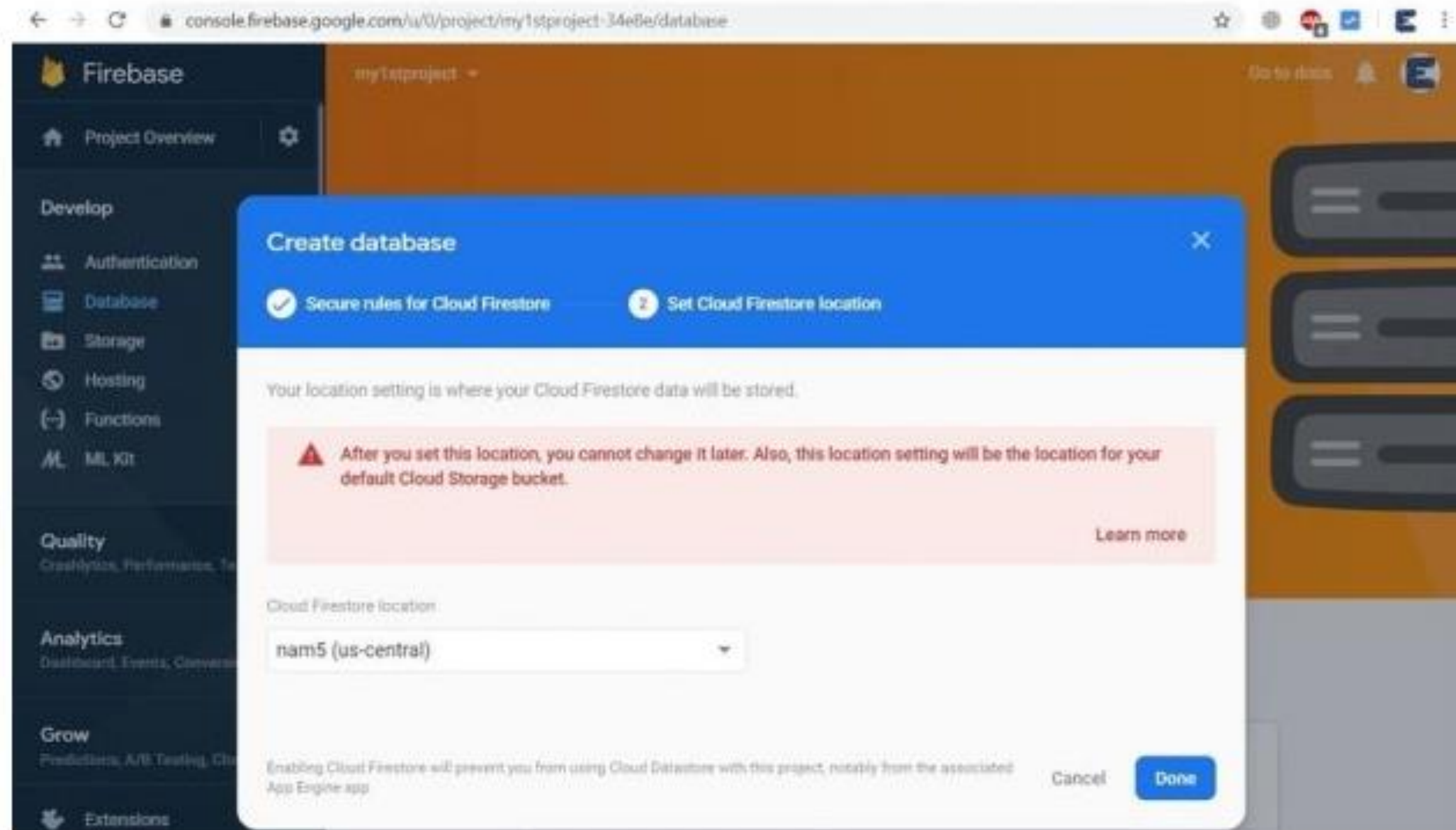
Cancel **Next**



SETTING UP GOOGLE FIREBASE



Step 12: Now click on "Done" & from left side click on "Database".

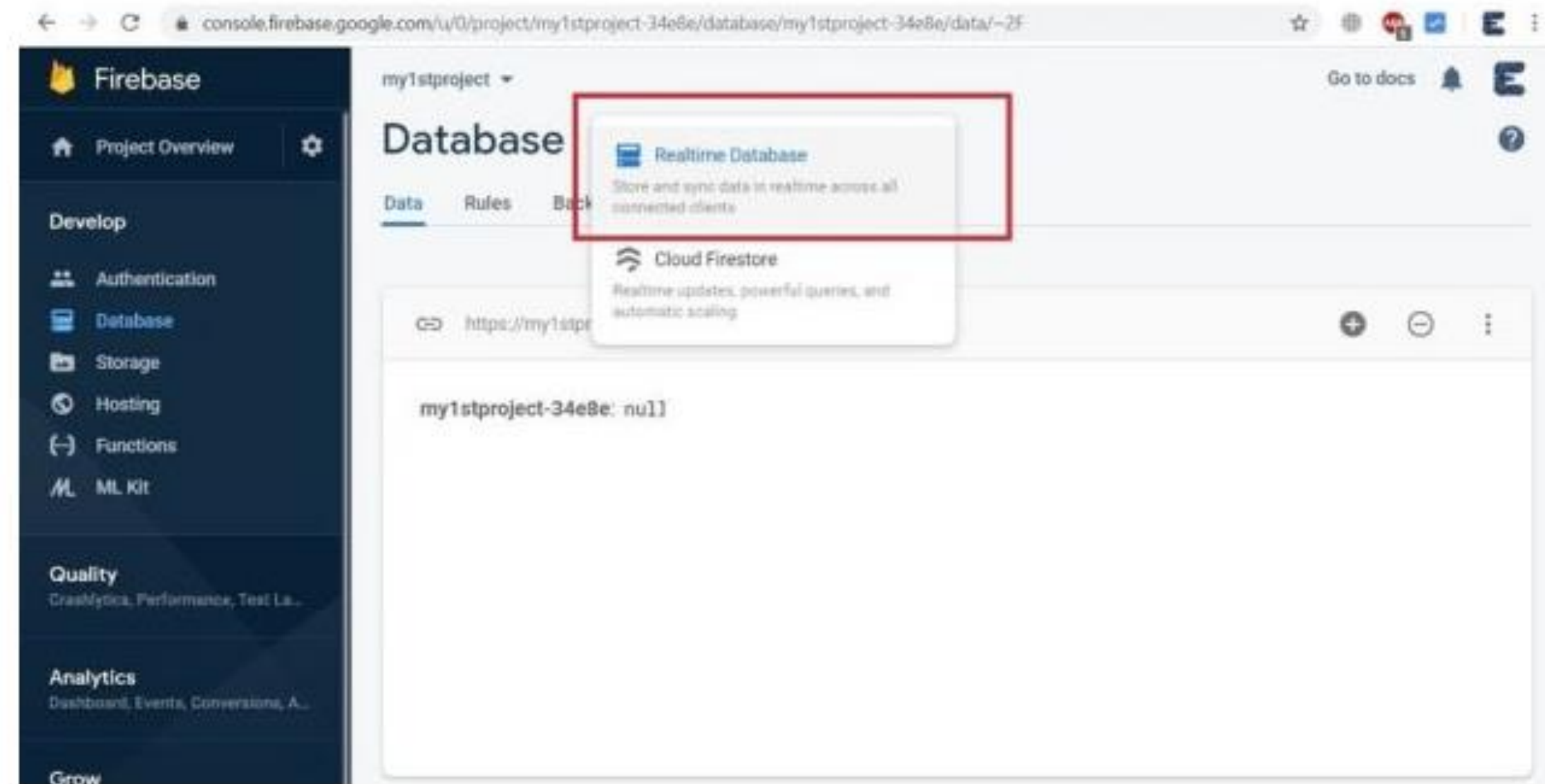




SETTING UP GOOGLE FIREBASE



Step 13: Select the "Realtime Database" option from the Database List.

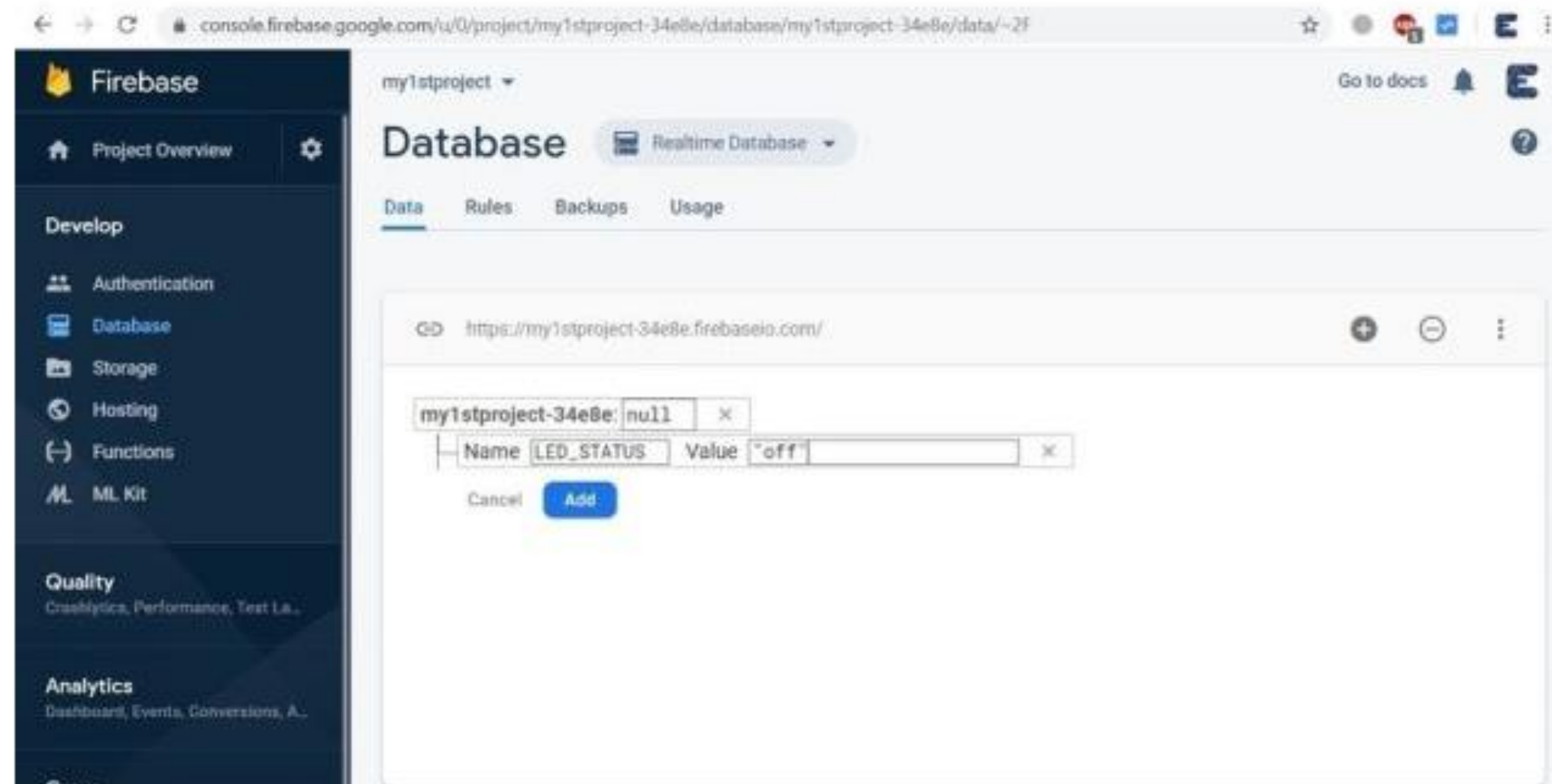




SETTING UP GOOGLE FIREBASE



Step 14: Now your final project is ready. You can modify the "ON/OFF" line from the list.



Step 15: Copy the "secret key" & "Project name". This are required in the Arduino code. The Project name looks something like this `https://your_project_name.firebaseio.com/`



PROGRAM



<https://drive.google.com/drive/folders/1BxqKd7XVoGQA0uyVGowr5I6vQ7Egp0Xp?usp=sharing>

g





SETTING UP GOOGLE FIREBASE



Firestore

Products ▾ Use Cases Pricing Docs ▾ Community Support

Search English Go to console

Google is committed to advancing racial equity for Black communities. [See how.](#)

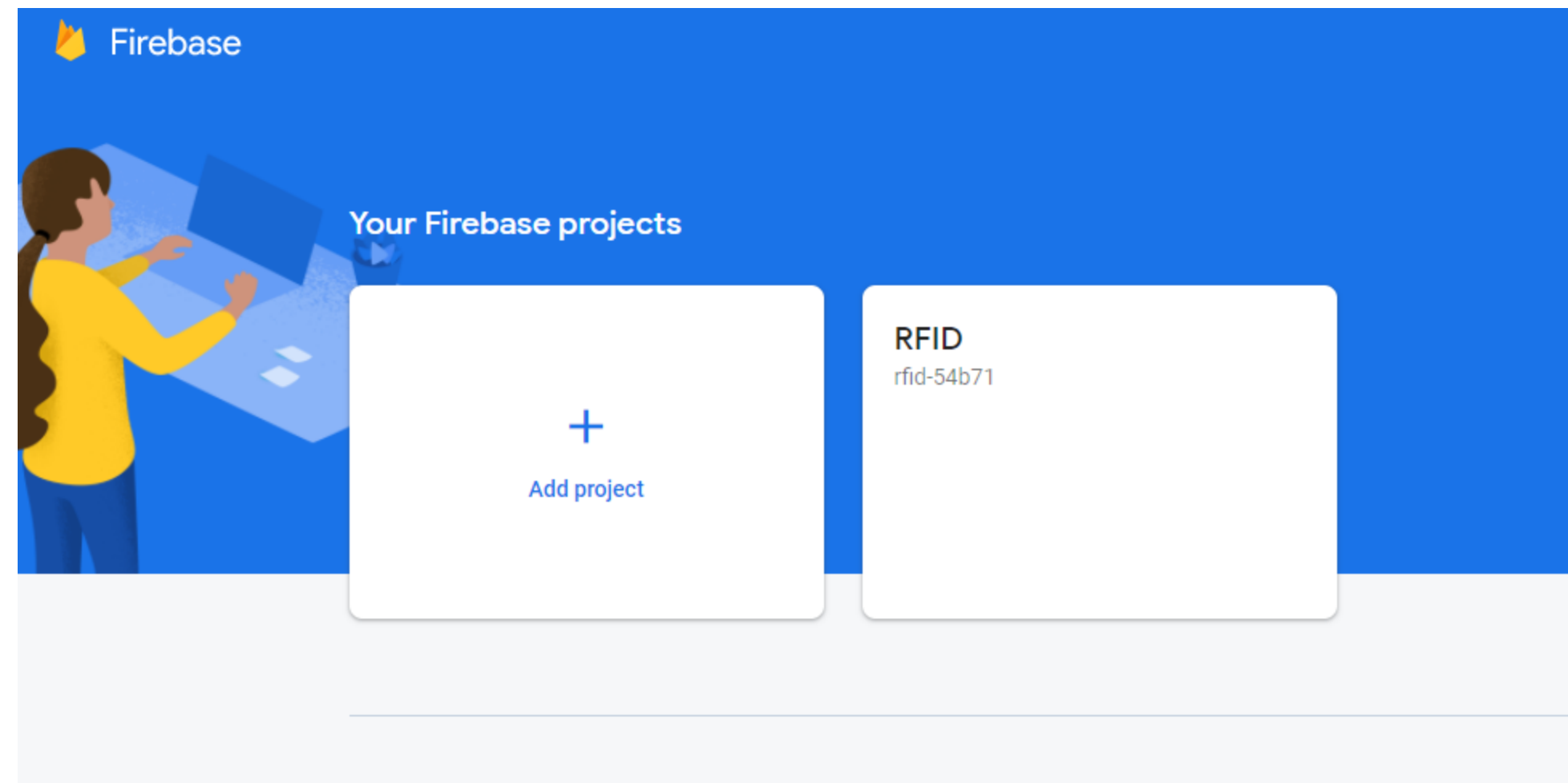
Firestore helps you build and run successful apps

Backed by Google and loved by app development teams - from startups to global enterprises

[Get started](#) [Try demo](#) [Watch video](#)



SETTING UP GOOGLE FIREBASE





SETTING UP GOOGLE FIREBASE




× Create a project (Step 1 of 3)

Let's start with a name for
your project[?]

Project name

LED FB

 led-fb

Continue




SETTING UP GOOGLE FIREBASE





× Create a project (Step 2 of 3)


reporting, and more in Firebase Crashlytics, Cloud Messaging, In-App Messaging, Remote Config, A/B Testing, Predictions, and Cloud Functions.


Google Analytics enables:

 A/B testing [?](#)

 Crash-free users [?](#)

 User segmentation & targeting across
Firebase products [?](#)

 Event-based Cloud Functions triggers [?](#)

 Predicting user behavior [?](#)

 Free unlimited reporting [?](#)

Enable Google Analytics for this project
Recommended

[Previous](#)

[Continue](#)




SETTING UP GOOGLE FIREBASE



Configure Google Analytics

Choose or create a Google Analytics account ⓘ

 Default Account for Firebase ▾

Automatically create a new property in this account ✎

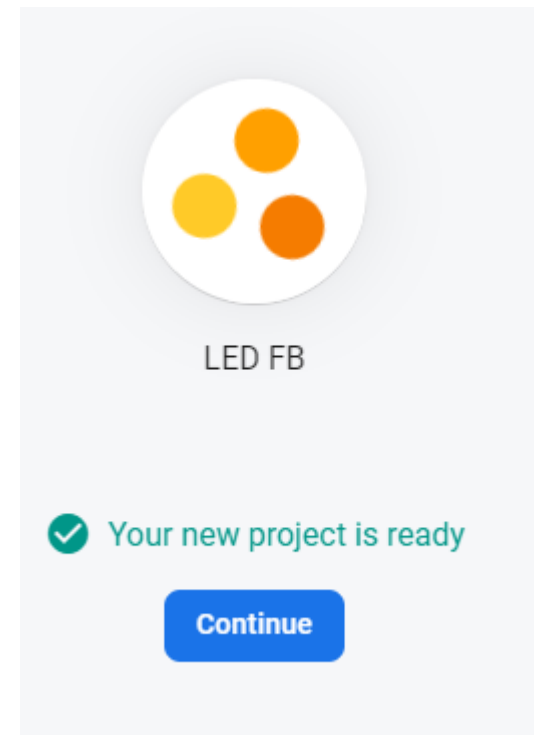
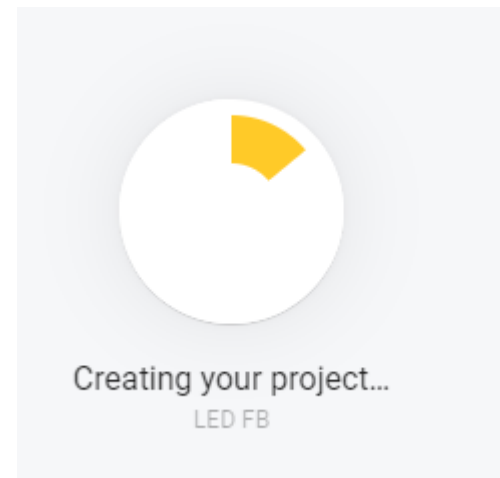
Upon project creation, a new Google Analytics property will be created in your chosen Google Analytics account and linked to your Firebase project. This link will enable data flow between the products. Data exported from your Google Analytics property into Firebase is subject to the Firebase terms of service, while Firebase data imported into Google Analytics is subject to the Google Analytics terms of service. [Learn more](#).

[Previous](#)

[Create project](#)



SETTING UP GOOGLE FIREBASE





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The screenshot shows the Firebase console interface. On the left is a dark sidebar with the 'Firebase' logo and a navigation menu. The main content area has a blue background with the text 'LED FB' and 'Spark plan'. Below this, it says 'Get started by adding Firebase to your app' and shows icons for iOS, Android, and a code editor. At the bottom, it says 'Add an app to get started'. There is also a notification banner at the top right that says 'Receive email updates about new Firebase features, research, and events' with a 'Sign up' button.

This image shows a close-up of the settings gear icon in the sidebar. A white dropdown menu is open, listing three options: 'Project settings', 'Users and permissions', and 'Usage and billing'. The 'Project settings' option is highlighted.



SETTING UP GOOGLE FIREBASE



The screenshot shows the Firebase Project settings interface. The left sidebar contains navigation options: Project Overview, Build (Authentication, Cloud Firestore, Realtime Database, Storage, Hosting, Functions, Machine Learning), Release & Monitor, Extensions, and Spark. The main content area is titled 'Project settings' and has tabs for General, Cloud Messaging, Integrations, Service accounts (selected), Data privacy, and Users and permissions. The 'Service accounts' tab shows the 'Firebase Admin SDK' section, which includes legacy credentials, database secrets, and other service accounts. The 'Admin SDK configuration snippet' is displayed for Node.js, showing the following code:

```
var admin = require("firebase-admin");  
var serviceAccount = require("path/to/serviceAccountKey.json");
```




SETTING UP GOOGLE FIREBASE



← → ↻ <https://console.firebase.google.com/project/led-fb/settings/serviceaccounts/databasesecrets> ☆ ☆ 📄 👤

LED FB ▾ Go to docs 🔔 🍷 ?

Project settings

General Cloud Messaging Integrations **Service accounts** Data privacy Users and permissions

[Manage service account permissions](#)

🔑 **Firebase Admin SDK**

Legacy credentials

📄 **Database secrets**

⚙️ **2 service accounts from Google Cloud**

Database Secrets

⚠️ Database secrets are currently deprecated and use a legacy Firebase token generator. Update your source code with the Firebase Admin SDK. [Learn more](#)

Create custom database authentication tokens using a legacy Firebase token generator. At least one secret must exist at all times. [Learn more](#)

Database	Secret





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THANK YOU