Deploy a Backend API (Firebase) to Netlify

Building a Scalable Backend API with Serverless Functions

Building a backend API with Netlify functions (on top of AWS Lambda functions), Node.js, Express, and PostgreSQL can be a powerful and efficient way to create scalable and cost-effective applications.

With the right tools and techniques, developers can create robust and flexible APIs that can be easily deployed and managed on the cloud.

Project Description

In this project, we'll create and deploy a Node.js web application on Netlify that incorporates CRUD (Create, Read, Update, Delete) functionality. We'll leverage Firebase Firestore, a flexible and scalable NoSQL database, as our data storage solution. This app will serve as a practical demonstration of building a dynamic web application, showcasing how to interact with a real-time database and providing a seamless user experience.

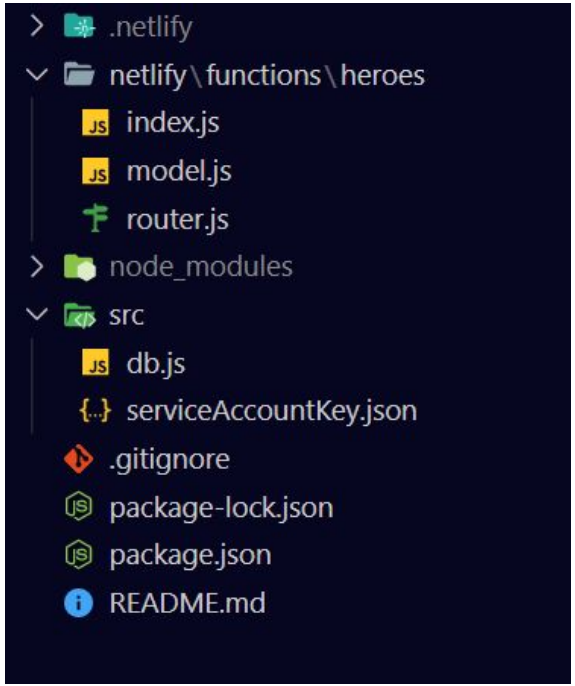
Project Structure

This project follows a structured layout to efficiently organize its components, backend logic, and deployment setup. Here's a breakdown of the main directories and files within the project:

.netlify: This directory contains configuration files and settings specific to Netlify deployment.

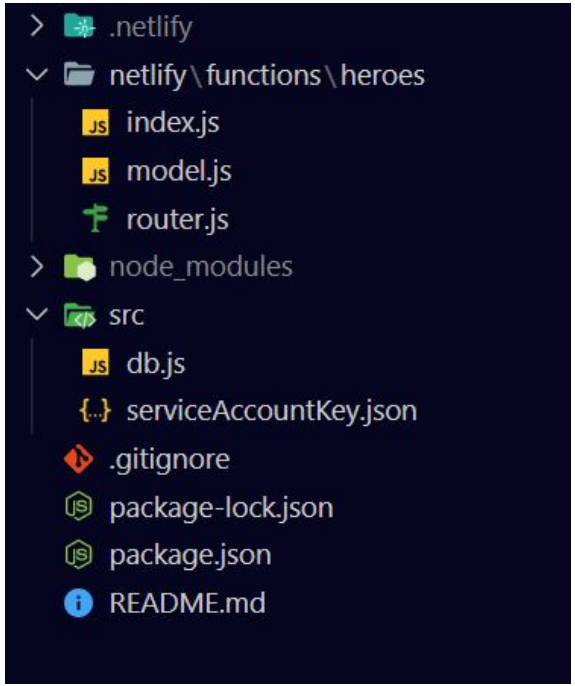
netlify/functions/heroes: This directory houses the backend functionalities of the application related to managing heroes. It's organized into separate files to ensure modular and maintainable code.

- index.js: This file serves as the entry point for the Netlify serverless functions related to heroes. It's responsible for routing incoming requests to appropriate routes using the Express.js framework.
- model.js: Here, you define the data model and interact with the database. This file encapsulates functions for CRUD operations on heroes, interacting with the database, and handling Firestore queries.
- router.js: This file defines the API routes that correspond to different CRUD operations. It uses Express.js to create a router that maps HTTP requests to specific model functions.



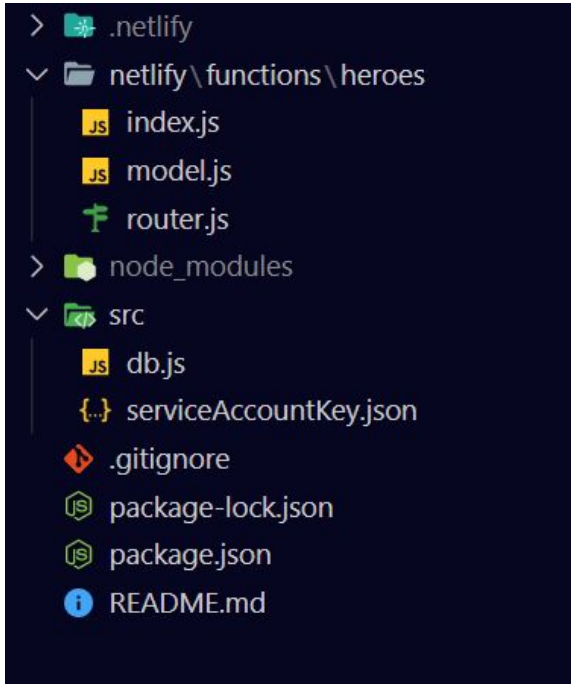
Project Structure

- node_modules: This directory contains the external libraries and dependencies required for the project. It's managed by npm and stores packages used in the application.
- src/db.js: This file establishes the connection to the Firebase Firestore database. It initializes the Firebase Admin SDK with the provided service account key, allowing the app to communicate with the Firestore database.
- src/serviceAccountKey.json: This JSON file contains the service account key required to authenticate the app with Firebase. It provides the necessary credentials to securely access the Firestore database.



Project Structure

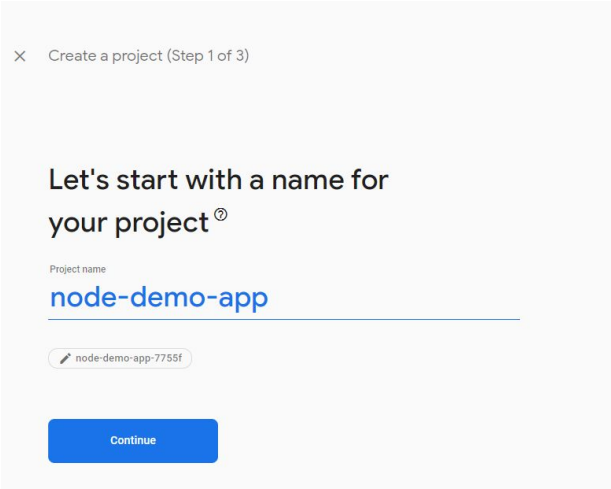
- .gitignore: The .gitignore file specifies which files and directories should be excluded from version control. It ensures sensitive or unnecessary files aren't committed to the repository.
- package-lock.json: This file is generated by npm and includes metadata about the project's dependencies and their versions. It ensures consistent installations across different environments.
- package.json: The package.json file holds metadata about the project and its dependencies. It also includes scripts, version information, and project settings.
- README.md: The README file provides essential information about the project. It explains how to set up, install dependencies, run the application, and provides a brief overview of its structure and features.

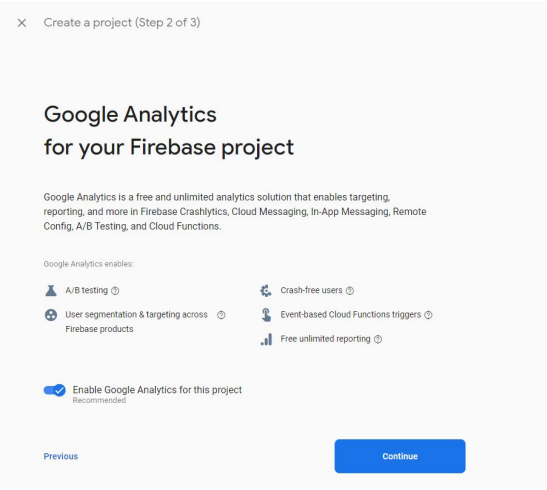


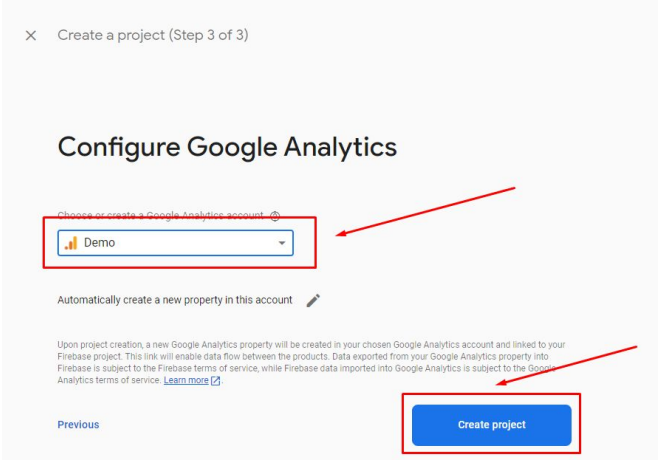
Set Up Firebase Project

- Go to the Firebase Console (https://console.firebase.google.com/).
- Create a new project

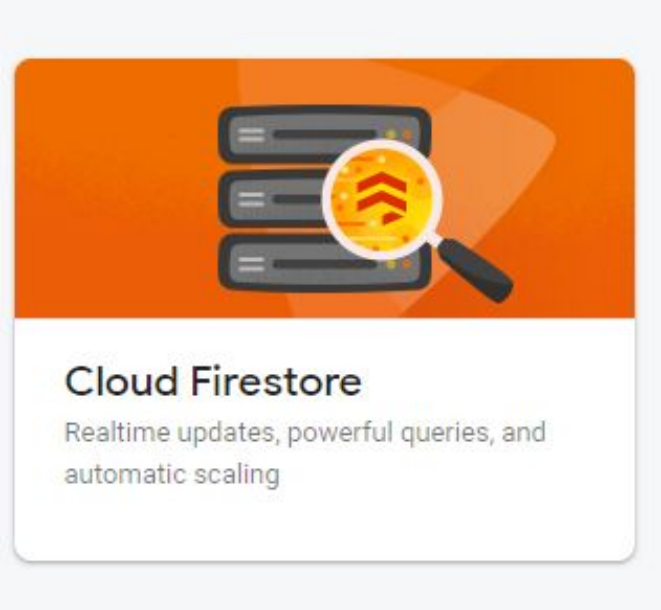
Create a new project





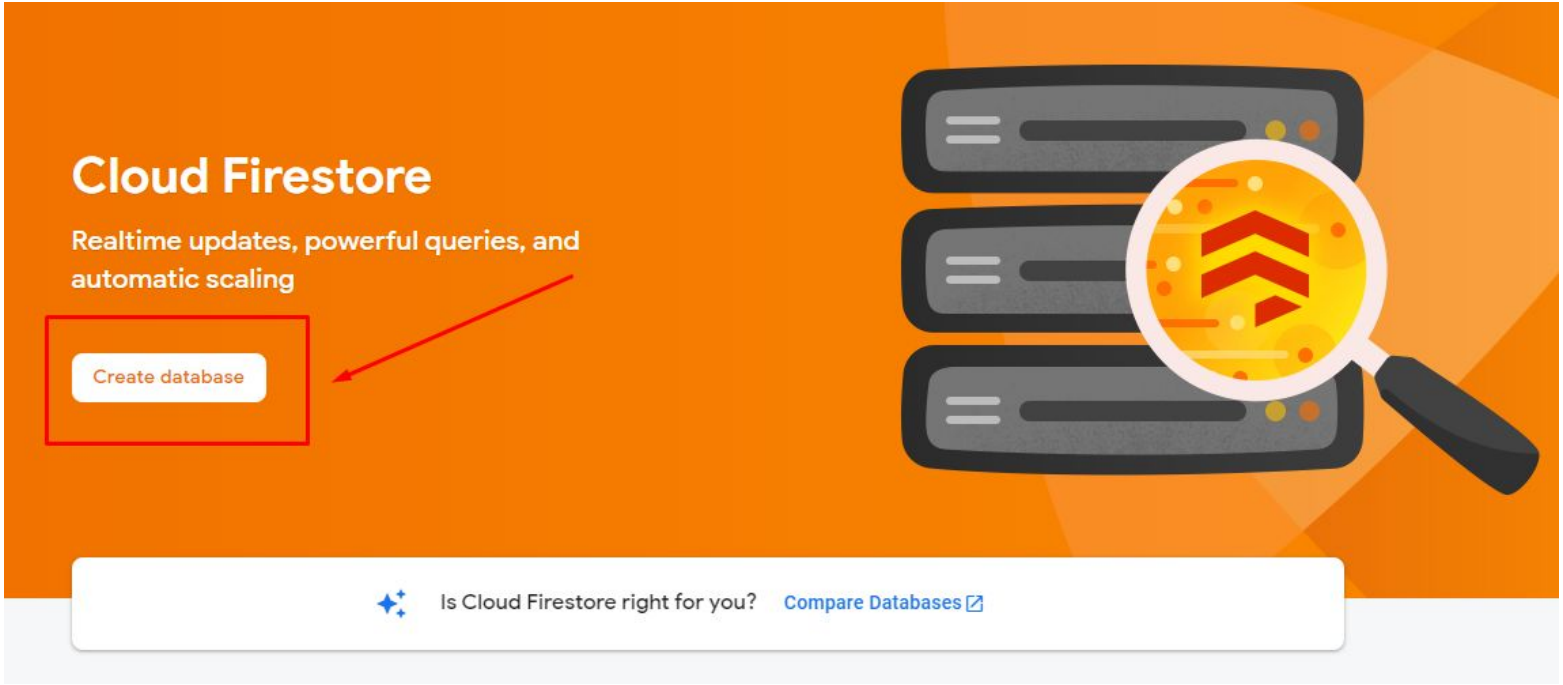


Choose a Database

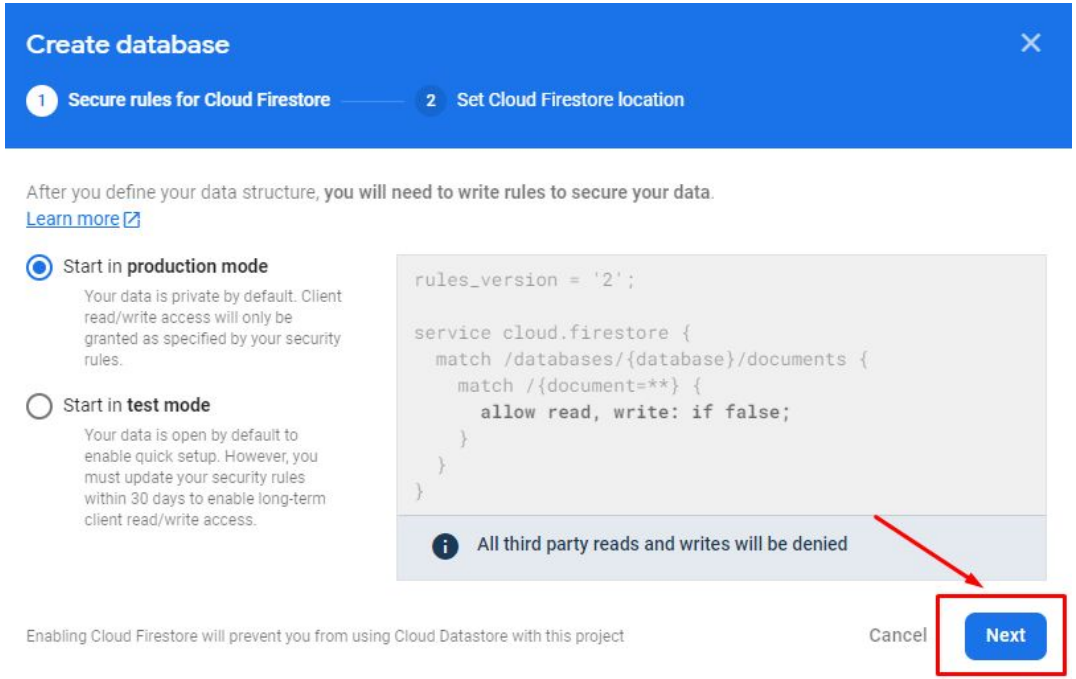


Cloud Firestore is a flexible, scalable, and fully managed NoSQL database service provided by Google Cloud. It allows developers to easily store, manage, and synchronize data for web and mobile applications. With real-time capabilities, Cloud Firestore enables seamless data synchronization across devices and provides a reliable and secure solution for building modern and responsive applications. Its flexible data model, automatic scaling, and comprehensive querying capabilities make it suitable for a wide range of use cases, from small applications to large-scale, globally distributed projects.

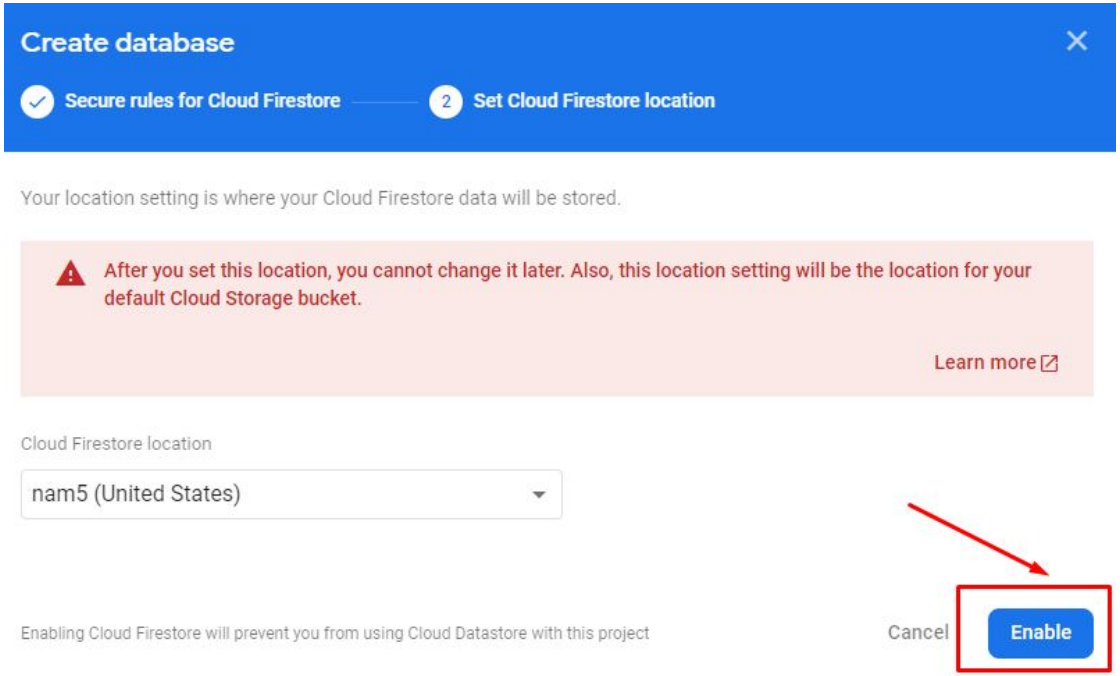
Create database



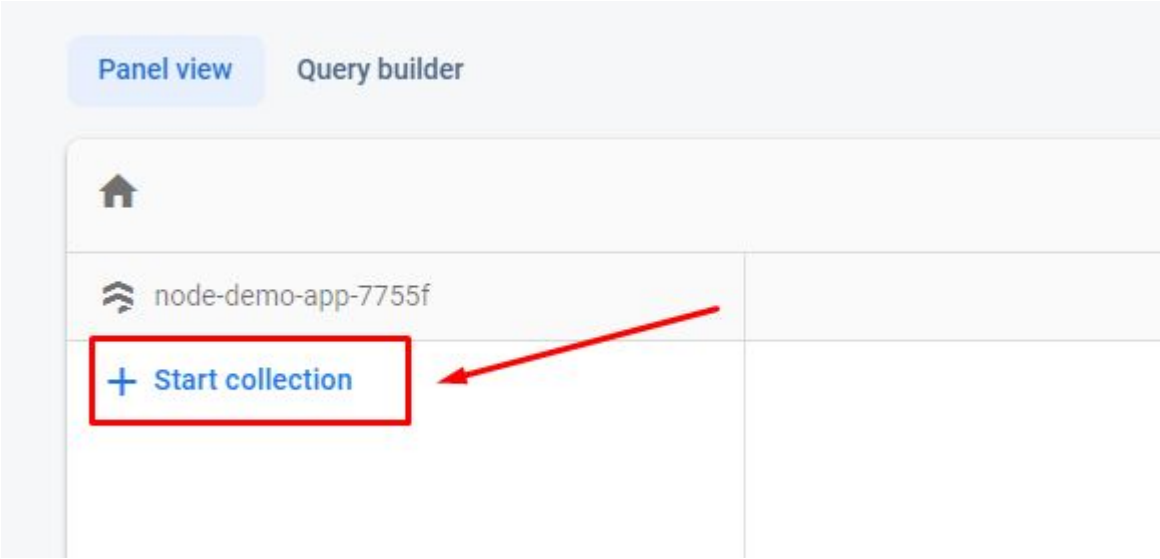
Create database



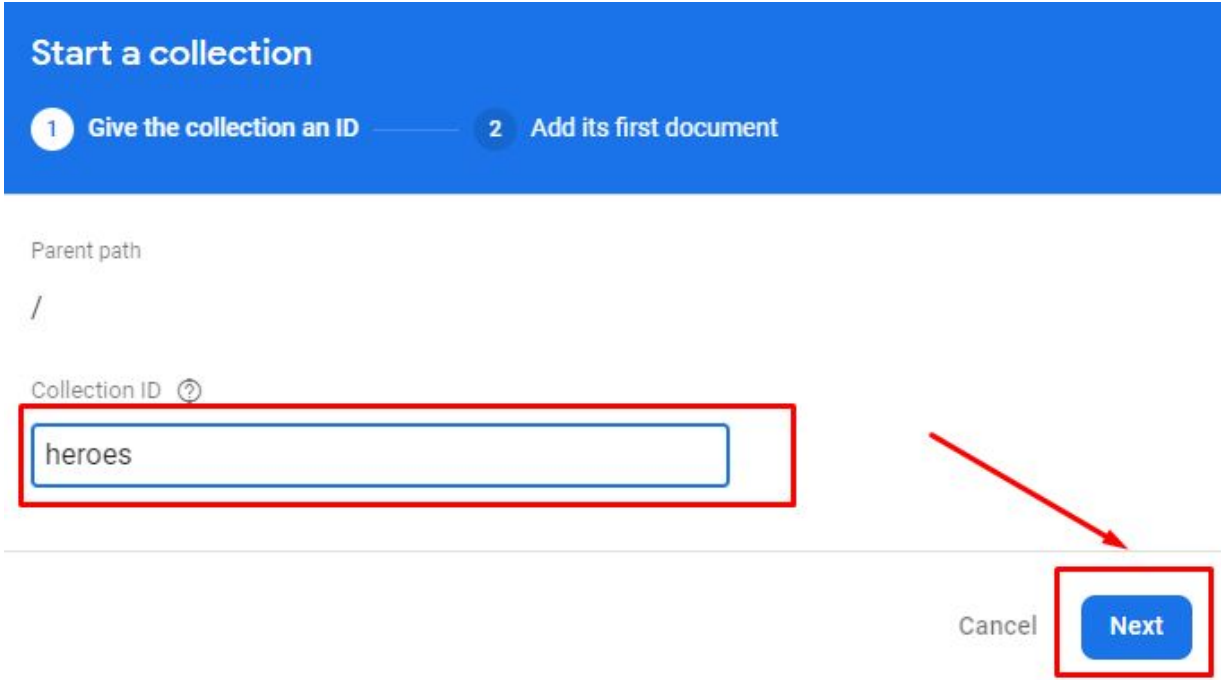
Create database



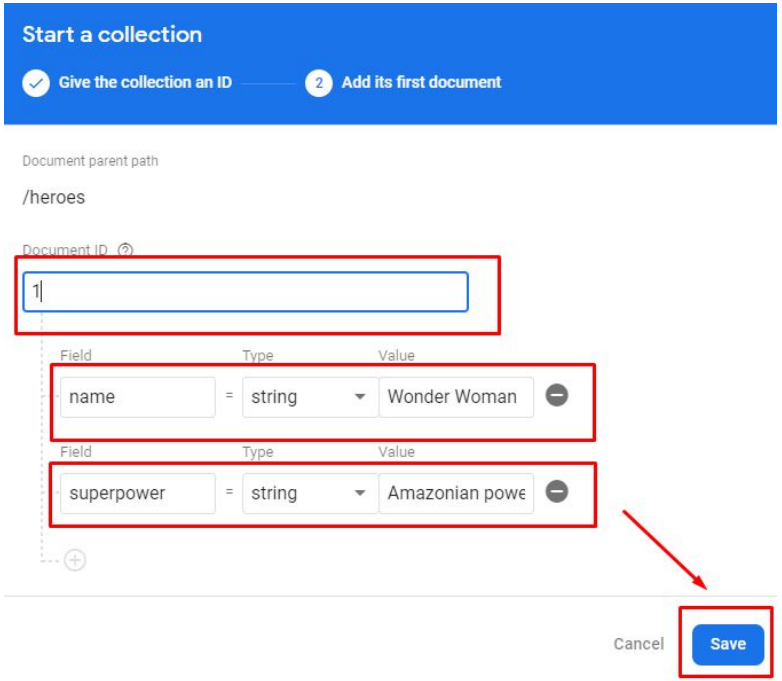
Add new collection



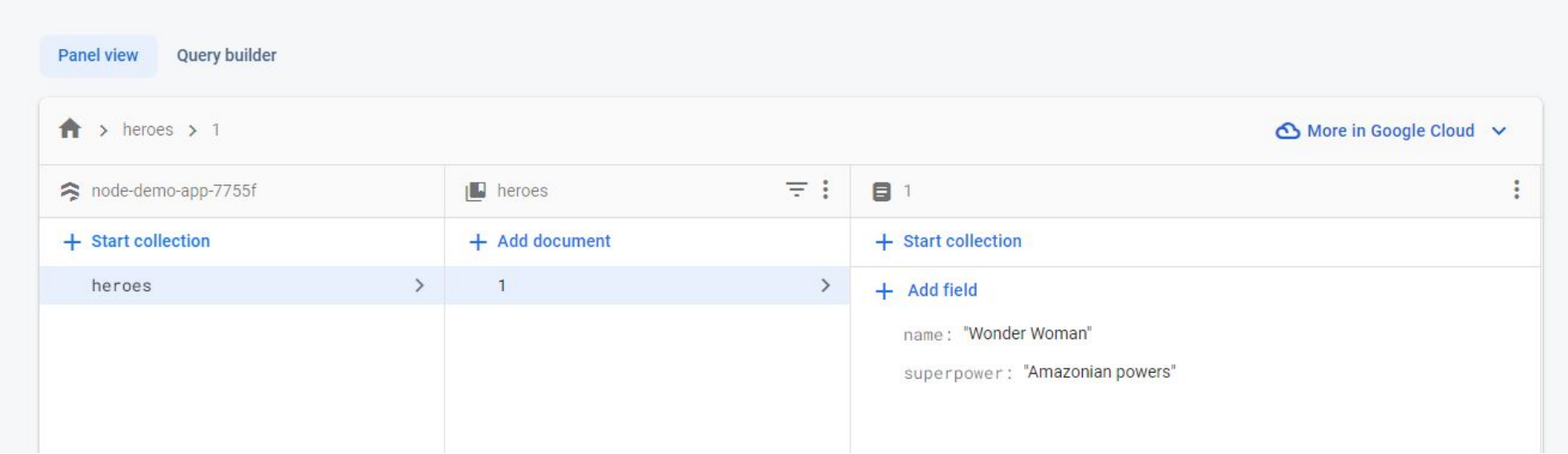
Add new collection



Add new Document

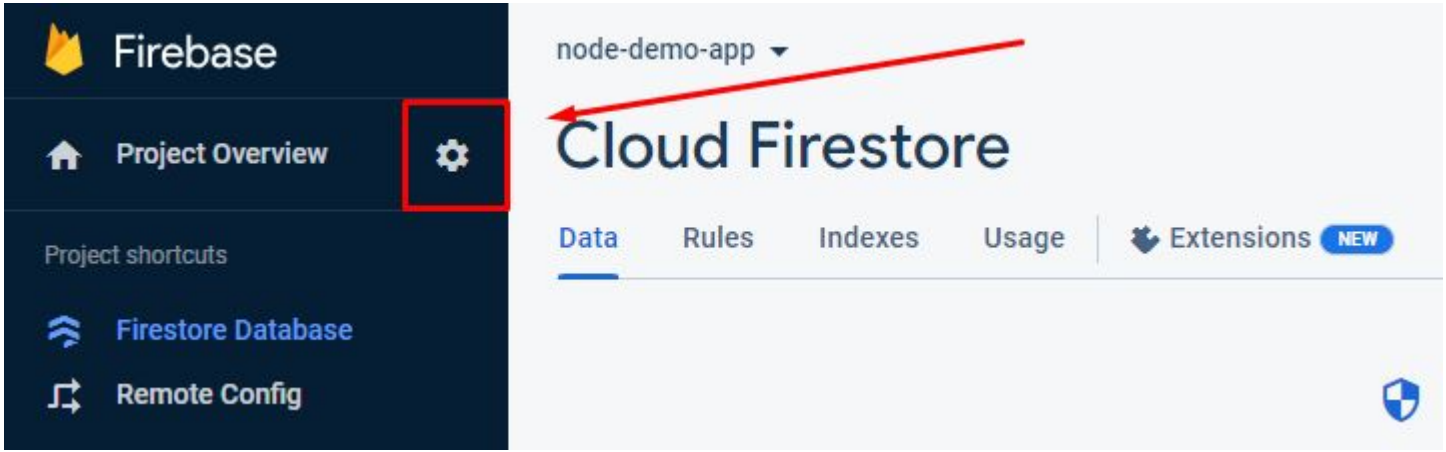


Add new Document



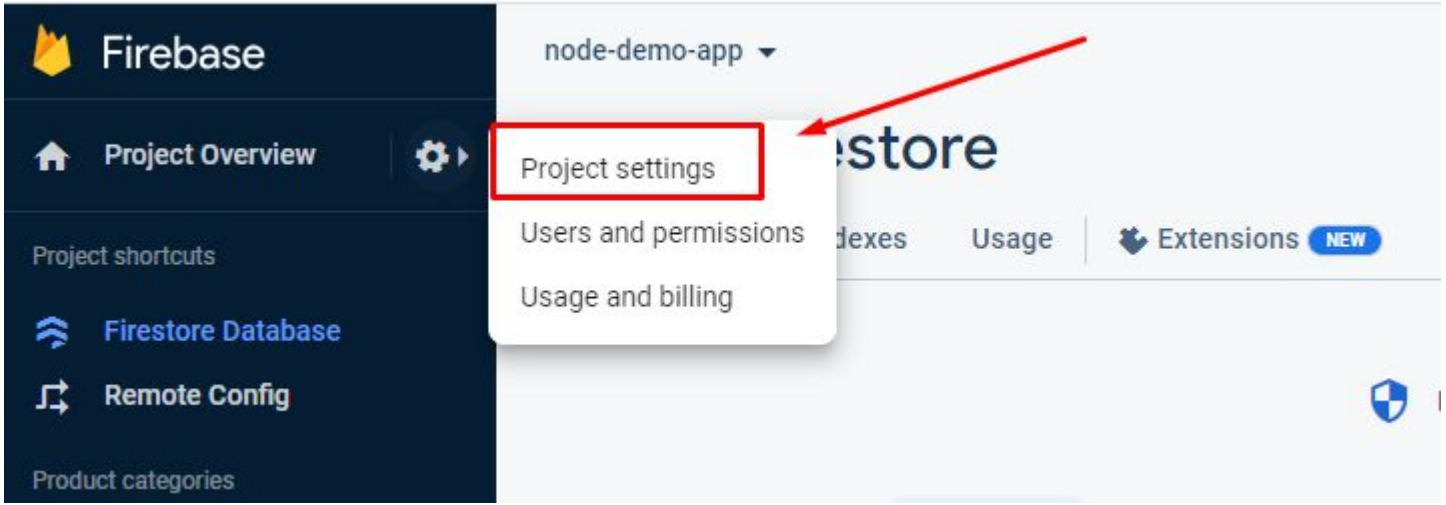
Generate and upload serviceAccountKey.json file

Go to the Firebase Console: Open the Firebase Console using the link:
https://console.firebase.google.com/
Select Your Project: If you have multiple projects, make sure you're in the project where you want to integrate Firebase.



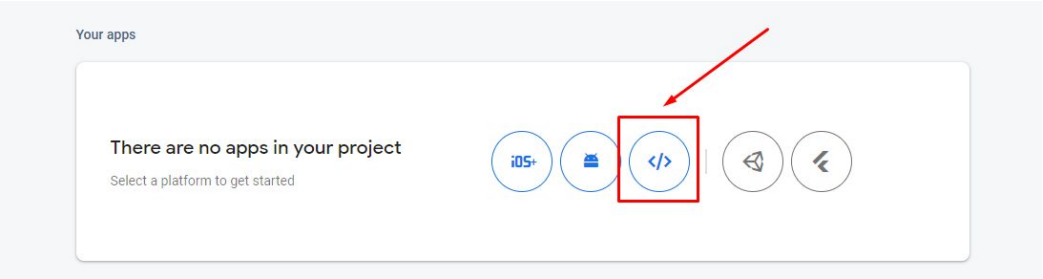
Generate and upload serviceAccountKey.json file

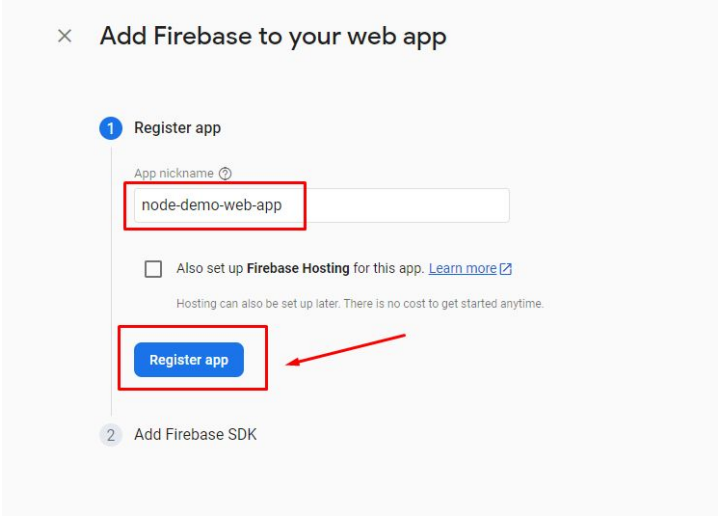
Navigate to Project Settings: Click on the gear icon (settings) at the top of the left sidebar to access your project settings.



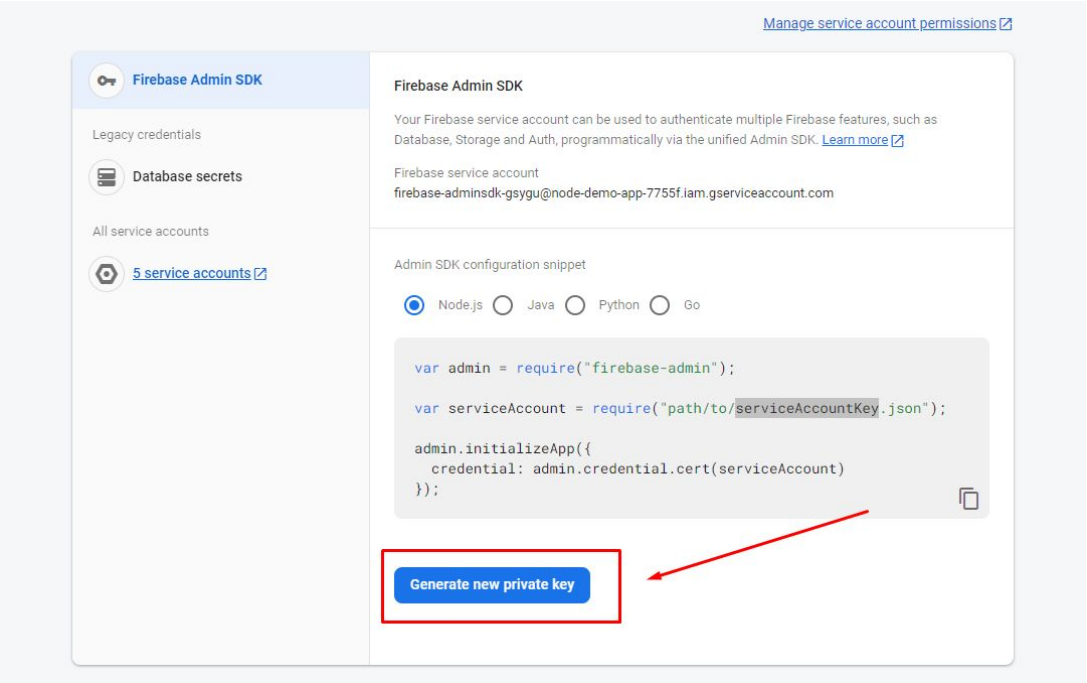
Generate and upload serviceAccountKey.json file

General Tab: In the General tab, you'll see a section called "Your apps" with your Firebase project's Web App. If you haven't created a web app yet, you can do so by clicking "Add app" and selecting "Web."





Generate and upload serviceAccountKey.json file



Go to the Firebase Console, navigate to your project settings, and then to the "Service accounts" tab. There, you can generate a new private key, which will give you a JSON file containing the credentials.

Full Project Code

Creating a Simple Express App for Netlify Serverless Function

This code sets up a simple Express app with two route handlers and exports it as a serverless function that can be deployed on Netlify. When a request is made to one of the defined routes, the app will respond with the appropriate message or data.

To use the code, you need to have the dependencies "express", "serverless-http" and "firebase-admin" installed. To install these dependencies, you can run the following command in your terminal while in the root directory of your project:

```
npm install express serverless-http firebase-admin
```

index.js

netlify > functions > heroes > index.js > ...

```javascript
const express = require('express')
const serverless = require('serverless-http')
const router = require('./router');

require('dotenv').config();

const app = express()

app.use(function (req, res, next) {
  const allowedHosts = ['charming-shortbread-286ef1.netlify.app',
  'main--charming-shortbread-286ef1.netlify.app',
  'localhost:8888'];
  const host = req.headers.host;
  console.log(`host: ${host}`)

  if (allowedHosts.includes(host)) {
    next();
  }
  else {
    return res.status(405).send('Host Not Allowed');
  }
});

app.use(express.json());
app.use('/.netlify/functions', router)

module.exports.handler = serverless(app)
```

model.js

netlify > functions > heroes > model.js > getHeroesModel

```
1   const firestore = require('../../../src/db'); // Adjust the path as needed
2
3   const getHeroesModel = () => {
4     return {
5       findAll: async (callback) => {
6         try {
7           const snapshot = await firestore.collection('heroes').get();
8           const heroes = snapshot.docs.map((doc) => {
9             const data = doc.data();
10            data.id = doc.id; // Add the id field to the data
11            return data;
12          });
13          callback(heroes);
14        } catch (err) {
15          console.error('Firestore query error:', err.message);
16          callback([]);
17        }
18      },
19      create: async (name, superPower, callback) => {
20        try {
21          await firestore.collection('heroes').add({
22            name,
23            superPower,
24          });
25          callback(null, 'Hero created successfully');
26        } catch (err) {
27          console.error('Firestore query error:', err.message);
28          callback('Error creating hero');
29        }
30      },
31
```

model.js

```
33      update: async (id, name, superPower, callback) => {
34        try {
35          await firestore.collection('heroes').doc(id).update({
36            name,
37            superPower,
38          });
39          callback(null, 'Hero updated successfully');
40        } catch (err) {
41          console.error('Firestore query error:', err.message);
42          callback('Error updating hero');
43        }
44      },
45
46      delete: async (id, callback) => {
47        try {
48          await firestore.collection('heroes').doc(id).delete();
49          callback(null, 'Hero deleted successfully');
50        } catch (err) {
51          console.error('Firestore query error:', err.message);
52          callback('Error deleting hero');
53        }
54      },
55    };
56  };
57
```

router.js

netlify > functions > heroes > router.js > router.put('/heroes/:id') callback

```
1   const express = require('express')
2   const getHeroesModel = require('./model');
3   const router = express.Router()
4
5   router.get('/heroes', async (req, res) => {
6     const HeroModel = getHeroesModel();
7
8     HeroModel.findAll((heroes) => {
9         res.status(200).json(heroes);
10    });
11  });
12  router.post('/heroes', async (req, res) => {
13    const { name, superPower } = req.body;
14
15    if (!name || !superPower) {
16      return res.status(400).json({ message: 'Name and superPower are required' });
17    }
18
19    const HeroModel = getHeroesModel(); // Initialize the model
20
21    HeroModel.create(name, superPower, (err, message) => {
22      if (err) {
23        console.error(err);
24        return res.status(500).json({ message: 'Error creating hero' });
25      }
26
27      return res.status(201).json({ message: 'Hero created successfully' });
28    });
29  });
```

router.js

```
31  router.put('/heroes/:id', async (req, res) => {
32    const { id } = req.params;
33    const { name, superPower } = req.body;
34    if (!name || !superPower) {
35      return res.status(400).json({ message: 'Name and superPower are required' });
36    }
37    const HeroModel = getHeroesModel(); // Initialize the model
38    HeroModel.update(id, name, superPower, (err, message) => {
39      if (err) {
40        console.error(err);
41        return res.status(500).json({ message: 'Error updating hero' });
42      }
43      return res.status(200).json({ message: 'Hero updated successfully' });
44    });
45  });
46
47  router.delete('/heroes/:id', async (req, res) => {
48    const { id } = req.params;
49    const HeroModel = getHeroesModel(); // Initialize the model
50
51    HeroModeldelete(id, (err, message) => {
52      if (err) {
53        console.error(err);
54        return res.status(500).json({ message: 'Error deleting hero' });
55      }
56      return res.status(200).json({ message: 'Hero deleted successfully' });
57    });
58  });
59
60  module.exports = router;
```

db.js

src > db.js > ...

```
1  const fs = require('firebase-admin');
2  const serviceAccount = require('./serviceAccountKey.json');
3  fs.initializeApp({
4   credential: fs.credential.cert(serviceAccount)
5  });
6
7    const firestore = fs.firestore();
8    module.exports = firestore;
```

Move the previously downloaded serviceAccountKey.json file to the src folder

Netlify CLI

Netlify CLI

To run this project locally, you'll need to have Node.js and the Netlify CLI installed. You can install Node.js from the official website, and you can install the Netlify CLI using NPM:

```
npm install netlify-cli -g
```

```
npm install netlify-cli -g --unsafe-perm=true --allow-root
```

By default, Netlify collects data on usage of Netlify CLI commands, opt out of sharing usage data with the command line:

```
netlify --telemetry-disable
```

Netlify CLI

⚠️ Some users reporting an error related to Execution Policies. This is because the script execution policies in PowerShell may be set to a restricted mode by default, preventing the running of scripts.

```
File C:\Users\your-user-name\AppData\Roaming\npm\netlify.ps1 cannot be loaded because running scripts is disabled
on this system. For more information, see about_Execution_Policies at https:/go.microsoft.com/fwlink/?LinkID=135170.
```

To solve the "Execution Policies" error, you need to run the following command in the Terminal:

```
Set-ExecutionPolicy -Scope CurrentUser -ExecutionPolicy Unrestrict
```

Run the project

Once you have the dependencies installed, you can run the project locally using the following command:

```
netlify dev
```

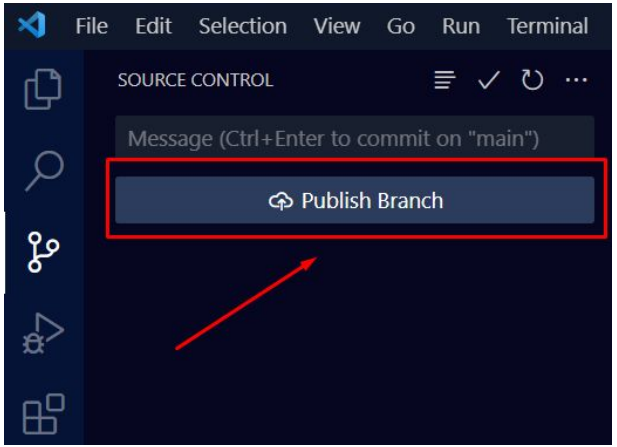
GitHub Repository

Create a Private GitHub Repository for Source Control and Publish Branch

1

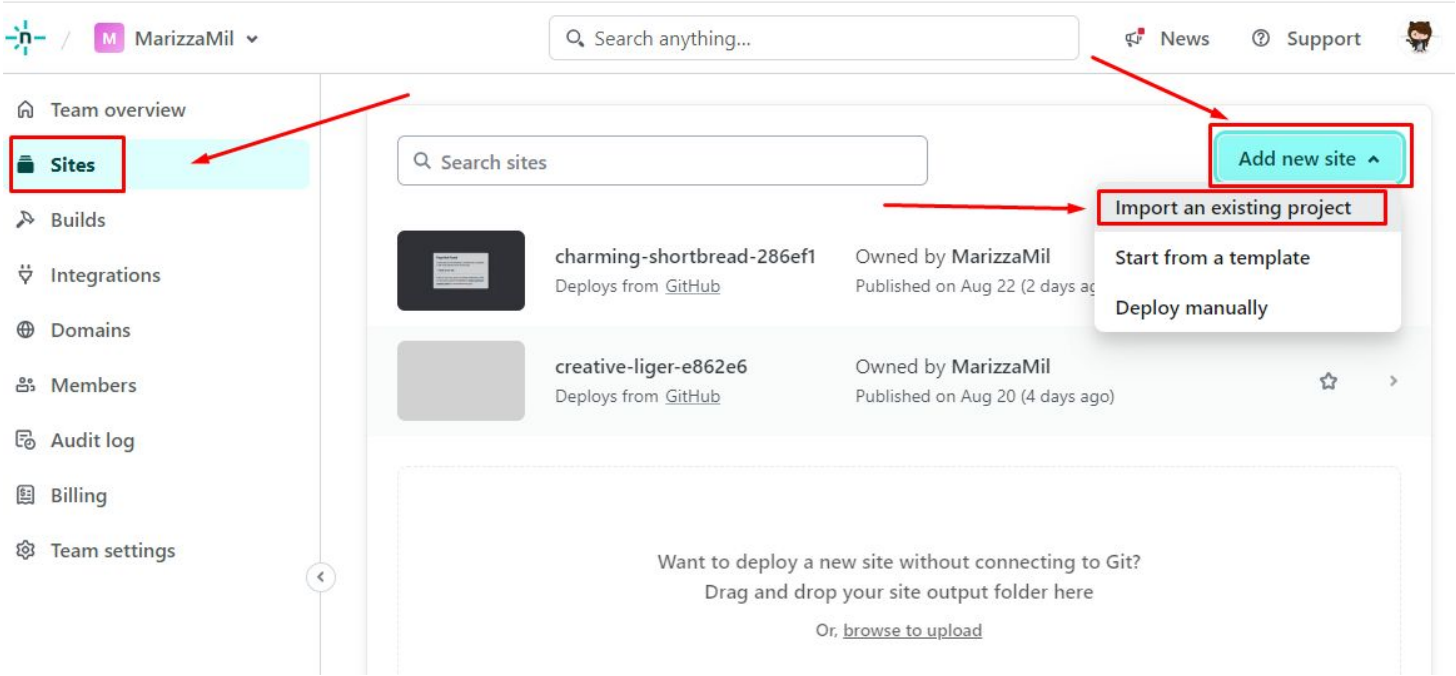
2

3



Deploy Project in the Netlify

Connecting Netlify to Your GitHub Account



Connecting Netlify to Your GitHub Account

3. Select "GitHub" as your Git provider.
4. Follow the prompts to connect your GitHub account to Netlify. You may need to grant Netlify access to your GitHub account.

Choosing "Only select repositories" option when connecting Netlify to GitHub means that you are selecting specific repositories from your GitHub account that you want to connect with Netlify. This provides more control and security to your deployment process.

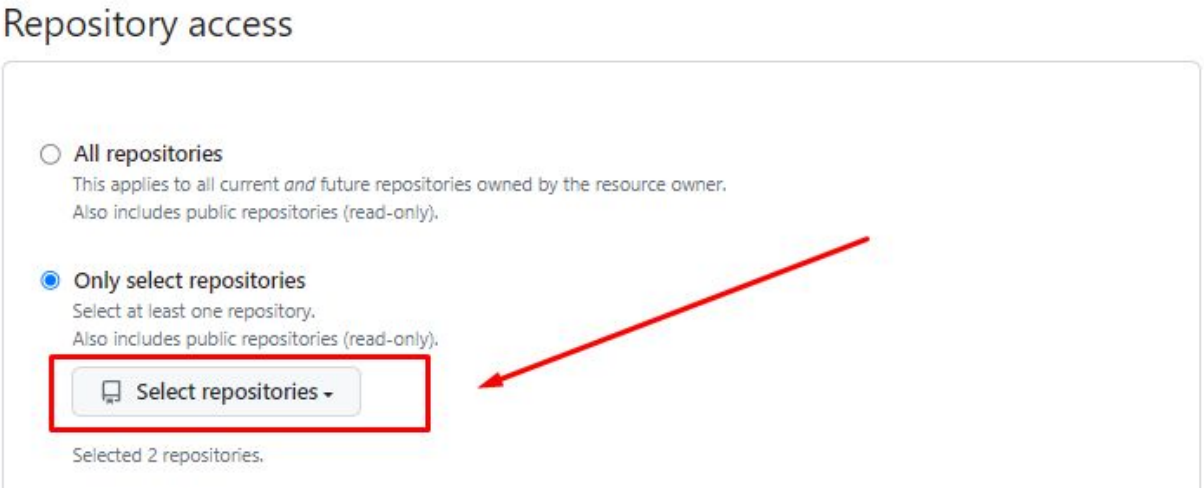
Connect to Git provider

Select repository

Once your GitHub account is connected, you can pick a repository to deploy to Netlify. In the "Pick a repository" section, select the repository you want to deploy.

If you have created a GitHub repository for your Netlify project, but it's not appearing in the list of available repositories on Netlify, you may need to configure the Netlify app on GitHub. Here's how to do it:

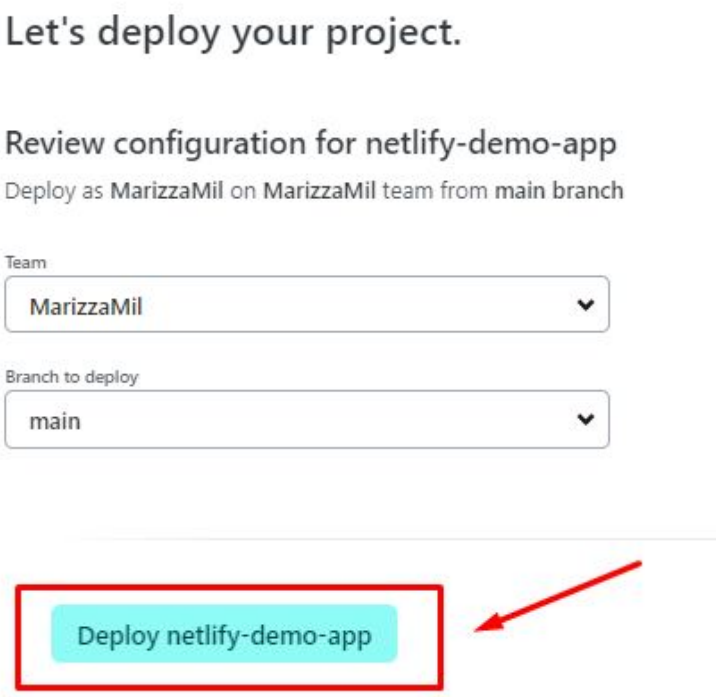
Configure site and deploy



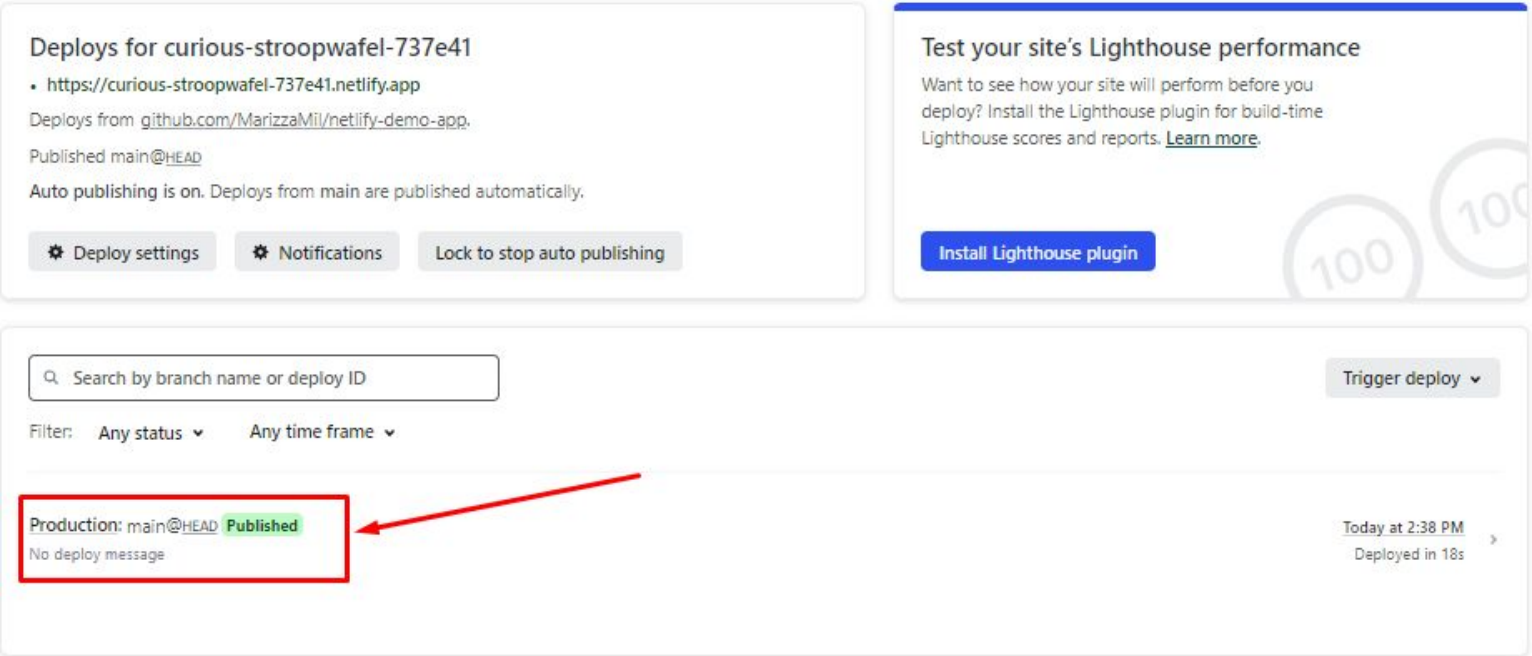
In the "Repository access" section, if you chose "Only select repositories" choose specific repositories. Select the repository you want to link to your Netlify site. Click "Save" to apply the changes.

Configure site and deploy

5. Configure your build settings. This will depend on the type of project you're deploying.
6. Click "Deploy site" to start the deployment process.



Production


Deploys for curious-stroopwafel-737e41
https://curious-stroopwafel-737e41.netlify.app
Deploys from github.com/MarizzaMil/netlify-demo-app.
Published main@HEAD
Auto publishing is on. Deploys from main are published automatically.
Deploy settings
Notifications
Lock to stop auto publishing
Test your site's Lighthouse performance
Want to see how your site will perform before you deploy? Install the Lighthouse plugin for build-time Lighthouse scores and reports. Learn more.
Install Lighthouse plugin
Search by branch name or deploy ID
Trigger deploy
Filter:
Any status
Any time frame
Production: main@HEAD Published
No deploy message
Today at 2:38 PM
Deployed in 18s

Deploy summary

Deploy summary

2 new files uploaded
2 assets changed.

No redirect rules processed
This deploy did not include any redirect rules. Learn more about redirects .

No header rules processed
This deploy did not include any header rules. Learn more about headers .

All linked resources are secure
Congratulations! No insecure mixed content found in your files.

1 function deployed
We have deployed 1 function. Visit your Functions for more information.

No edge functions deployed
This deploy did not include any edge functions. Learn more about Edge Functions .

Deploy log


Deploy log
Preview
Maximize log
Initializing
Complete
Building
Complete
Deploying
Complete
Cleanup
Complete
Post-processing
Complete

Production


Published deploy for curious-stroopwafel-737e41
Permalink
Today at 2:38 PM
Production: main@HEAD
Deployed Functions
Open production deploy
Lock to stop auto publishing
Options

Test the API using Postman

GET REQUEST

GET https://<your_address>/.netlify/functions/heroes Send

Params Authorization Headers (6) Body Pre-request Script Tests Settings Cookies

Query Params

KEY	VALUE	DESCRIPTION	ooo	Bulk Edit
Key	Value	Description		

Body Cookies Headers (10) Test Results Status: 200 OK Time: 3.00 s Size: 422 B Save Response

Pretty Raw Preview Visualize JSON


```
[
    {
        "name": "Wonder Woman",
        "superpower": "Amazonian powers",
        "id": "1"
    }
]
```

POST REQUEST

POST https://<your_address>/.netlify/functions/heroes Send

Params Authorization Headers (8) Body Pre-request Script Tests Settings Cookies

none form-data x-www-form-urlencoded raw binary GraphQL JSON Beautify

```
1 {
2   "name": "New Hero",
3   "superPower": "Super Strength"
4 }
```

Body Cookies Headers (10) Test Results Status: 201 Created Time: 374 ms Size: 400 B Save Response

Pretty Raw Preview Visualize JSON

```
1 {
2     "message": "Hero created successfully"
3 }
```

UPDATE REQUEST

PUT https://<your_address>/.netlify/functions/heroes/EthGkivvD2KfptcgeafS Send

Params Authorization Headers (8) Body Pre-request Script Tests Settings Cookies

none form-data x-www-form-urlencoded raw binary GraphQL JSON Beautify

```
1 {
2   "name": "New Hero",
3   "superPower": "New Super Strength"
4 }
```

Body Cookies Headers (10) Test Results Status: 200 OK Time: 654 ms Size: 395 B Save Response

Pretty Raw Preview Visualize JSON

```
1 {
2   "message": "Hero updated successfully"
3 }
```

DELETE REQUEST

DELETE https://<your_address>/.netlify/functions/heroes/EthGkivvD2KfptcgeafS Send

Params Authorization Headers (6) Body Pre-request Script Tests Settings Cookies

Query Params

KEY	VALUE	DESCRIPTION	ooo	Bulk Edit
Key	Value	Description		

Body Cookies Headers (10) Test Results Status: 200 OK Time: 397 ms Size: 395 B Save Response

Pretty Raw Preview Visualize JSON

```
1 {
2     "message": "Hero deleted successfully"
3 }
```

Conclusion

In conclusion, you've successfully navigated through the process of creating a Node.js application deployed on Netlify, equipped with a Firebase Cloud Firestore database to facilitate CRUD operations. This tutorial aimed to provide a comprehensive guide, covering everything from setting up your development environment to building a functional application with real-time data capabilities.

By following the steps outlined in this tutorial, you've gained valuable insights into:

- Environment Setup: You've configured your development environment by creating a Firebase project and setting up the necessary dependencies.
- Database Creation: You've established a Firestore database, a scalable and NoSQL solution, to store your application's data.
- API Development: You've constructed an API using Express.js, enabling your application to perform Create, Read, Update, and Delete operations seamlessly.
- Model-Router Architecture: You've structured your project with a clear separation of concerns, using models and routers for enhanced code organization and maintainability.
- Real-Time Data Handling: By integrating Firestore, you've harnessed the power of real-time data synchronization, ensuring your application remains responsive and up-to-date.
- Deployment on Netlify: You've successfully deployed your Node.js application on Netlify, allowing it to be accessible to users online.

Throughout this journey, you've encountered and overcome challenges, such as configuring Firestore, implementing authentication, and ensuring your code adheres to best practices. This hands-on experience has provided you with practical insights that can be extended to future projects.

As you continue to develop your skills, remember that the journey of learning is ongoing. You now possess a foundation that enables you to build upon this project, explore more advanced features of Firestore and Netlify, and further refine your application based on evolving needs. Armed with the knowledge gained here, you're better equipped to embark on new coding endeavors and create innovative solutions that address real-world challenges.