Firebase Real time monitoring using ESP32 and DHT11

What You'll Learn

- **Firebase Project**:
  - Create a Firebase project;
  - Add authentication to your Firebase project (email and password);
  - Add a Realtime Database (RTDB) to your project to save data in JSON format;
  - Organize your RTDB;
  - Protect the RTDB using database rules;
  - Add a web app to your Firebase project to control and monitor your ESP32 and ESP8266 boards;
  - Host your web app in Firebase servers;
  - Add a custom domain to your web app— this requires that you buy a domain name (this step is optional).
- **ESP32/ESP8266**:
  - Authenticate the ESP32 or ESP8266 board as an authorized user with email and password;
  - Write data to the Realtime Database;

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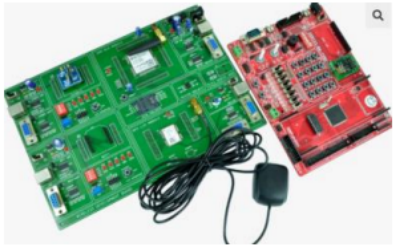
- ✓ Started in the Year 2004
- ✓ Lab equipments and Sensor Interface
- ✓ Manufacturer of Brainsense EEG Headset
- ✓ Reconfigurable Algorithms on AI
- ✓ Manufacture of AI development Boards
- ✓ Power electronics, Fuel cell and Renewable Energy trainers



Vision

To help 10 Million students around the globe to learn technology in a easy way

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About me

Education

College of Engineering, Guindy
Masters of Engineering, Applied Electronics
2002 – 2004

Govt College of Engg,Bargur
Bachelor of Engineering (B.E.), Electrical, Electronics and Communications Engineering, A
1998 – 2002

My Primary Expertise

Microcontroller Architecture: 8051,PIC,AVR,ARM,MSP430,PSOC3
DSP Architecture: Blackfin,C2000,C6000,21065L Sharc
FPGA: Spartan,Virtex,Cyclone
Image Processing Algorithms: Image/Scene Recognition, Machine Learning, Computer Vision, Deep Learning, Pattern Recognition, Object Classification ,Image Retrieval, Image enhancement and denoising.
Neural Networks : SVM,RBF,BPN
Cryptography :RSA,DES,3DES,Ellipti curve,Blowfish,Diffe Hellman
Compilers: Keil,Visual DSP++,CCS, Xilinx Platform studio,ISE, Matlab, Open CV

https://www.linkedin.com/in/jeevarajan/

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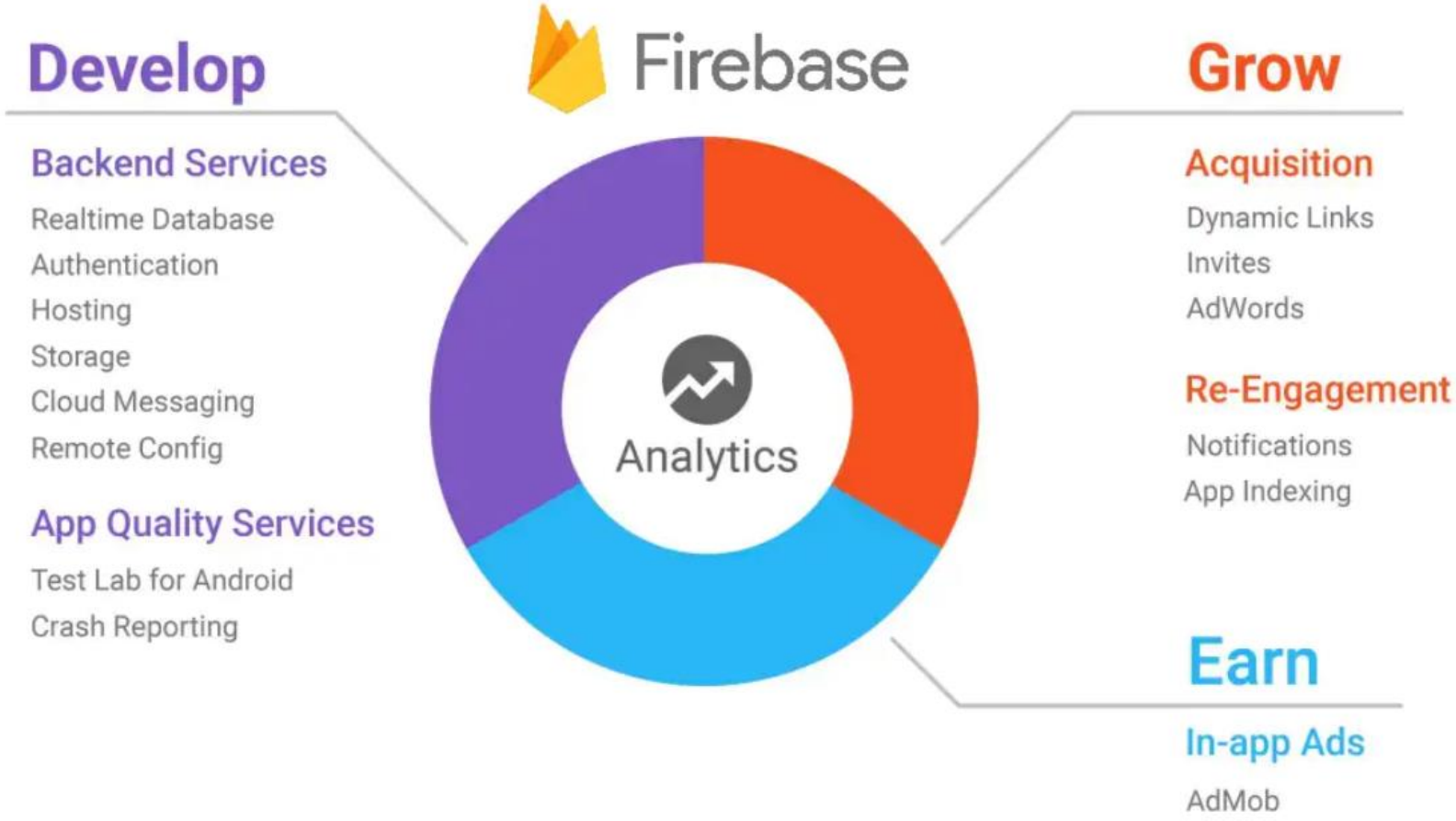
What is Firebase

Firebase is Google's mobile application development platform that includes many services to manage data from IOS, Android, or web applications. You'll create a Firebase project with a realtime database (RTDB), and you'll learn how to store and read values from the database with your ESP32.

What is Firebase

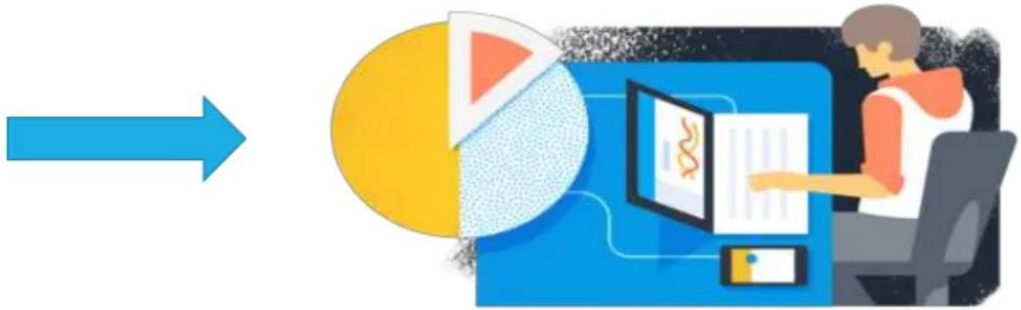


ns.net

Why Firebase

- Forget about infrastructure

- Make smart, data-driven decisions



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DEVELOP

- Realtime Database

  Store and sync app data in realtime
- Authentication

  Reduce friction with robust authentication
- Cloud Messaging

  Deliver and receive messages across platforms reliably
- Storage

  Store files with ease

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DEVELOP

- Hosting

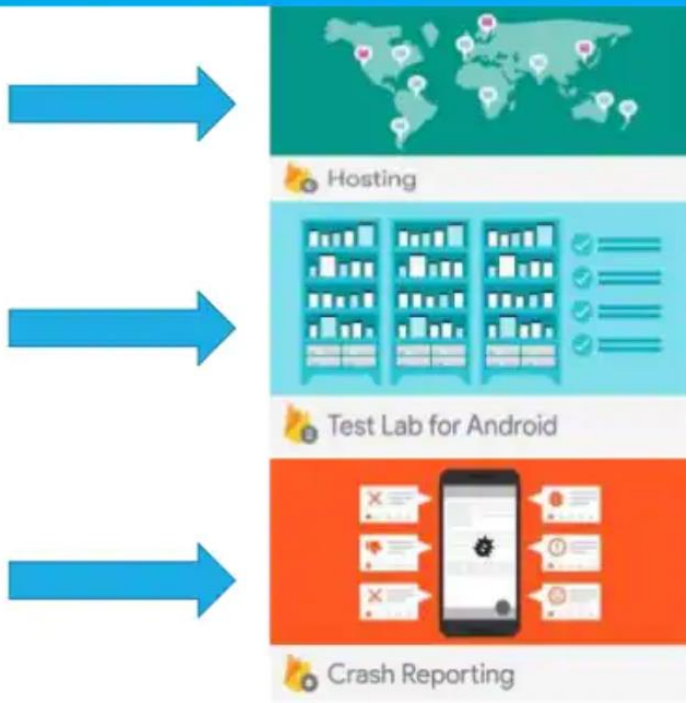
  Deliver web content faster

- Test Lab

  Test in the lab, not on your users

- Crash Reporting

  Keep your app stable



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GROW

- Notifications

  Engage with users at the right moment

- Remote Config

  Customize your app on the fly

- App Indexing

  Drive organic search traffic to your app

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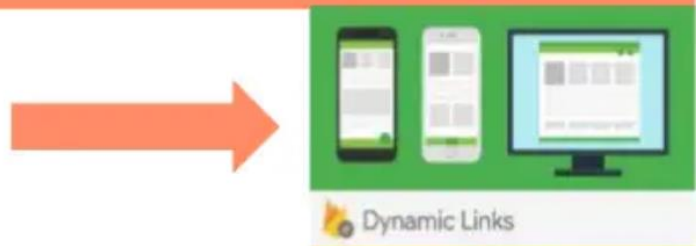
GROW

- Dynamic Links

  Send users to the right place inside your app

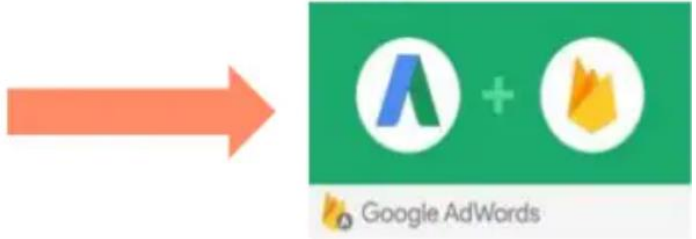


- Invites

  Empower your users to share your app

- AdWords

  Acquire users with the reach of Google



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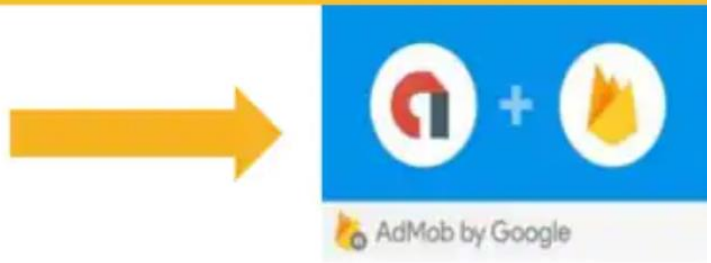
EARN

- AdMob

  Monetize through engaging ads



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Authentication

- Authentication & account management

- Supports:
  - Email & password
  - Social providers
  - Existing auth systems

- [**New!**] Out-of-the box UI

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Realtime Database

- Cloud-hosted NoSQL database
- Synchronization & conflict resolution
- Access directly from your app

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Hosting

- Serve static assets (images too)

- SSL by default
- **New**: free custom domains

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Storage

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

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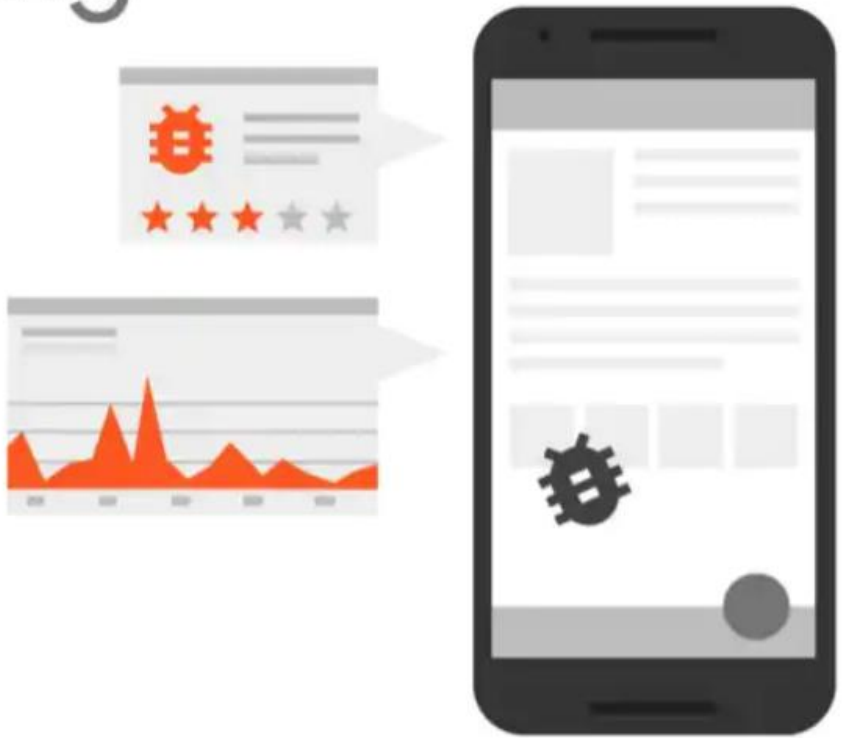
Crash Reporting

- See crashes & impact
- Version & OS drill-down
- Integrated with Analytics



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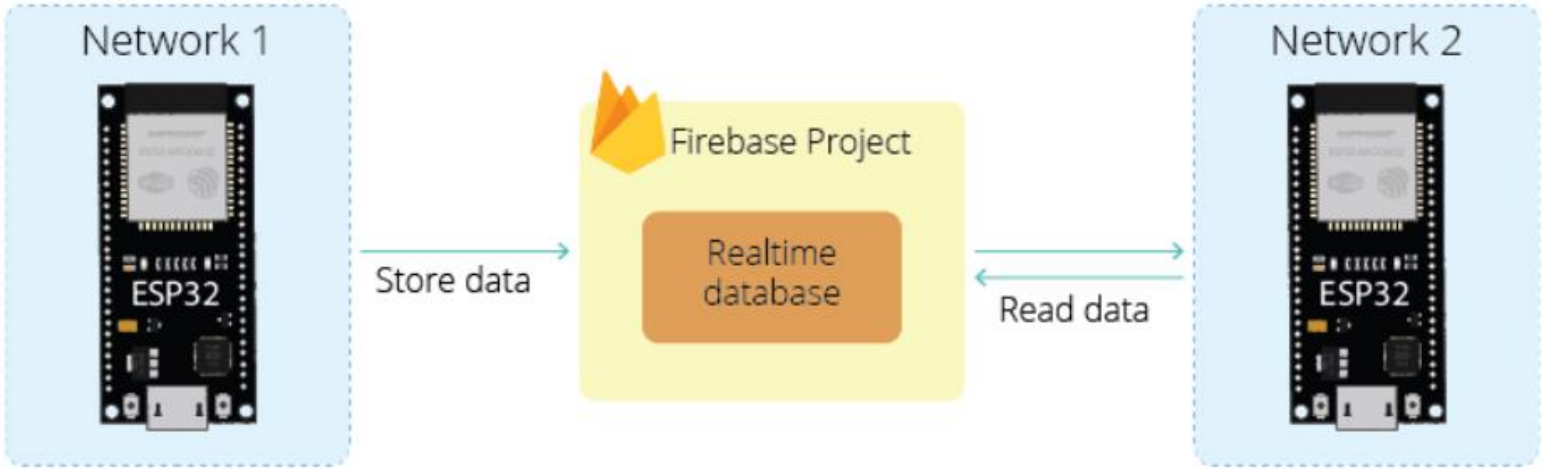
What you can do with Firebase

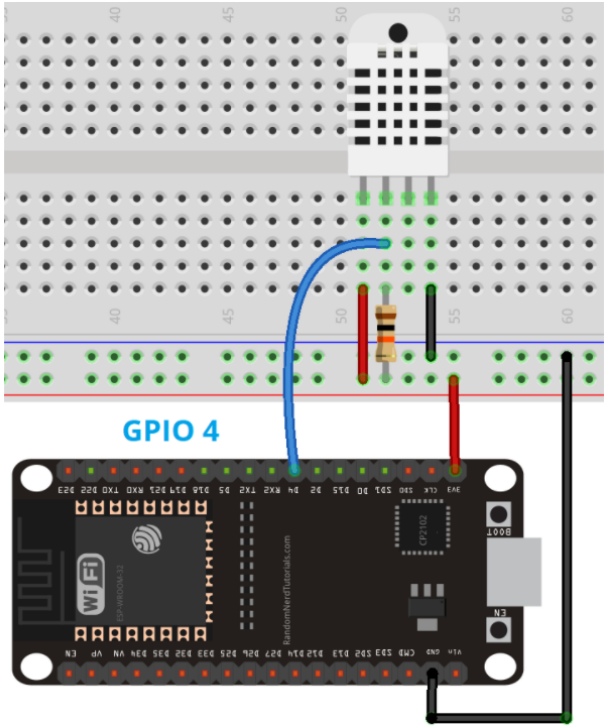


Parts Required

- ✓ ESP32
- ✓ DHT11

The following table shows the DHT22/DHT11 pinout. When the sensor is facing you, pin numbering starts at 1 from left to right

DHT pin	Connect to
1	3.3V
2	Any digital GPIO; also connect a 10k Ohm pull-up resistor
3	Don't connect
4	GND



Project Overview

In this tutorial, you'll learn how to create a Firebase project with a realtime database and store and read data from the database using the ESP32.

To follow this project, first, you need to set up a Firebase project and create a realtime database for that project. Then, you'll program the ESP32 to store and read data from the database. This tutorial is divided into two sections.

1. Create a Firebase Project
2. ESP32: Store data to the Firebase Realtime Database

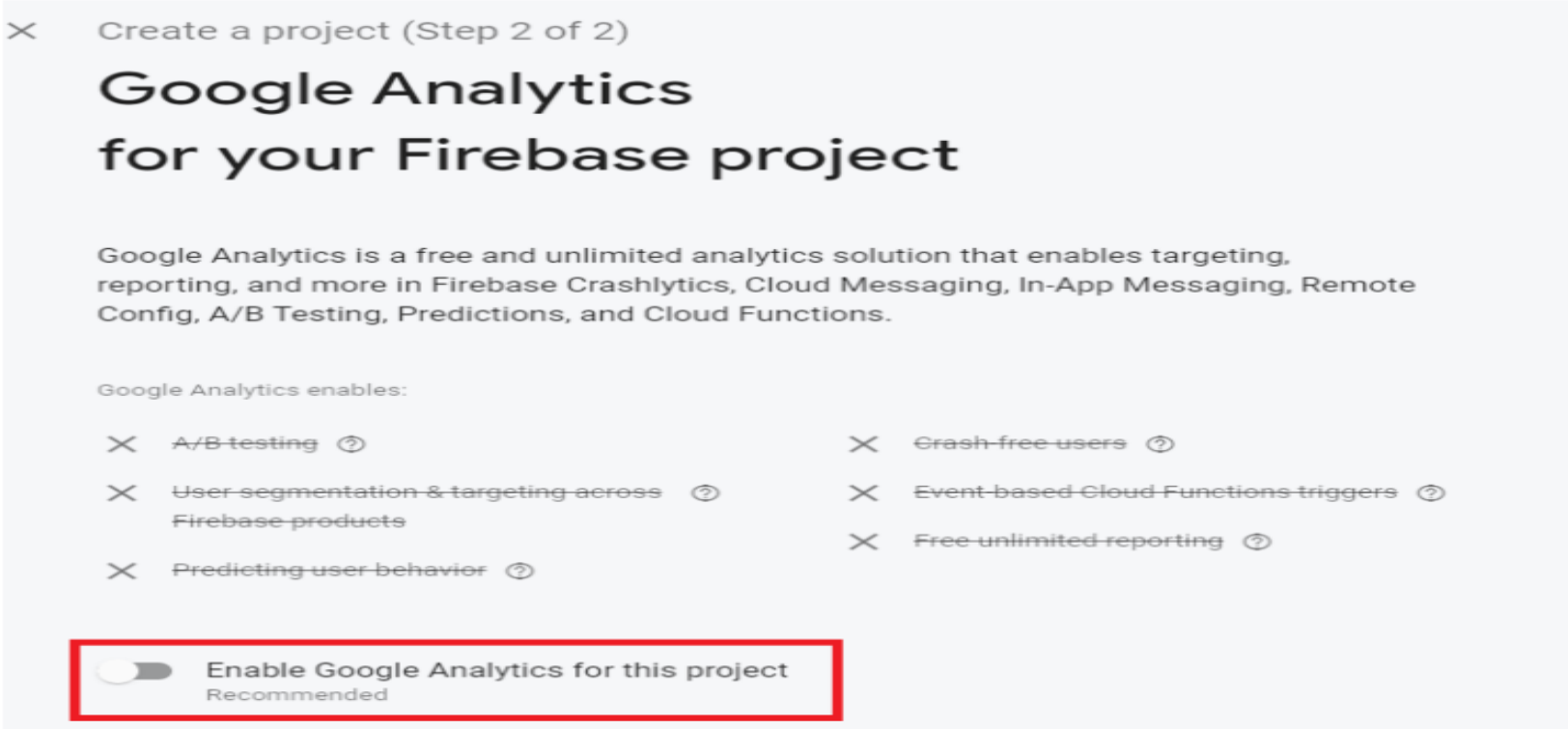
1.Create a New Project

Follow the next instructions to create a new project on Firebase.

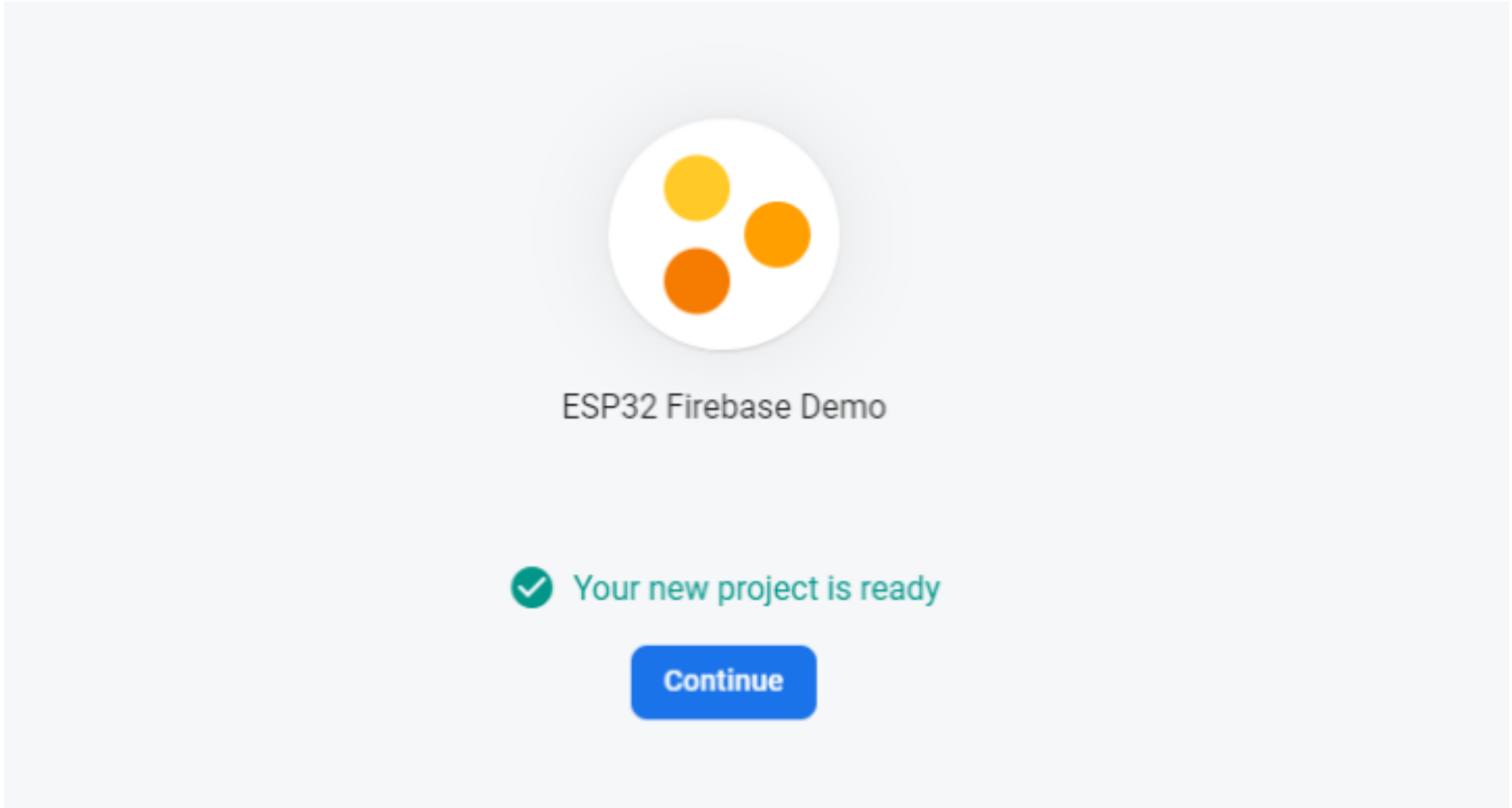
1. Go to **Firebase** and sign in using a Google Account.
2. Click *Get Started*, and then *Add project* to create a new project.
3. Give a name to your project, for example: *ESP32 Firebase Demo*.

https://firebase.google.com/

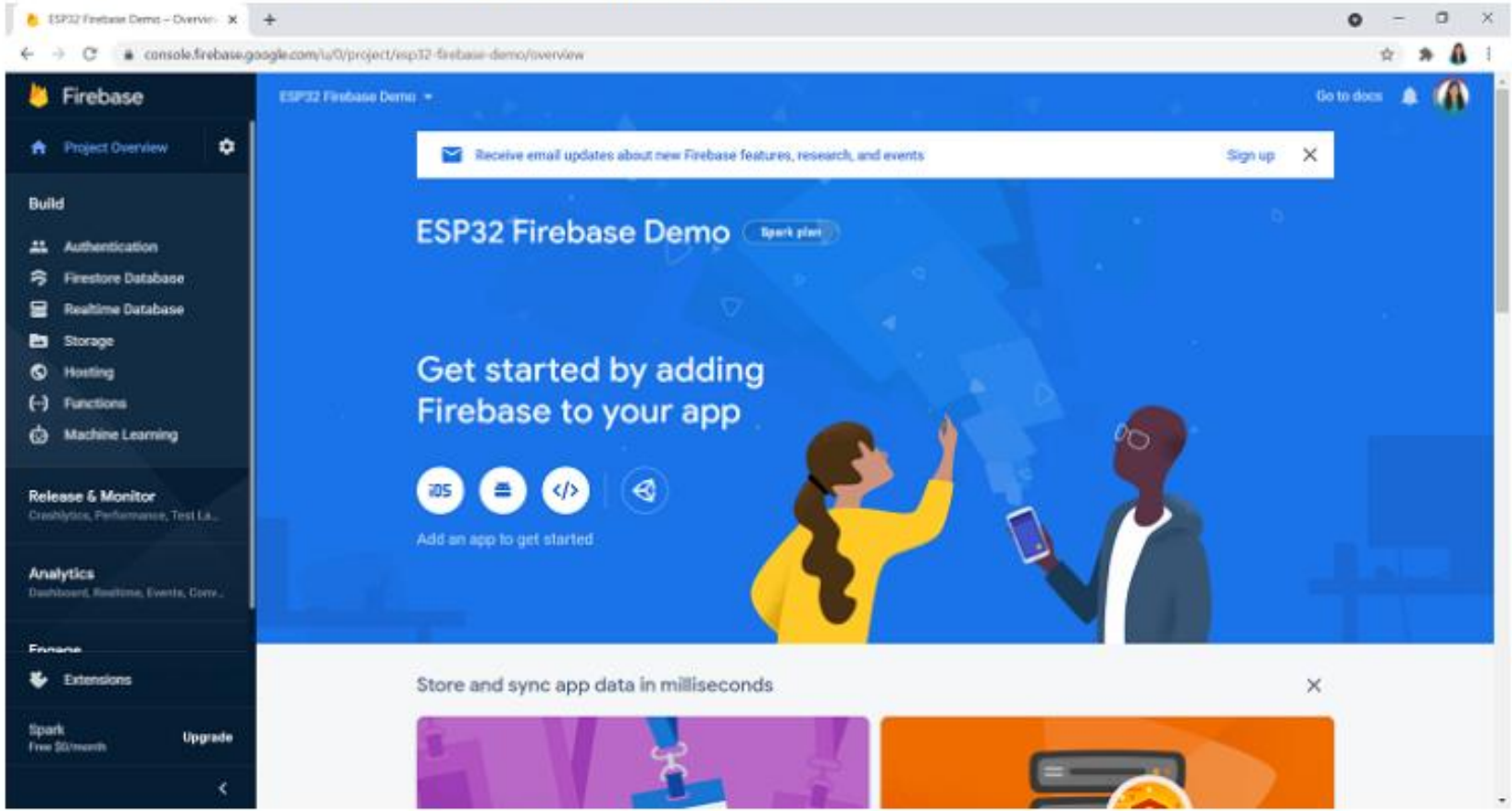
4. Disable the option *Enable Google Analytics* for this project as it is not needed and click *Create project*.



5. It will take a few seconds setting up your project. Then, click *Continue* when it's ready.



6. You'll be redirected to your Project console page.

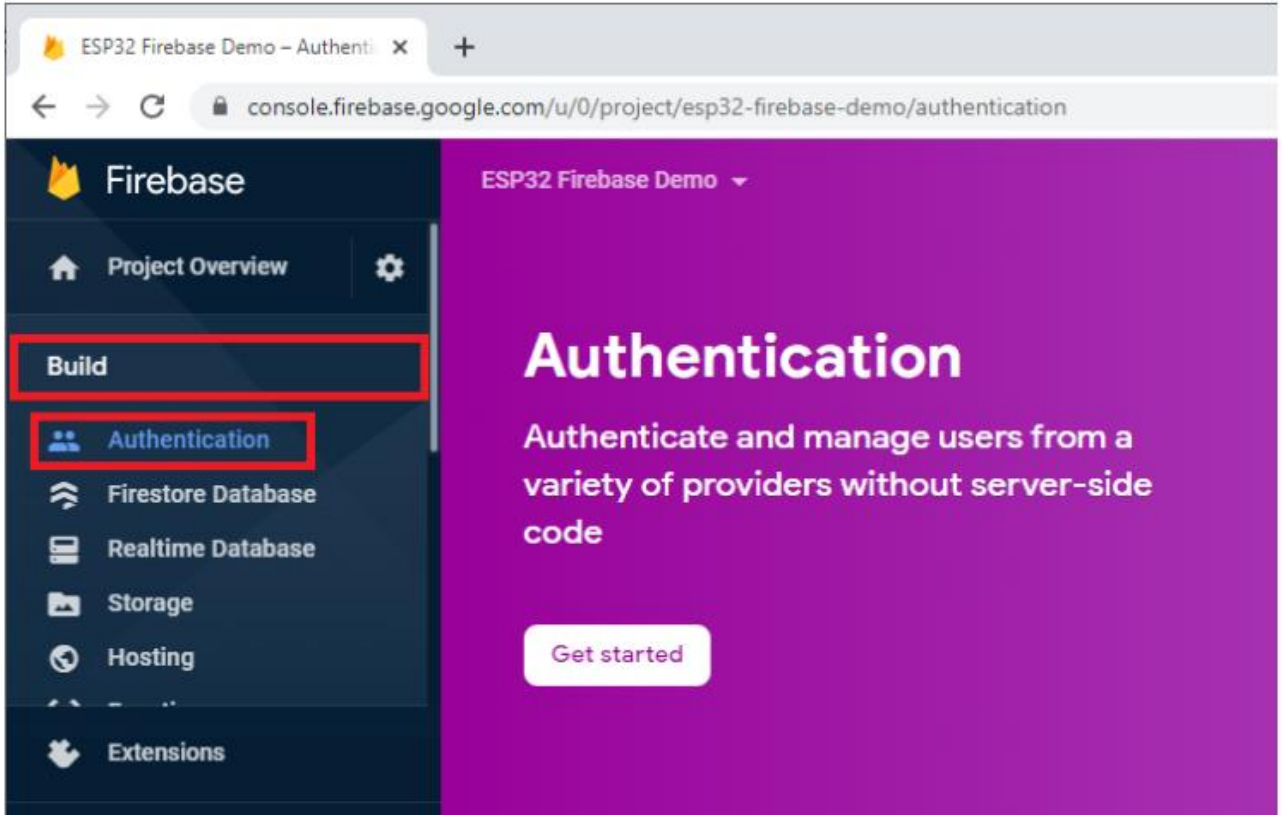


2. Set Authentication Methods

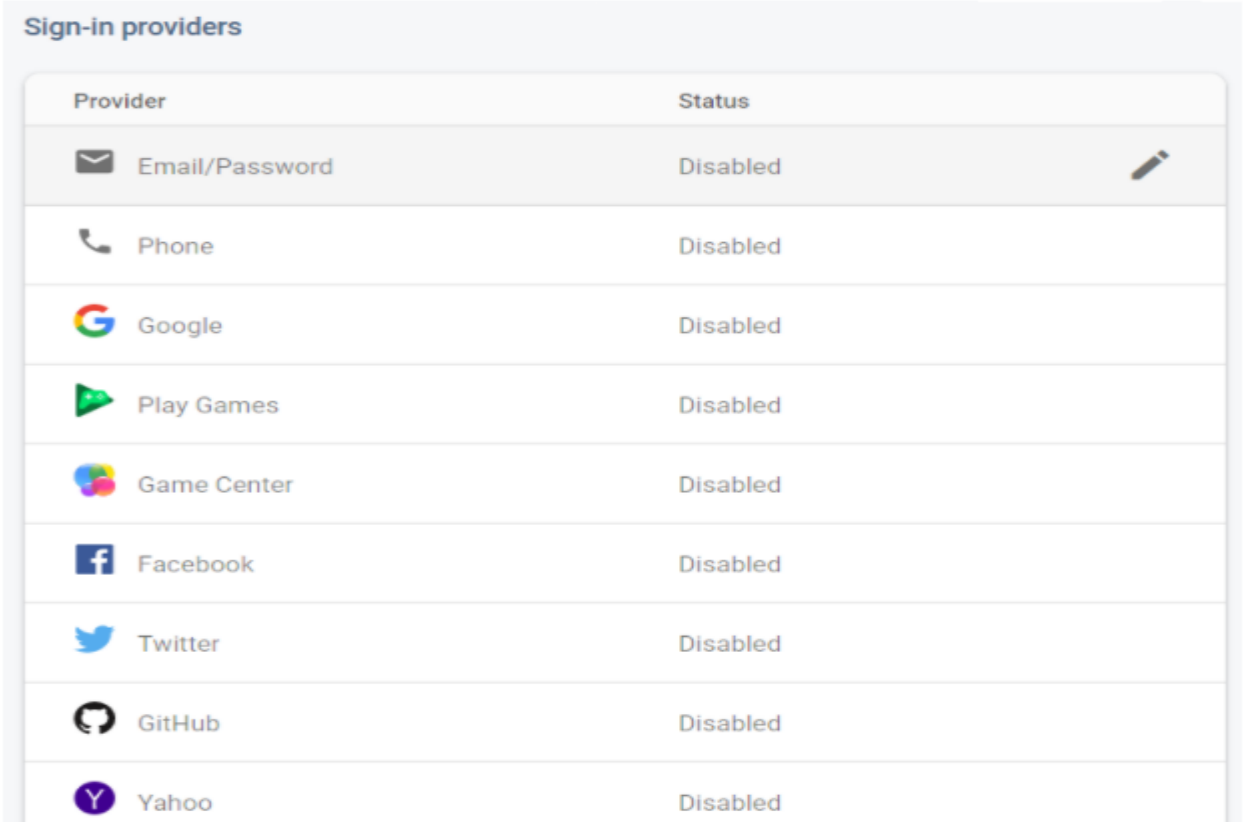
You need to set authentication methods for your app.

“Most apps need to know the identity of a user. In other words, it takes care of logging in and identify the users (in this case, the ESP32). Knowing a user’s identity allows an app to securely save user data in the cloud and provide the same personalized experience across all of the user’s devices.” To learn more about the authentication methods, you can read the documentation.

1. On the left sidebar, click on *Authentication* and then on *Get started*.



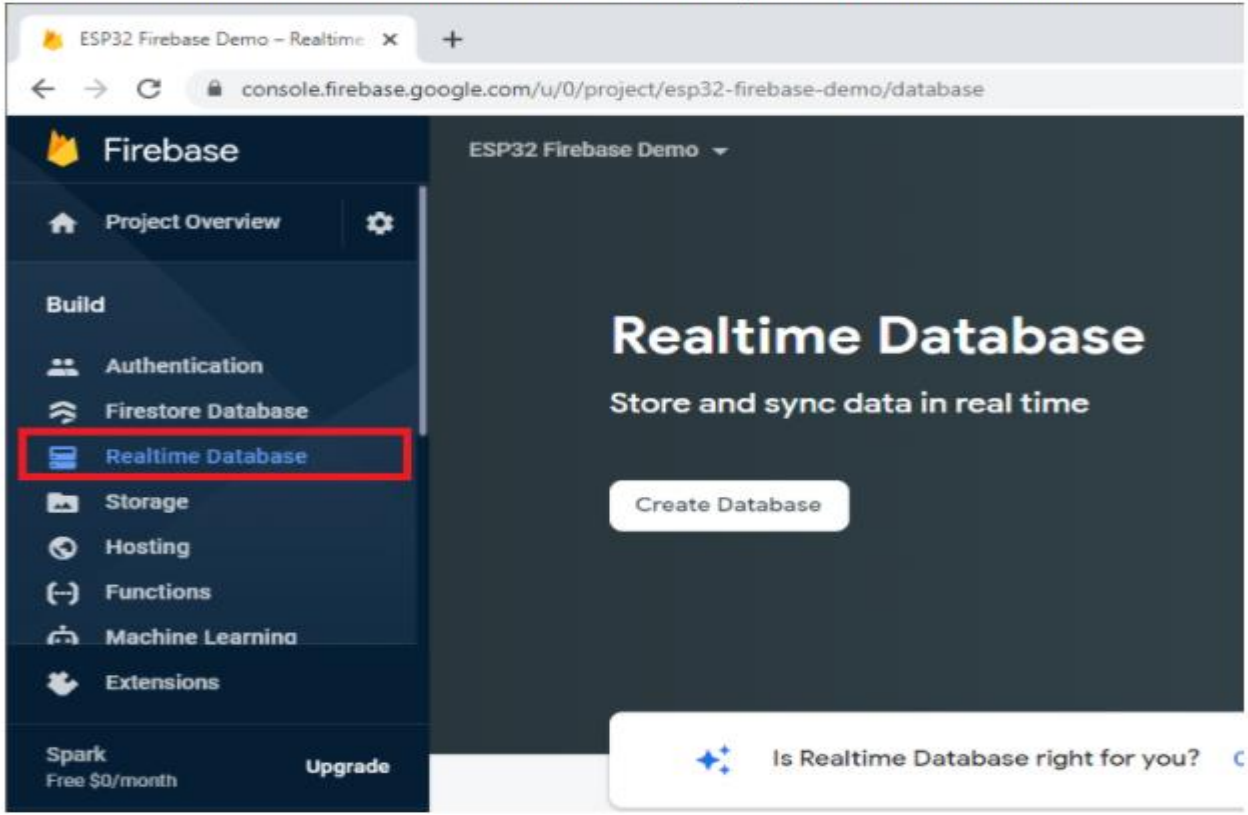
2. There are several authentication methods like email and password, Google Account, Facebook account, and others.



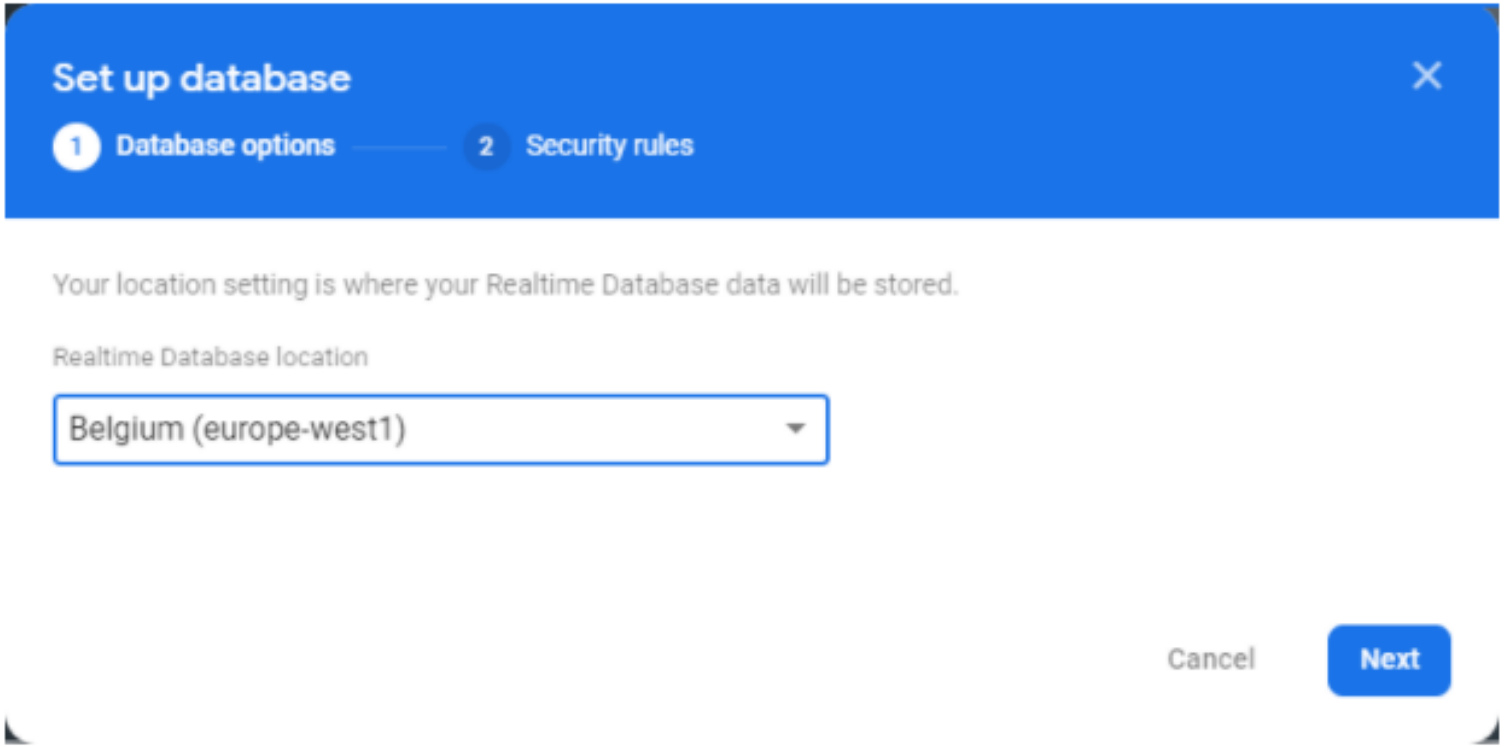
3. Creating a Realtime Database

The next step is creating a Realtime Database for your project. Follow the next steps to create the database.

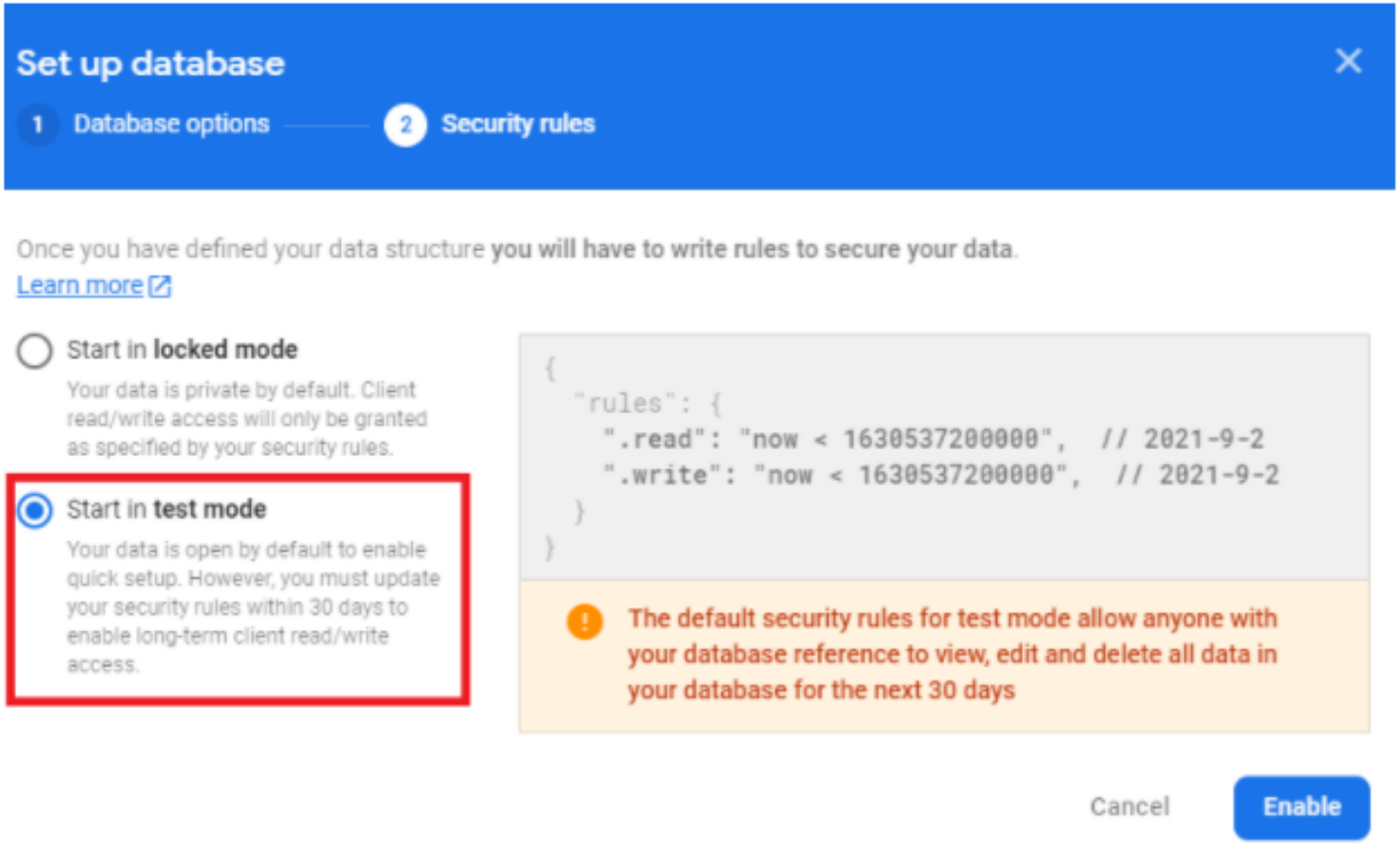
1. On the left sidebar click on *Realtime Database* and then, click on *Create Database*.



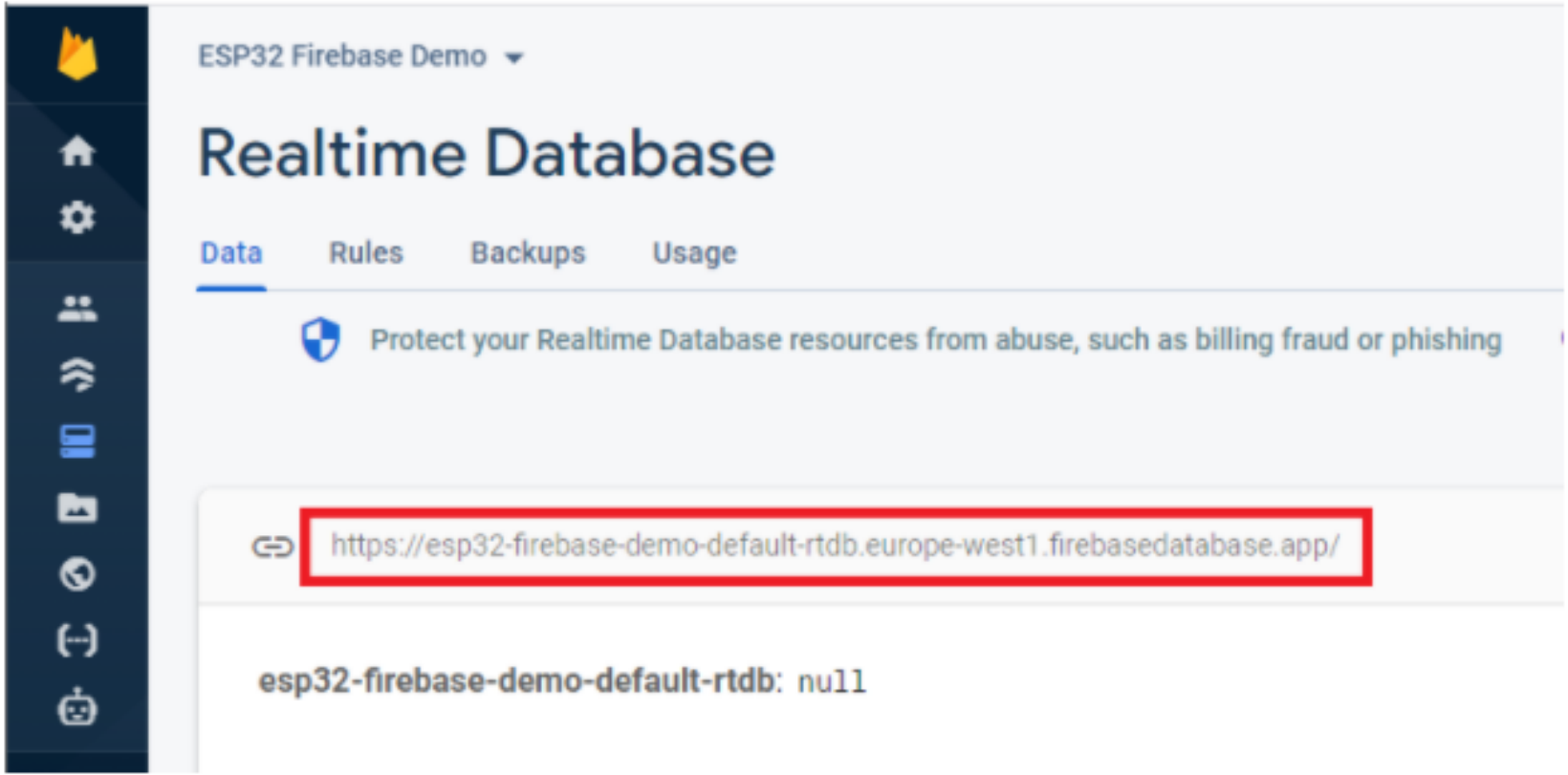
2. Select your database location. It should be the closest to your location.



3. Set up security rules for your database. For testing purposes, select *Start in test mode*. In later tutorials you'll learn how to secure your database using database rules.

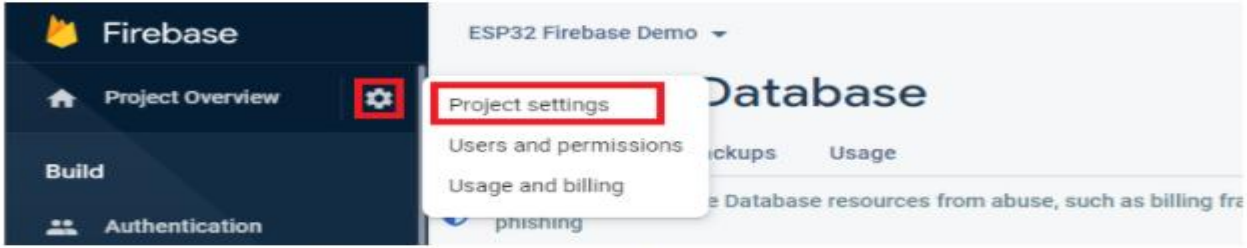


4. Your database is now created. You need to copy and save the database URL—highlighted in the following image—because you'll need it later in your ESP32 code.

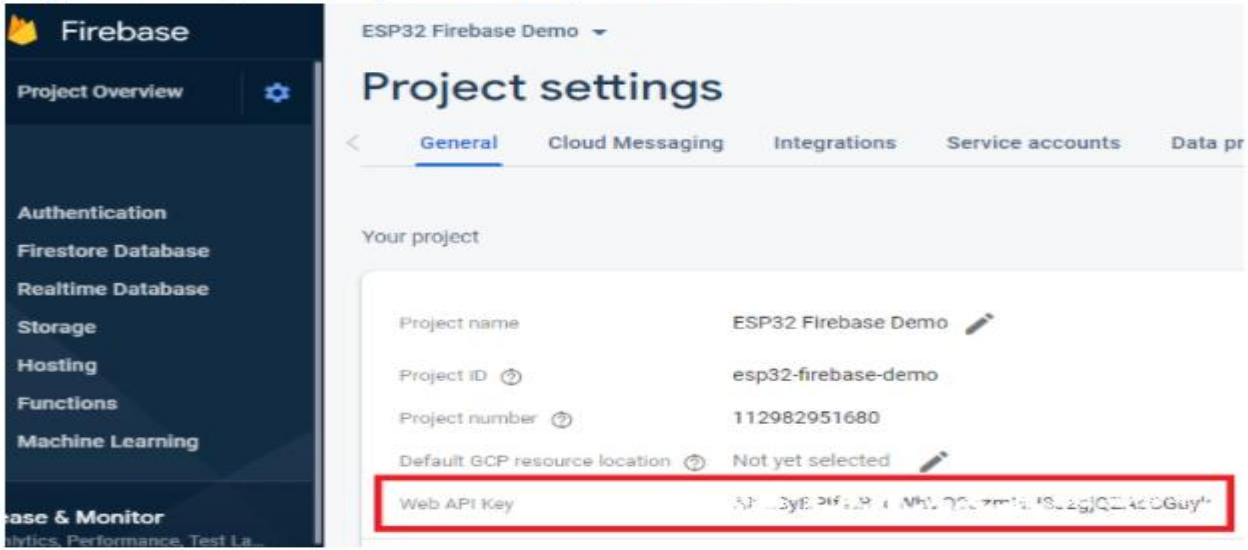


4. Get Project API Key

1. To get your project's API key, on the left sidebar click on *Project Settings*.

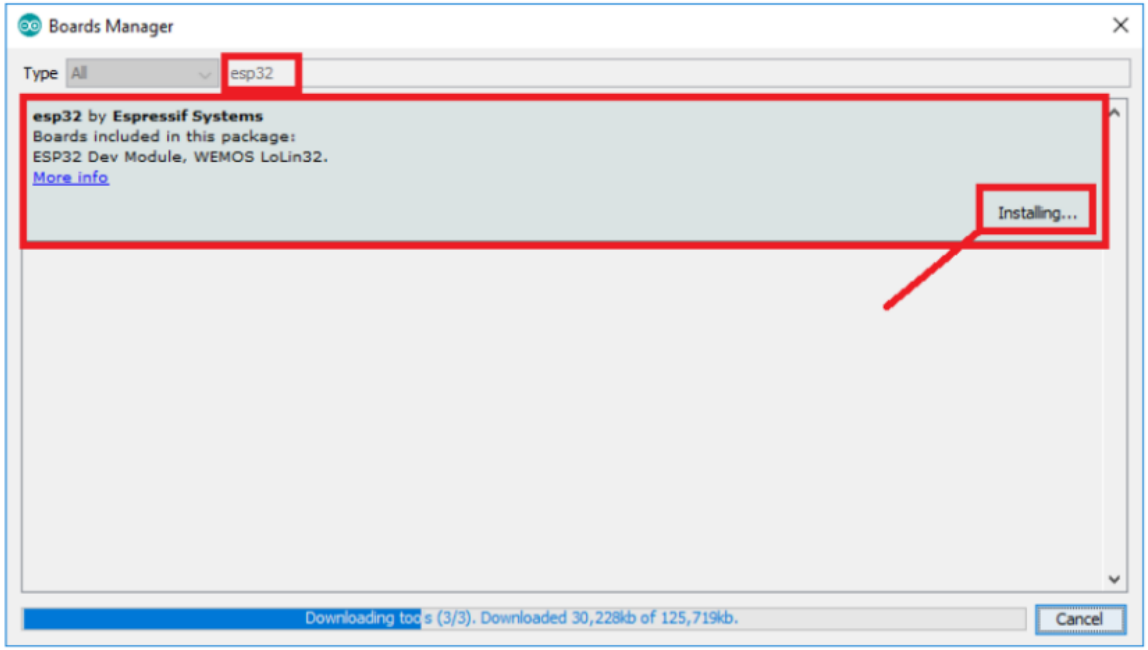


2. Copy the API Key to a safe place because you'll need it later.



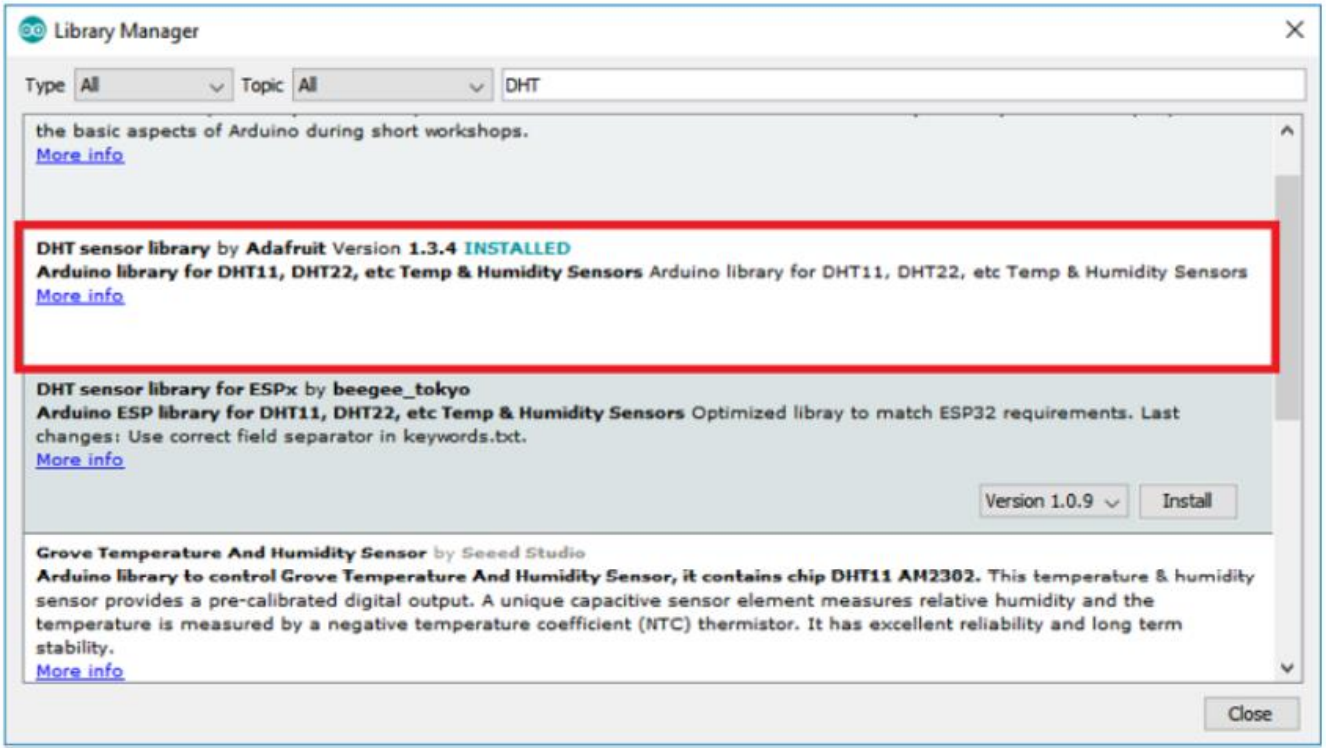
Install ESP32 in Board Manager

4. Search for **ESP32** and press install button for the "**ESP32 by Espressif Systems**":



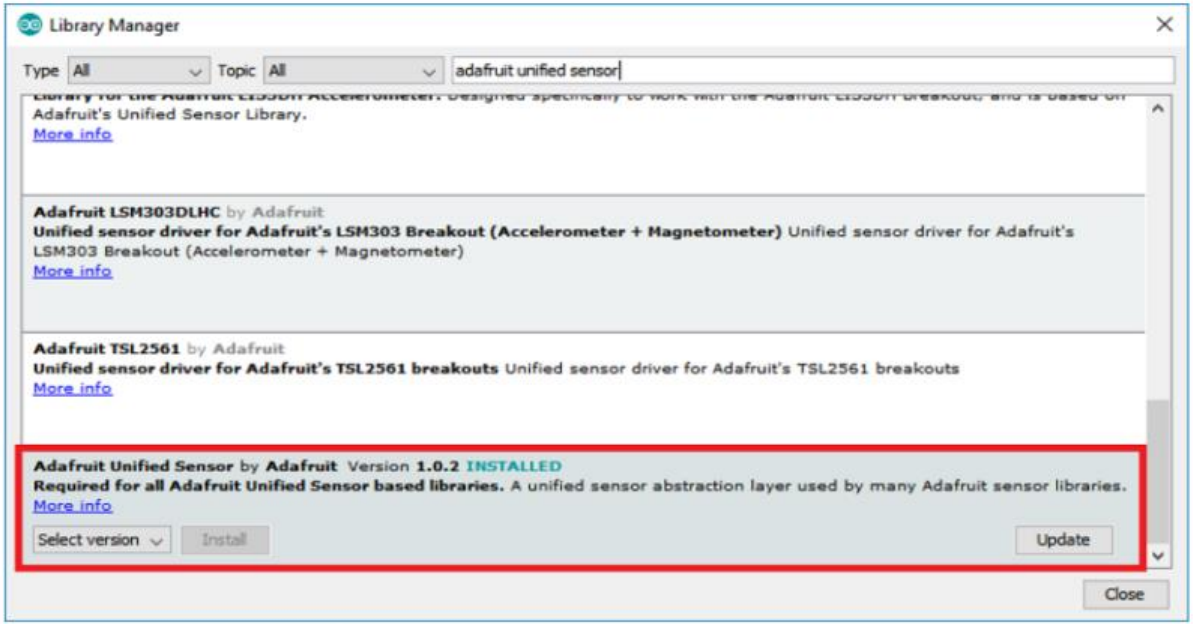
Library required

Search for “**DHT**” on the Search box and install the DHT library from Adafruit.



Library required

After installing the DHT library from Adafruit, type "**Adafruit Unified Sensor**" in the search box. Scroll all the way down to find the library and install it.



- After installing the libraries, restart your Arduino IDE.

Installation – Arduino IDE

If you're using Arduino IDE, follow the next steps to install the library.

1. Go to **Sketch** > **Include Library** > **Manage Libraries**
2. Search for *Firebase ESP Client* and install the *Firebase Arduino Client Library for ESP8266 and ESP32* by Mobitz.

Note: We are using version 2.3.7. If you have issues compiling your code with more recent versions of the library, downgrade to version 2.3.7.

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