

# FIREBASE



# FIREBASE

## WHAT IS FIREBASE [^5]

“Firebase is a platform developed by Google for creating mobile and web applications.”



# FIREBASE

## WHAT IS FIREBASE

- » set of tools to develop applications
- » apps can be created without server side code
- » "Backend as a service"





# FIREBASE TOOLS

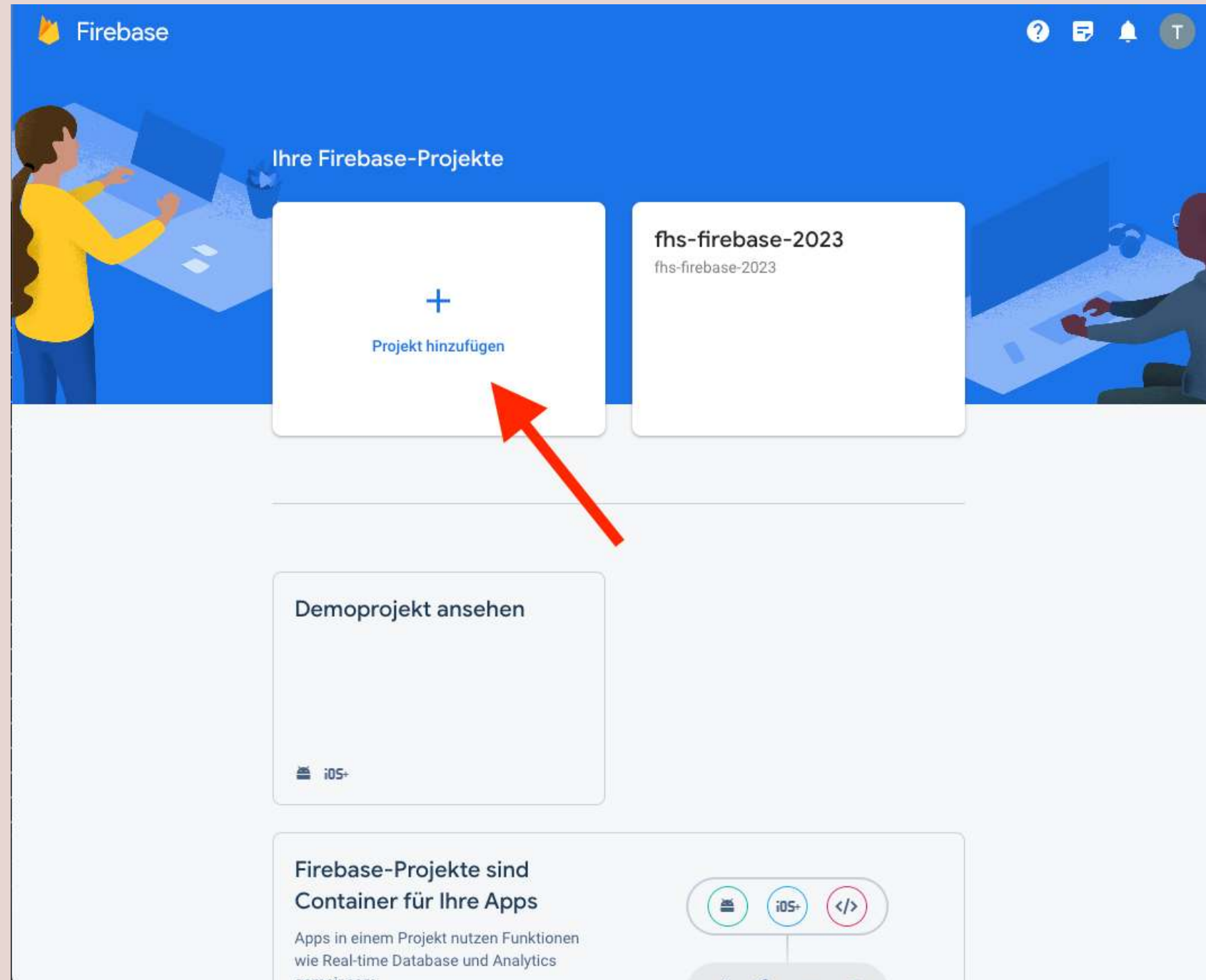
- » Analytics
- » Authentication
- » Database
- » Messaging
- » Hosting
- » File Storage
- » ...



# REGISTRATION

- » go to <https://console.cloud.google.com>
  - » accept terms and services if popup appears
- » go to <https://console.firebase.google.com>

# SETUP



# SETUP

✕ Projekt erstellen(Schritt 1 von 3)

Geben Sie zuerst einen  
Namen für Ihr Projekt ein<sup>?</sup>

Projektname

fhs-2023

 fhs-2023

Weiter

# SETUP



✕ Projekt erstellen(Schritt 2 von 3)



## Google Analytics für Ihr Firebase-Projekt

Google Analytics ist ein kostenloses Analysetool mit unbegrenzten Nutzungskontingenten. Es ermöglicht Ausrichtung, Berichterstellung und mehr in Firebase Crashlytics, Cloud Messaging, In-App-Messaging, Remote Config, A/B Testing und Cloud Functions.

Mit Google Analytics möglich:



 A/B-Testing 



 Nutzer-Segmentierung und -Targeting in Firebase-Produkten 

 Nutzer ohne Abstürze 

 ☒ Google Analytics für dieses Projekt aktivieren  
Empfohlen

1) Optional

 Ereignisbasierte Cloud Functions-Trigger 

 Uneingeschränkte kostenlose Berichterstellung 

2)

[Zurück](#)

[Weiter](#)




# SETUP


× Projekt erstellen(Schritt 3 von 3)

## Google Analytics konfigurieren

Google Analytics-Konto auswählen oder erstellen ?

 Default Account for Firebase ▼

1) When Google Analytics is activated  
select default account

Automatisch eine neue Property in diesem Konto erstellen 

Bei der Projekterstellung wird in Ihrem ausgewählten Google Analytics-Konto eine neue Analytics-Property erstellt und mit Ihrem Firebase-Projekt verknüpft. Durch diesen Link wird der Datenaustausch zwischen den Produkten ermöglicht. Aus Ihrer Analytics-Property nach Firebase exportierte Daten unterliegen den Firebase-Nutzungsbedingungen. Für Firebase-Daten, die in Analytics importiert werden, gelten hingegen die Nutzungsbedingungen für Google Analytics. [Weitere Informationen](#) 

[Zurück](#)

Projekt erstellen

2)

# SETUP



fhs-2023

✓ Ihr neues Projekt steht bereit

Weiter

# SETUP

firebase

Projektübersicht

Produktkategorien

Entwickeln

- Authentication
- App Check
- Firestore Database
- Realtime Database**
- Extensions
- Storage
- Hosting
- Functions
- Machine Learning
- Remote Config

Veröffentlichen und beobachten

Analytics

Einbeziehen

Alle Produkte

Spark  
Keine Kosten 0 \$/Monat Upgrade

fhs-2023

Sie können E-Mail-Benachrichtigungen über neue Funktionen, Forschungsergebnisse und Veranstaltungen von Firebase erhalten Anmelden

fhs-2023 Spark-Plan

Fügen Sie Firebase zu Ihrer App hinzu, um zu beginnen

iOS+ Android Web

App hinzufügen, um zu beginnen

App-Daten in Millisekunden speichern und synchronisieren

Authentication

Cloud Firestore

<https://console.firebase.google.com/project/fhs-2023/data...>

# SETUP

The screenshot shows the Firebase console interface for a project named 'fhs-2023'. The left sidebar contains navigation links: 'Projektübersicht', 'Realtime Database', and a list of product categories including 'Entwickeln', 'Veröffentlichen und beobachten', 'Analytics', 'Einbeziehen', and 'Alle Produkte'. A 'Navigation anpassen' modal is open, suggesting adjustments to the console layout. The main content area is titled 'Realtime Database' with the subtitle 'Daten in Echtzeit speichern und synchronisieren'. A button labeled 'Datenbank erstellen' is prominently displayed. Below it, a modal asks 'Ist Realtime Database das Richtige für Sie?' with a link to 'Datenbanken vergleichen'. The 'Weitere Informationen' section provides links to documentation and pricing. At the bottom, a banner for 'Introducing Firebase Realtime Database' is visible.

**Realtime Database**  
Daten in Echtzeit speichern und synchronisieren

Datenbank erstellen

Ist Realtime Database das Richtige für Sie? [Datenbanken vergleichen](#)

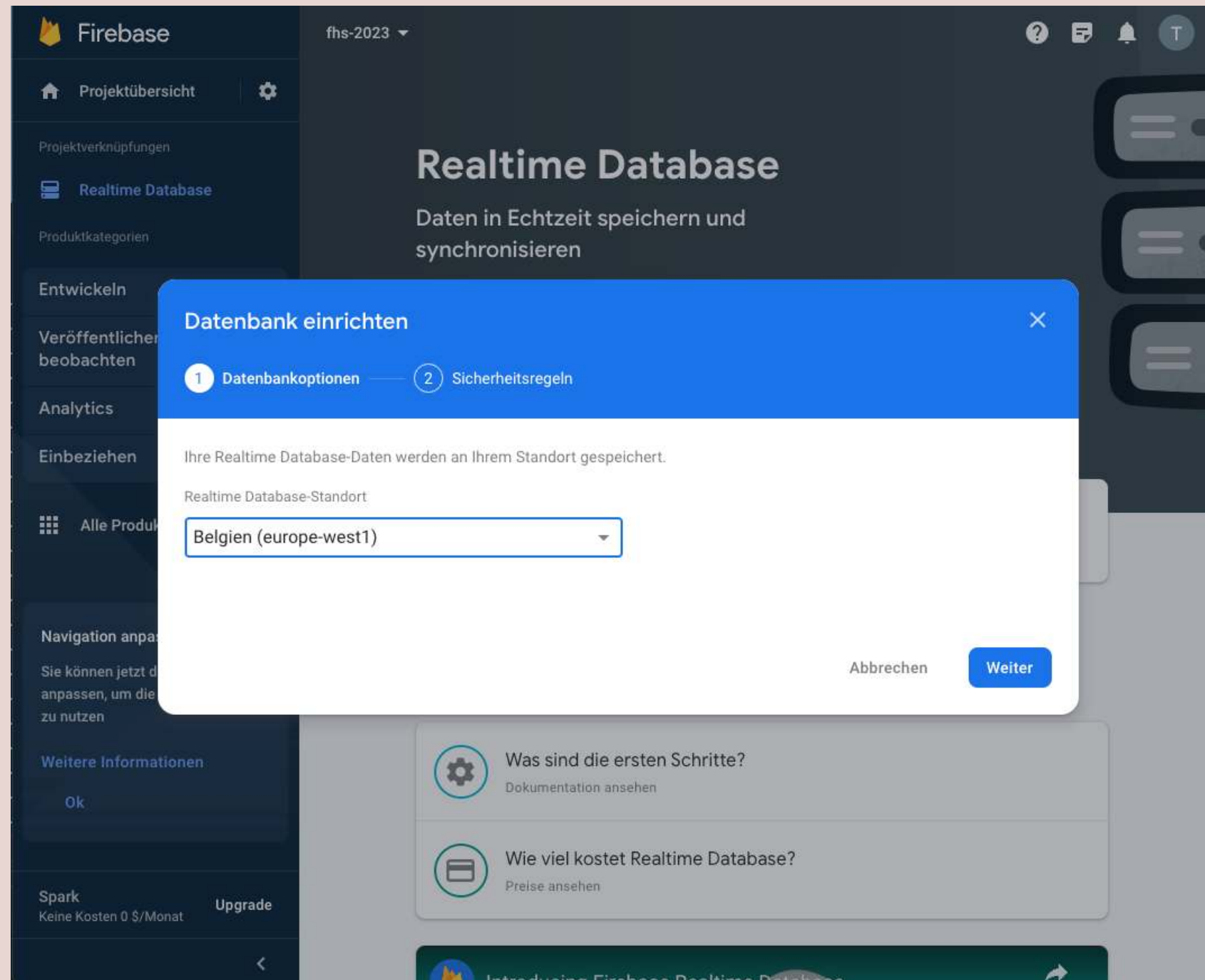
**Weitere Informationen**

- Was sind die ersten Schritte?  
[Dokumentation ansehen](#)
- Wie viel kostet Realtime Database?  
[Preise ansehen](#)

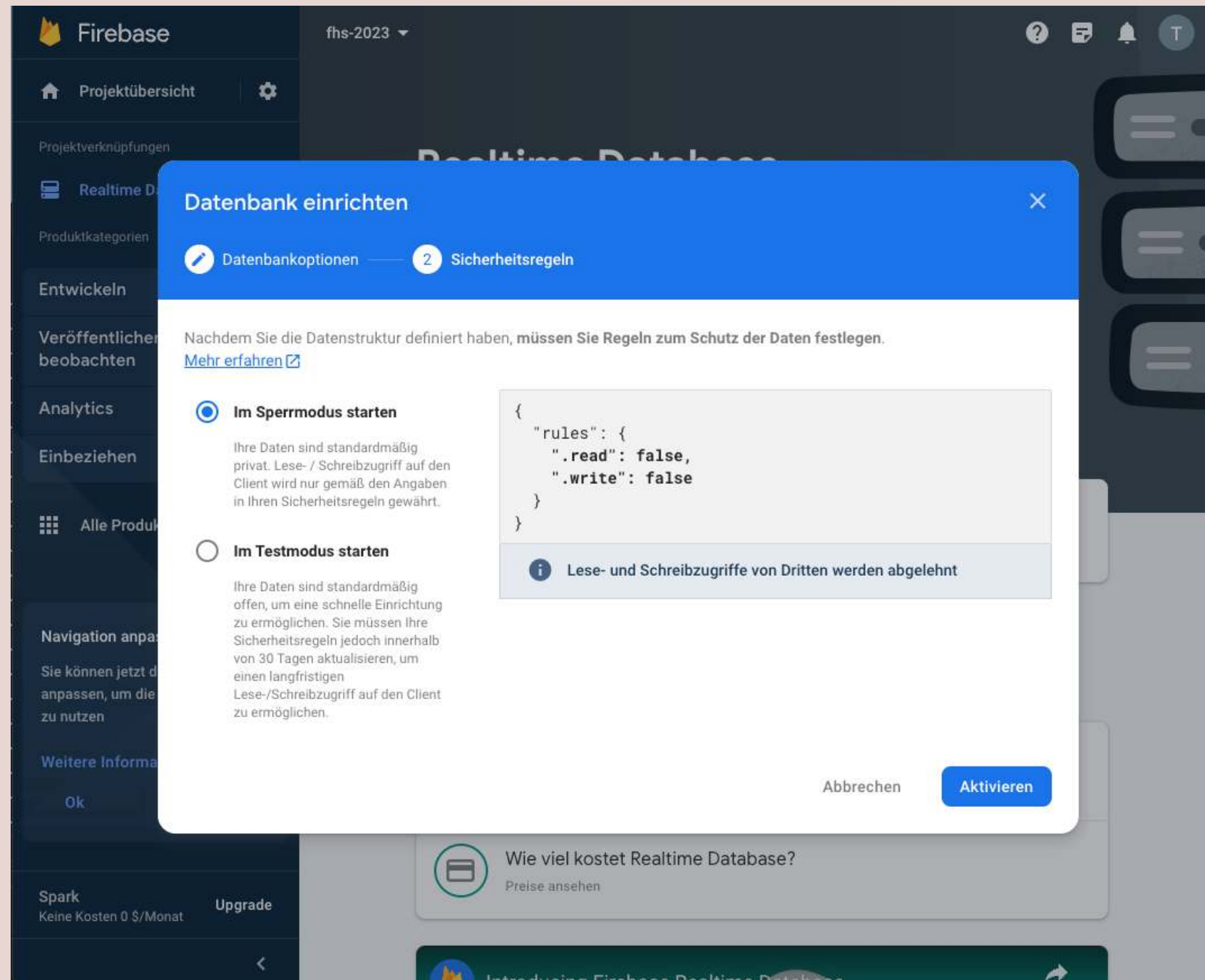
Introducing Firebase Realtime Database



# SETUP



# SETUP



# SETUP/DEPLOYE APPLICATION

```
npm install -g firebase-tools
```

```
firebase login
```

```
firebase init # watch https://asciinema.org/a/ZTa9tGUWAmQDn1WeKnT2n31Xd
```

# SETUP/DEPLOYE APPLICATION

- » Firebase hosting makes it easy to deploy web-apps
- » execute `firebase deploy`
- » or add deploy script to `package.json`

```
{  
  "scripts": {  
    // ... other scripts  
    "deploy": "npm run build && firebase deploy"  
  }  
}
```



# SETUP WEBAPP

The screenshot shows the Firebase console interface for the project 'fhs-2023-firebase'. The left sidebar contains navigation links: 'Projektübersicht', 'Realtime Database', 'Entwickeln', 'Veröffentlichen und beobachten', 'Analytics', 'Einbeziehen', and 'Alle Produkte'. The main content area has a blue header with the project name and a 'Spark-Plan' button. Below the header is a '+ App hinzufügen' button, which is highlighted by a red arrow. The 'Entwickeln' section is active, showing 'Hosting' and 'Downloads' metrics. A 'Bereitgestellt' (Deployed) status is shown with the date '16.04.2023 18:05' and the user 'fhs-2023-firebase@gmail.com'. At the bottom, there is a notification banner about app data storage and synchronization.

firebase

fhs-2023-firebase

fhs-2023-firebase Spark-Plan

+ App hinzufügen

Entwickeln

Hosting

Downloads

Keine Daten für die vergangenen 14 Tage

Bereitstellungsverlauf

Bereitgestellt

16.04.2023 18:05

Bereitgestellt von fhs-2023-firebase@gmail.com

App-Daten in Millisekunden speichern und synchronisieren

# SETUP WEBAPP

**Firebase**

fhs-2023

Sie können E-Mail-Benachrichtigungen über neue Funktionen, Forschungsergebnisse und Veranstaltungen von Firebase erhalten [Anmelden](#)

**fhs-2023** [Spark-Plan](#)

**Fügen Sie Firebase zu Ihrer App hinzu, um zu beginnen**

[iOS+](#) [Android](#) [Web](#) [Flutter](#) [React Native](#)

App hinzufügen, um zu beginnen

**App-Daten in Millisekunden speichern und synchronisieren**

**Authentication**  
Nutzer authentifizieren und verwalten

**Cloud Firestore**  
Aktualisierungen in Echtzeit, Idempotente Abfragen und

# SETUP WEBAPP

×

Firestore zu meiner Web-App hinzufügen

1

App registrieren

App-Nickname ⓘ

Webapp

☐

**Firebase Hosting** für diese App einrichten. [Weitere Informationen](#) ⓘ

Das Hosting kann auch später eingerichtet werden. Dafür fallen nie Kosten an.

2

Firebase SDK hinzufügen

# SETUP WEBAPP

✓ App registrieren

2 Firebase SDK hinzufügen

☒ npm verwenden ☐ <script>-Tag verwenden

Wenn Sie schon [npm](#) und einen Module Bundler wie [Webpack](#) oder [Rollup](#) verwenden, können Sie mit dem folgenden Befehl das neueste SDK installieren ([weitere Informationen](#)):

```
$ npm install firebase
```

Initialisieren Sie anschließend Firebase und verwenden Sie die SDKs für die gewünschten Produkte.

```
// Import the functions you need from the SDKs you need
import { initializeApp } from "firebase/app";
// TODO: Add SDKs for Firebase products that you want to use
// https://firebase.google.com/docs/web/setup#available-libraries

// Your web app's Firebase configuration
const firebaseConfig = {
  apiKey: "...",
  authDomain: "...",
  databaseURL: "...",
  projectId: "...",
  storageBucket: "...",
  messagingSenderId: "...",
  appId: "..."
};

// Initialize Firebase
const app = initializeApp(firebaseConfig);
```

**Hinweis:** Bei dieser Option wird das [modulare JavaScript SDK](#) verwendet, da dieses SDK kleiner ist.

Hier finden Sie weitere Informationen zu Firebase für das Web: [Startleitfaden](#), [Web SDK API-Referenz](#), [Beispiele](#)



# SETUP AUTH

The screenshot displays the Firebase console interface for a project named 'fhs-2023-firebase'. On the left, a dark sidebar contains a menu with various services. The 'Entwickeln' (Develop) section is expanded, and the 'Authentication' option is highlighted with a red arrow. The main content area shows the 'Entwickeln' header and a 'Hosting' section with a 'Downloads' chart. A 'Bereitgestellt' (Deployed) status is shown for the 'Bereitstellungsverlauf' (Deployment history) with a timestamp of '16.04.2023 18:05' and the user 'fhs-2023-firebase'. Below this, a notification banner reads 'App-Daten in Millisekunden speichern und synchronisieren' (App data in milliseconds save and synchronize). The bottom of the screen shows a URL bar with the address 'https://console.firebase.google.com/project/fhs-2023-firebase/authentication/users'.

firebase

Projektübersicht

Projektverknüpfungen

Realtime Database

Produktkategorien

Entwickeln

Authentication

App Check

Firestore Database

Realtime Database

Extensions

Storage

Hosting

Functions

Machine Learning

Remote Config

Veröffentlichen und beobachten

Analytics

Einbeziehen

Spark  
Keine Kosten 0 \$/Monat Upgrade

fhs-2023-firebase

fhs-2023-firebase Spark-Plan

2 Anwendungen || + App hinzufügen

Entwickeln

Hosting

Downloads

Bereitstellungsverlauf

Bereitgestellt

16.04.2023 18:05

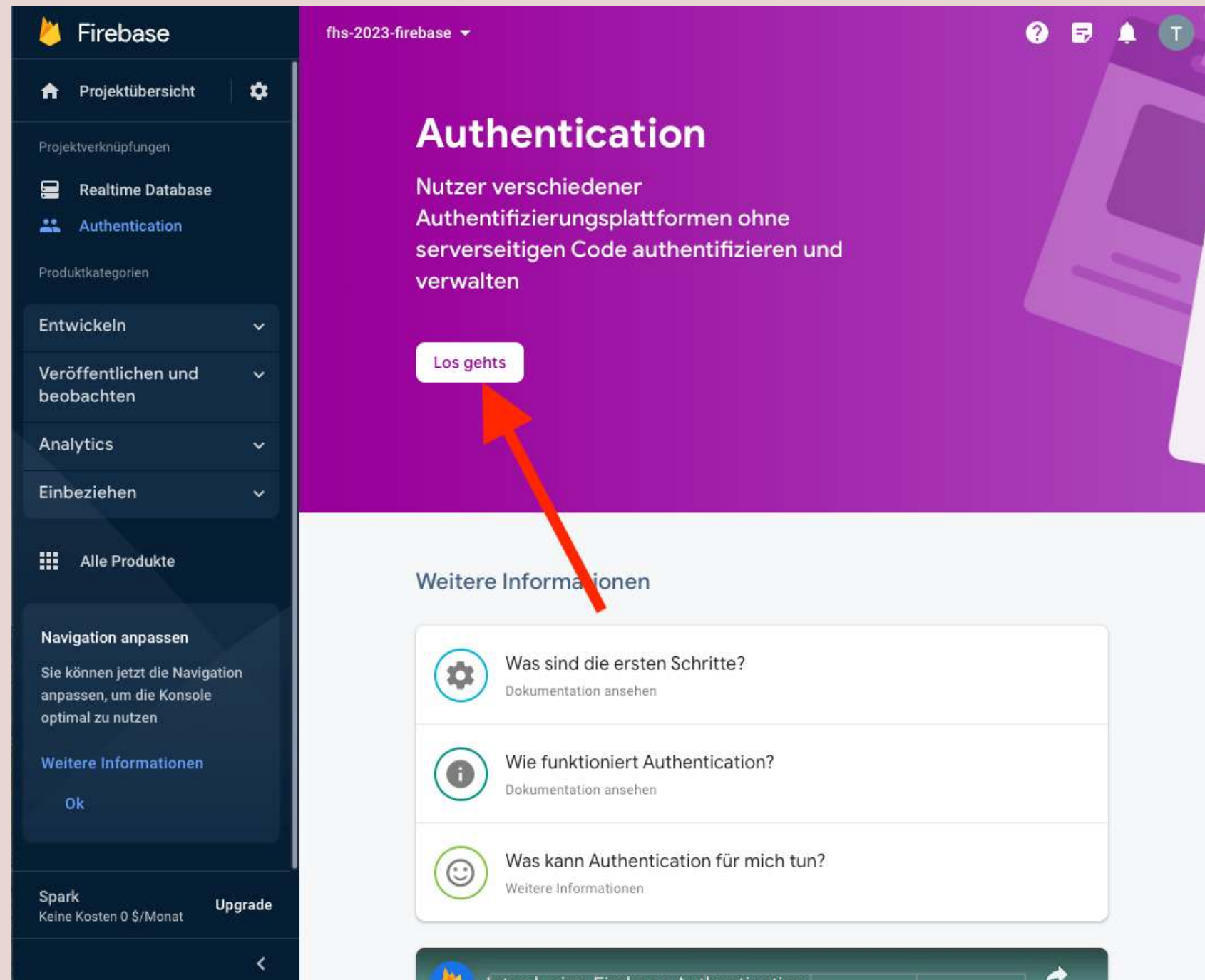
Bereitgestellt von

fhs-2023-firebase

App-Daten in Millisekunden speichern und synchronisieren

https://console.firebase.google.com/project/fhs-2023-firebase/authentication/users

# SETUP AUTH



# SETUP AUTH

The screenshot shows the Firebase Authentication console for the project 'fhs-2023-firebase'. The left sidebar contains the Firebase logo and navigation links: 'Projektübersicht', 'Realtime Database', 'Authentication', and 'Produktkategorien'. The main content area is titled 'Authentication' and has tabs for 'Users', 'Sign-in method', 'Templates', 'Usage', 'Settings', and 'Extensions'. The 'Sign-in method' tab is active, displaying 'Anbieter für Anmeldungen'. A heading reads 'Erste Schritte mit Firebase Auth: Erste Anmeldemethode hinzufügen'. Below this, providers are categorized into 'Native Anbieter', 'Zusätzliche Anbieter', and 'Individuelle Anbieter'. A red arrow points to the 'E-Mail-Adresse/Passwort' provider in the 'Native Anbieter' column. A red text box at the bottom of the arrow says 'Standard (Sidenote: you can choose other providers as well)'.

Erste Schritte mit Firebase Auth: Erste Anmeldemethode hinzufügen

Native Anbieter	Zusätzliche Anbieter	Individuelle Anbieter
E-Mail-Adresse/Passwort	Google	OpenID Connect
Telefon	Facebook	SAML
Anonym	Play Spiele	
	Game Center	
	Apple	
	GitHub	
	Microsoft	
	Twitter	

# SETUP AUTH

The screenshot shows the Firebase Authentication setup page for a project named 'fhs-2023-firebase'. The left sidebar contains the Firebase logo and navigation links: 'Projektübersicht', 'Realtime Database', 'Authentication', and a list of product categories including 'Entwickeln', 'Veröffentlichen und beobachten', 'Analytics', 'Einbeziehen', and 'Alle Produkte'. A 'Navigation anpassen' dialog box is open, prompting the user to adapt the navigation for optimal console use, with 'Weiteren Informationen' and 'Ok' options. At the bottom of the sidebar, a 'Spark' plan is shown with 'Keine Kosten 0 \$/Monat' and an 'Upgrade' button.

The main content area is titled 'Authentication' and includes tabs for 'Users', 'Sign-in method' (selected), 'Templates', 'Usage', 'Settings', and 'Extensions' (marked 'NEU'). Under the 'Sign-in method' tab, the section 'Anbieter für Anmeldungen' (Providers for logins) is active. It lists two providers: 'E-Mail-Adresse/Passwort' (Email address/Password) and 'E-Mail-Link (Anmeldung ohne Passwort)' (Email link (login without password)). The 'E-Mail-Adresse/Passwort' provider is currently active, with a toggle switch labeled 'Aktivieren'. Below it, a text block explains that users can sign in with their email addresses and passwords, and that SDKs also allow for email verification, password resets, and password change primitives. A link to 'Weitere Informationen' (Further information) is provided. The 'E-Mail-Link' provider is currently inactive, with a toggle switch labeled 'Aktivieren'. At the bottom of the provider list, there are 'Abbrechen' (Cancel) and 'Speichern' (Save) buttons.

Below the providers, the 'Erweitert' (Advanced) section is visible, showing the 'Multi-Faktor-Authentifizierung per SMS' (Multi-factor authentication via SMS) option. A text block explains that users can add an additional security layer to their accounts by using SMS for two-step verification. A link to 'Weitere Informationen' (Further information) is provided.



# CONNECT REACT WITH FIREBASE

```
npm i firebase
```

```
npm i @react-firebase/auth
```

```
npm i @react-firebase/database
```

```
npm i react-firebase-hooks
```

# CONNECT REACT WITH FIREBASE

» Create a file `firebase.js` and add snippet from the UI:

```
import { initializeApp } from "firebase/app";
import { getAuth } from 'firebase/auth';
import { getDatabase } from 'firebase/database';
// TODO: Add SDKs for Firebase products that you want to use
// https://firebase.google.com/docs/web/setup#available-libraries

// Your web app's Firebase configuration
const firebaseConfig = {
  apiKey: "....",
  authDomain: "....",
  projectId: "....",
  storageBucket: "....",
  messagingSenderId: "....",
  appId: "...."
};

// Initialize Firebase
const app = initializeApp(firebaseConfig);
export const auth = getAuth(app)
export const database = getDatabase(app)
```

# REACT FIREBASE AUTH

## SIGN UP

```
import { auth } from './firebase'
import { createUserWithEmailAndPassword } from 'react-firebase-hooks/auth'

const SignUp = () => {
  const [signUp] = createUserWithEmailAndPassword(auth)
  // ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  // use hook to create a user
  const formik = useFormik({
    initialValues: { email: '', password: '' },
    onSubmit: async (values) => {
      await signUp(values.email, values.password)
      // ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
      // create a new user and wait until executed
      // after user was created -> redirect to sign-in (see routing slides)
    },
  });

  // ...
}
```

# REACT FIREBASE AUTH

## SIGN IN

```
import { auth } from './firebase'
import { useSignInWithEmailAndPassword } from 'react-firebase-hooks/auth'

const SignIn = () => {
  const [signIn] = useSignInWithEmailAndPassword(auth)
  // ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  // use hook to sign in with email and password
  const formik = useFormik({
    initialValues: { email: '', password: '' },
    onSubmit: async (values) => {
      await signIn(values.email, values.password)
      // ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
      // create a new user and wait until executed
      // after user was signed in -> redirect to app (see routing slides)
    },
  });

  // ...
}
```

# REACT FIREBASE AUTH

## SIGN OUT

```
import { auth } from './firebase'
import { useSignOut } from 'react-firebase-hooks/auth'

const SignOutButton = () => {
  const [signOut] = useSignOut(auth)
  //          ^^^^^^^^^^^
  // use hook to get a sign out callback

  return (
    <button onClick={signOut}>Sign out</button>
  )
}
```



# REACT FIREBASE AUTH AUTHENTICATION STATUS

```
import { auth } from './firebase'
import { useSignOut } from 'react-firebase-hooks/auth'

const SignOutButton = () => {
  const [user, loading] = useAuthState(auth)
  //                               ^^^^^^^^^
  // use hook to get the current authentication state

  console.log(user) // if user is undefined not authenticated
}
```

# FIREBASE REALTIME DATABASE

- » NoSQL document store
- » can sync data with devices automatically
- » supports authorization via database rules
- » ...

“Realtime Database is Firebase's original database. It's an efficient, low-latency solution for mobile apps that require synced states across clients in realtime.”

# REACT FIREBASE DATABASE SETUP SECURITY RULES

The screenshot displays the Firebase console interface for a project named 'fhs-2023-firebase'. The left sidebar shows the 'Entwickeln' (Develop) section with 'Realtime Database' highlighted. The main panel shows the 'Realtime Database' settings, with the 'Regeln' (Rules) tab selected. A red arrow labeled '1' points to the 'Regeln' tab in the sidebar, and another red arrow labeled '2' points to the 'Regeln bearbeiten' (Edit Rules) button. The 'Regeln bearbeiten' button is also highlighted with a blue background. Below the button, the 'Regel-Playground' button is visible. The main area contains a code editor with the following JSON rules:

```
1 {  
2   "rules": {  
3     ".read": false,  
4     ".write": false,  
5     "users": {  
6       "$uid": {  
7         ".write": "$uid === auth.uid",  
8         ".read": "$uid === auth.uid"  
9       }  
10    }  
11  }  
12 }
```

At the bottom, the location is specified as 'Datenbankspeicherort: Belgien (europe-west1)'.

# REACT FIREBASE DATABASE

## SETUP SECURITY RULES

```
{
  "rules": {
    // prevent read and write for all users
    ".read": false,
    ".write": false,

    "users": {
      // create "scope" for each authenticated user
      "$uid": {
        ".write": "$uid === auth.uid", // prevent unauthorized access
        ".read": "$uid === auth.uid"
      }
    }
  }
}
```

# REACT FIREBASE DATABASE

## WRITE DATA TO REALTIME DATABASE

```
import { ref, push } from 'firebase/database'
// ...

const CreateMoneyTransaction = () => {
  const [user] = useAuthState(auth)

  // Get a reference to the document
  const transactionRef = ref(database, `users/${user?.uid}/transactions`)

  const formik = useFormik({
    initialValues: { email: '', password: '' },
    onSubmit: async (values) => {
      // push values to firestore
      push(transactionRef, values);
    },
  });
}
```



# REACT FIREBASE DATABASE

## READ DATA FROM DATABASE

```
import { ref, push } from 'firebase/database'
// ...

const ListMoneyTransactions = () => {
  const [user] = useAuthState(auth)

  // Get a reference to the document
  const transactionRef = ref(database, `users/${user?.uid}/transactions`)

  const [transactions, loading, error] = useObjectVal(ref(database, rootPath))
  //                                     ^^^^^^^^^^^^^^^
  // get object values from reference (will stream updates to UI)
}
```

# REACT FIREBASE DATABASE

## UPDATE DATA

[illegible]

# FIREBASE

- » there are lots of other things to discover in firebase
  - » cloud functions
  - » advanced authorization of data (via database rules)
  - » ...
- » we'll look into necessary features for your MMP when required

# LINKS

- » <https://en.wikipedia.org/wiki/Firebase>
- » <https://firebaseopensource.com/projects/csfrequency/react-firebase-hooks/>
- » Auth hooks: <https://github.com/csfrequency/react-firebase-hooks/tree/master/auth>
- » Database hooks: <https://github.com/csfrequency/react-firebase-hooks/tree/master/database>

# FEEDBACK

» Questions: [tmayrhofer.lba@fh-salzburg.ac.at](mailto:tmayrhofer.lba@fh-salzburg.ac.at)

» <https://s.surveyplanet.com/x1ibwm85>