Dependency Management

Dependency Managers

A *dependency manager* is a tool that makes it easy to add, remove, update, and manage third-party dependencies used by your app.

- For example, instead of reinventing your own networking library, you could simply pull in AlamoFire using a dependency manager.
  - You can specify the exact version you want to use, or even a range of acceptable versions.
  - Even if AlamoFire gets updated, your app can continue to use the older version until / unless you're ready to update it.

CocoaPods

CocoaPods is a third-party dependency manager designed specifically for Swift and Objective-C projects.

- contains over 30,000 libraries
- used in over 2,000,000 apps
- built on top of Ruby, which ships with all recent versions of Mac OS X
- *pods* are libraries or frameworks added to your project via CocoaPods

CocoaPods is still a very useful tool for adding and managing dependencies in a project, but there is another option that is starting to replace it.

Swift Package Manager

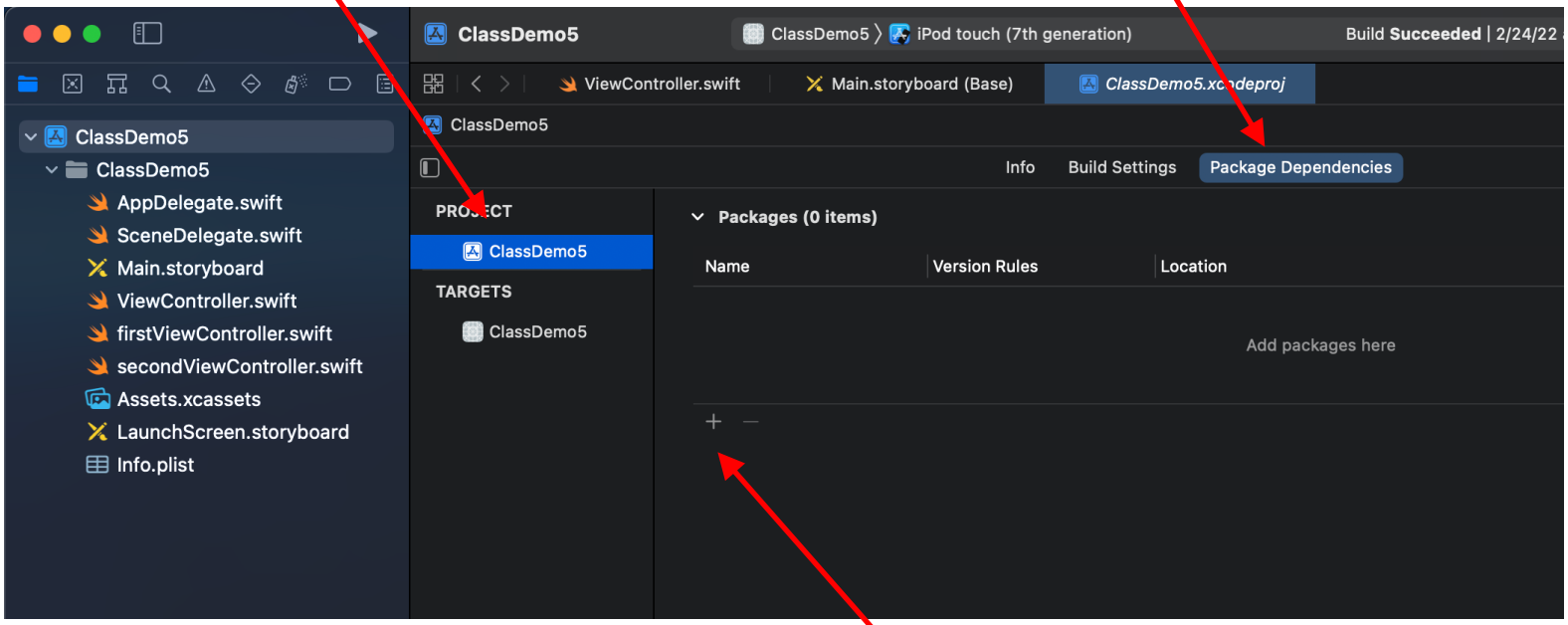
The *Swift Package Manager* (SwiftPM) has become the easier option for iOS dependency management.

- With it, you no longer have to rely on a third party dependency manager such as CocoaPods.
- It's been around since Swift 3.0, but only available for a limited collection of packages
- Apple significantly improved support for it in Swift 5 / Xcode 11
- A *package* is simply a collection of Swift source code files, plus a metadata ("manifest") file called Package.swift that defines various properties about the package, such as the name, code dependencies, etc.

Adding a package using SwiftPM

To add a package to your project:

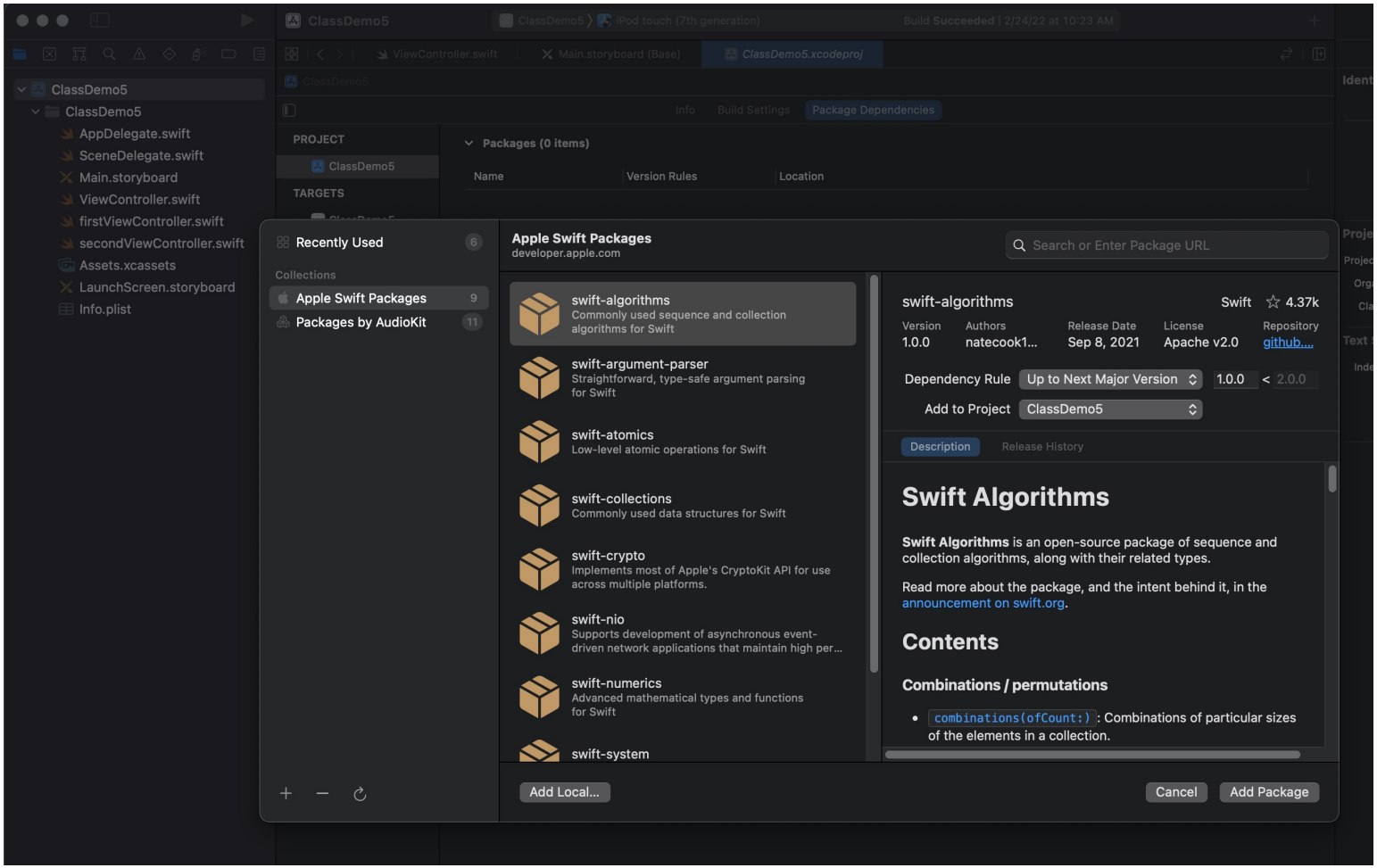
1. Select your project
2. Select the "Package Dependencies" tab



3. Click the "+" button

Adding a package using SwiftPM (cont.)

This pops up a window where you can either use a recently used package, or enter a URL where the package can be found.



Firebase

What is Firebase?

Firebase is a “Backend-as-a-Service” (BaaS). It is a mobile and web application development platform that manages servers for you so you can focus on your app.

- Real-time database: you can create a database on a server and access it though a Web socket, which is much faster than HTTP.
- File storage: you can save binary files (especially images) securely on Google Cloud Storage
- Authentication: Firebase `auth` has a built-in email/password authentication system you can use for your app.

What is Firebase? (cont.)

Lots of other stuff, too. . .

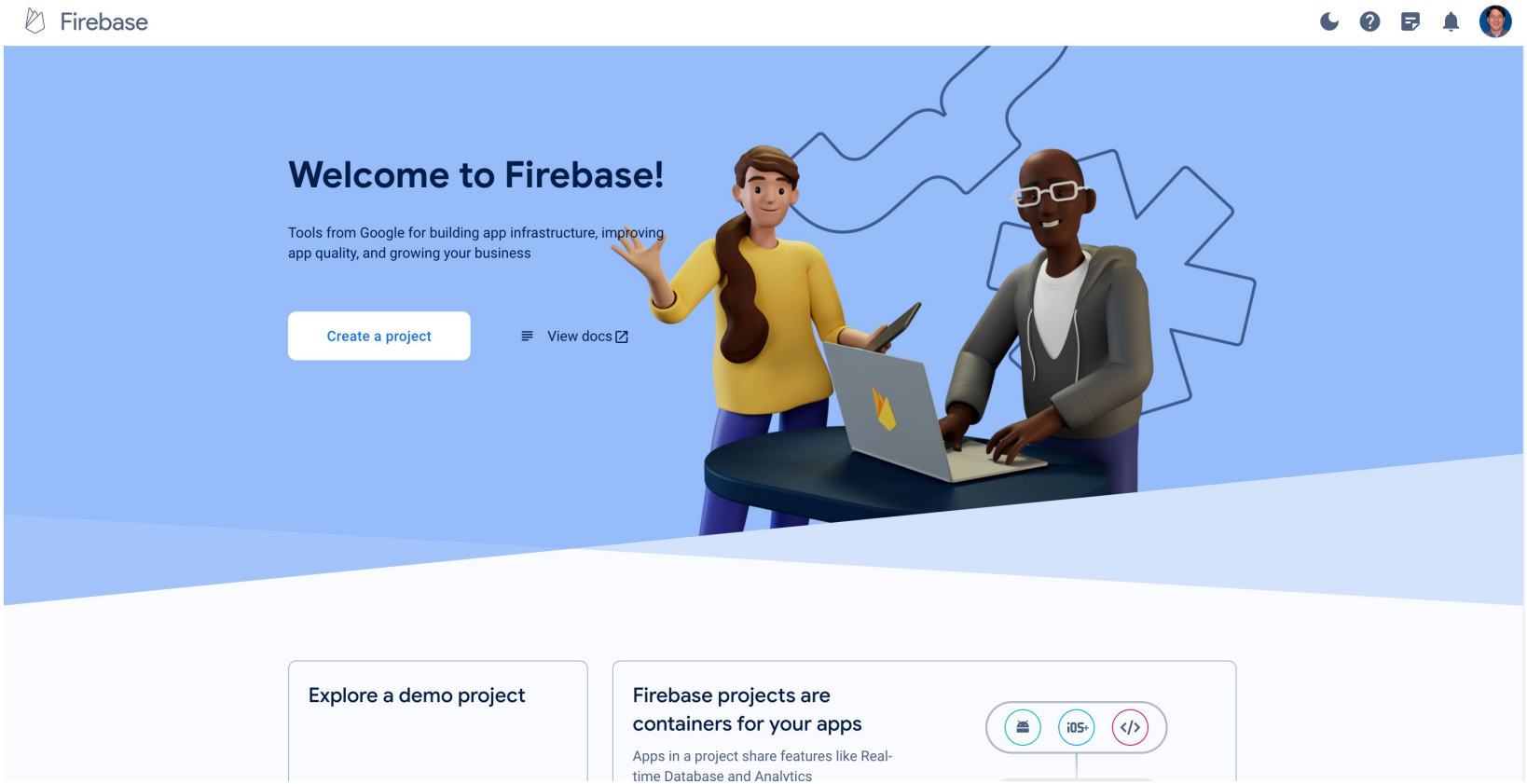
- Hosting
- Analytics
- Cloud Messaging
- A collection of other Google products, including
  - Remote config
  - Test Lab
  - Crash
  - Notifications
  - Dynamic Links
  - AdMob

Setting up Firebase

1. Create a Google account, if you don’t already have one. (You can use the same one you have for Gmail, Google Drive, etc.)

Setting up Firebase (cont.)

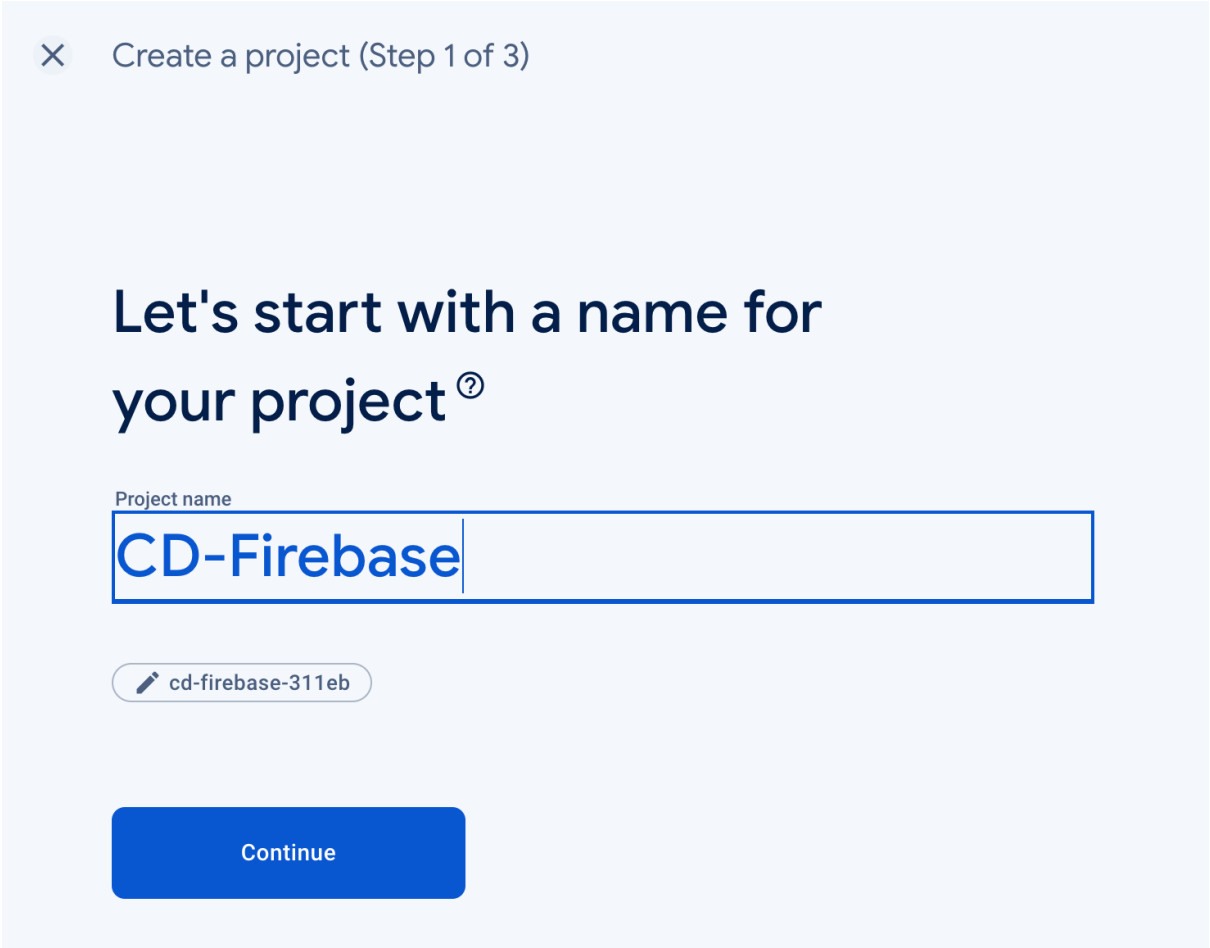
2. Go to https://console.firebase.google.com



3. Add Firebase to your project by clicking on “Create project”

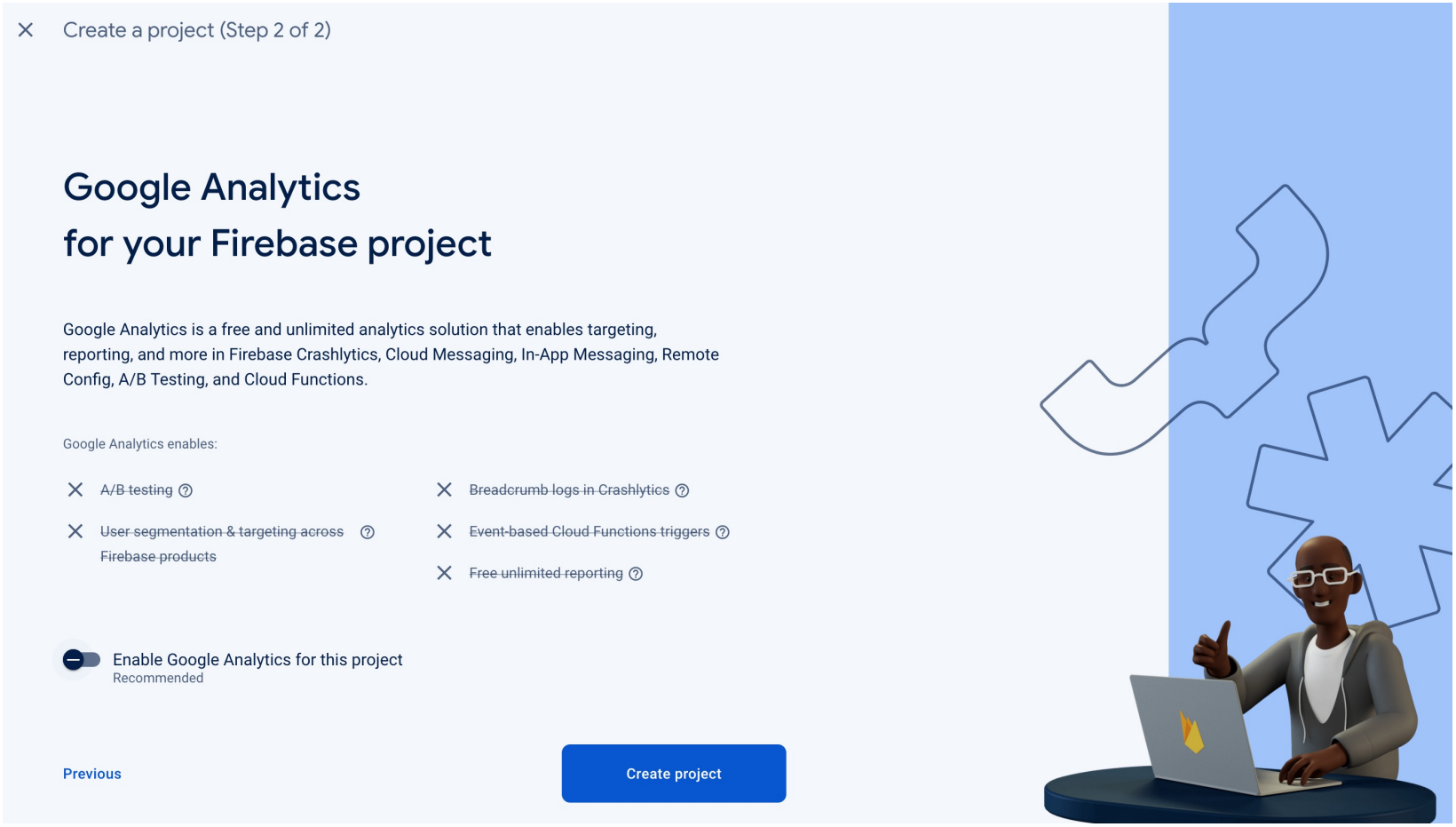
Setting up Firebase (cont.)

3. Enter your project name.



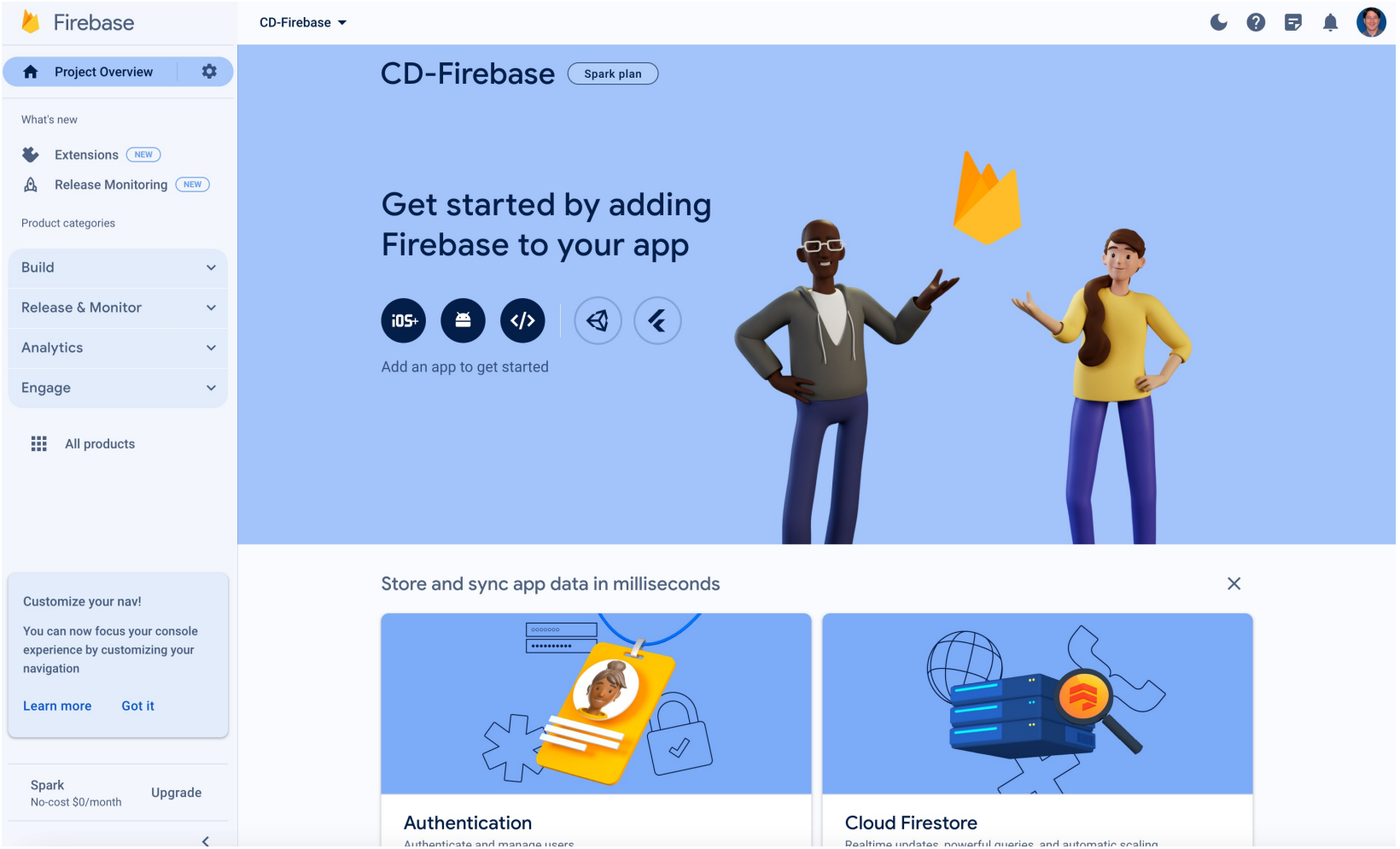
Setting up Firebase (cont.)

4. It will offer to set up Google Analytics. Either accept (and complete an additional screen) or decline and hit “Create Project”. Wait.



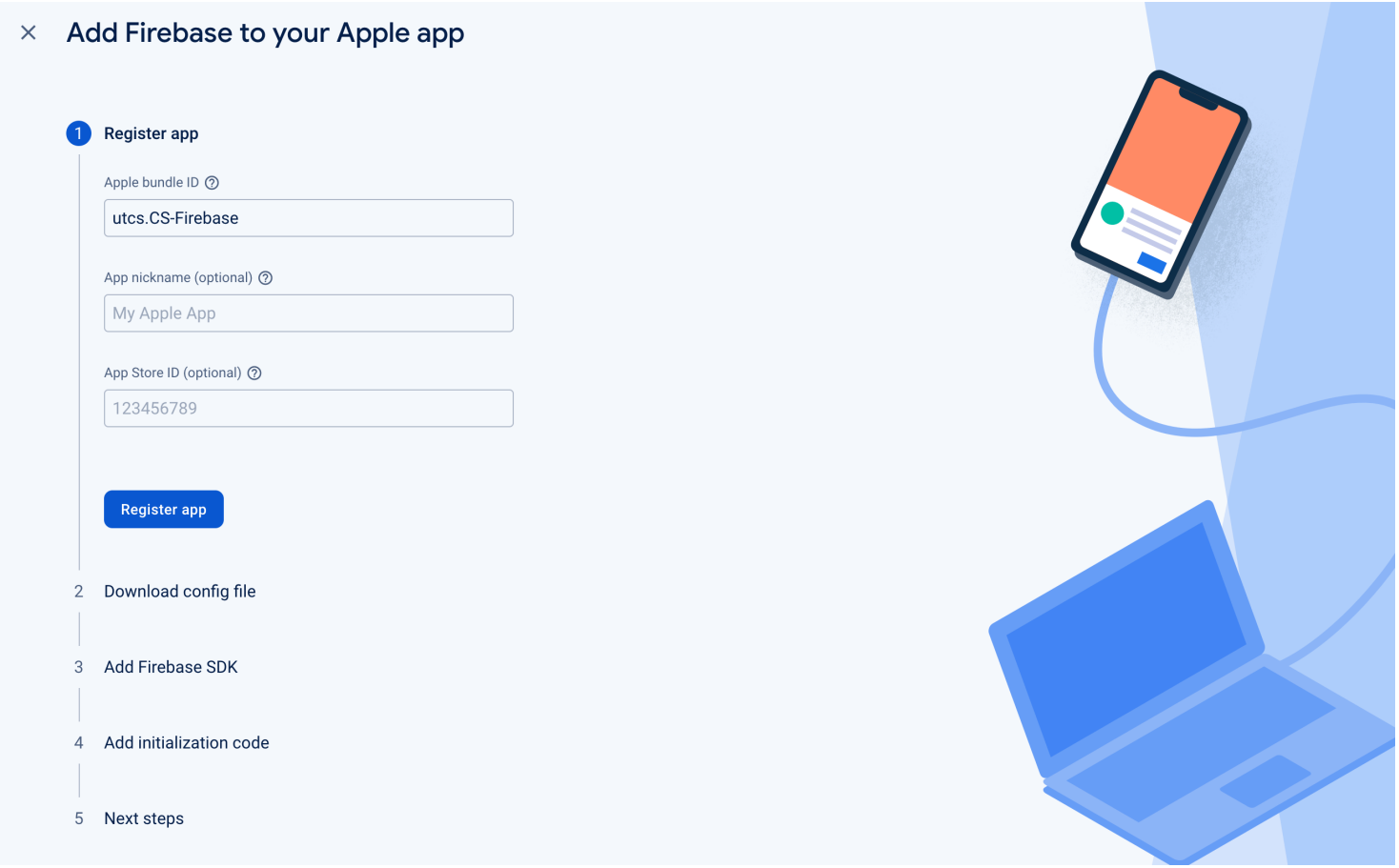
Setting up Firebase (cont.)

This takes you to the “Get started” screen. Click on the "iOS" button.



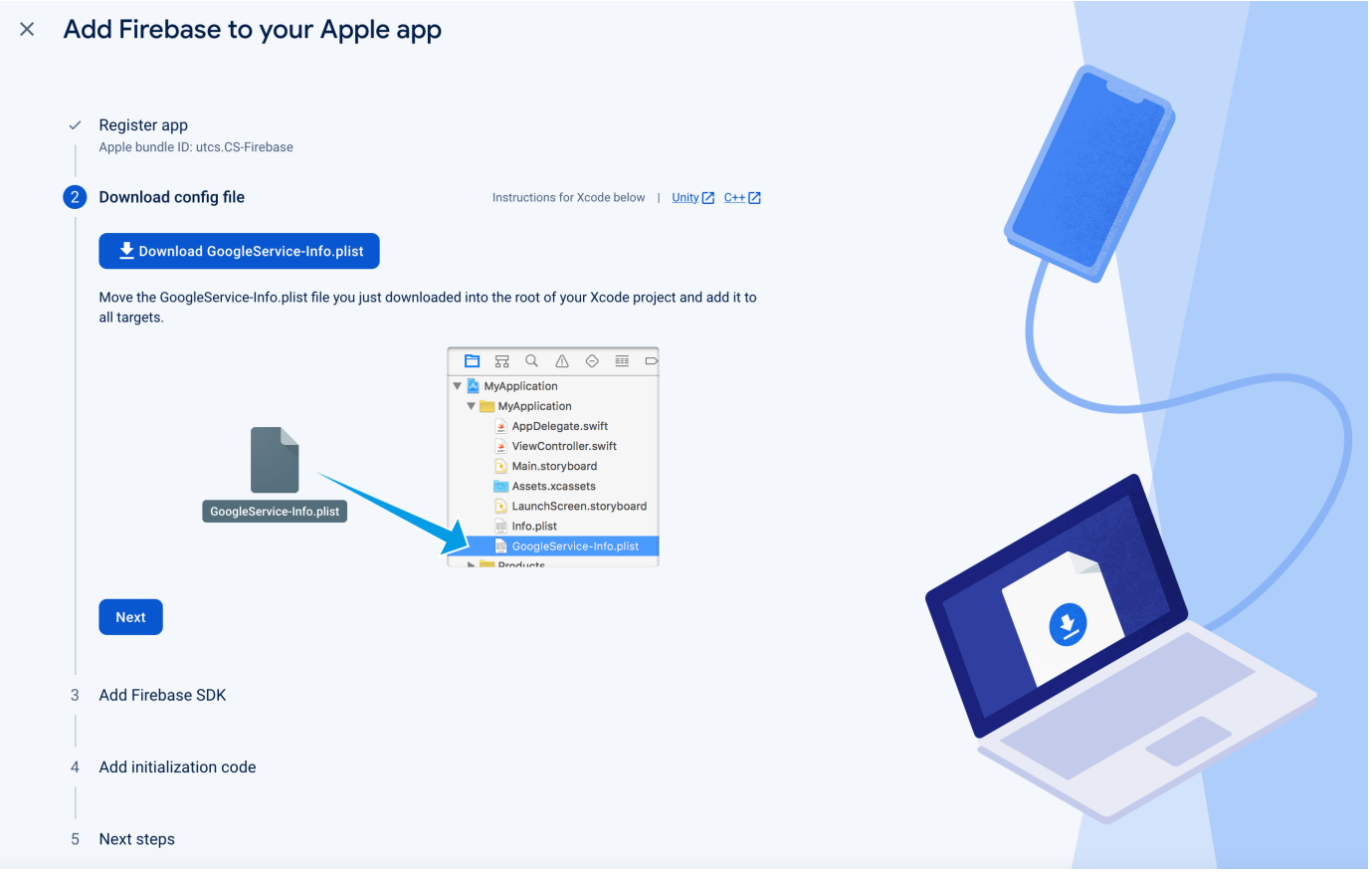
Setting up Firebase (cont.)

Enter the Bundle ID for your app. (Remember how to find this?) Click on “Register app”.



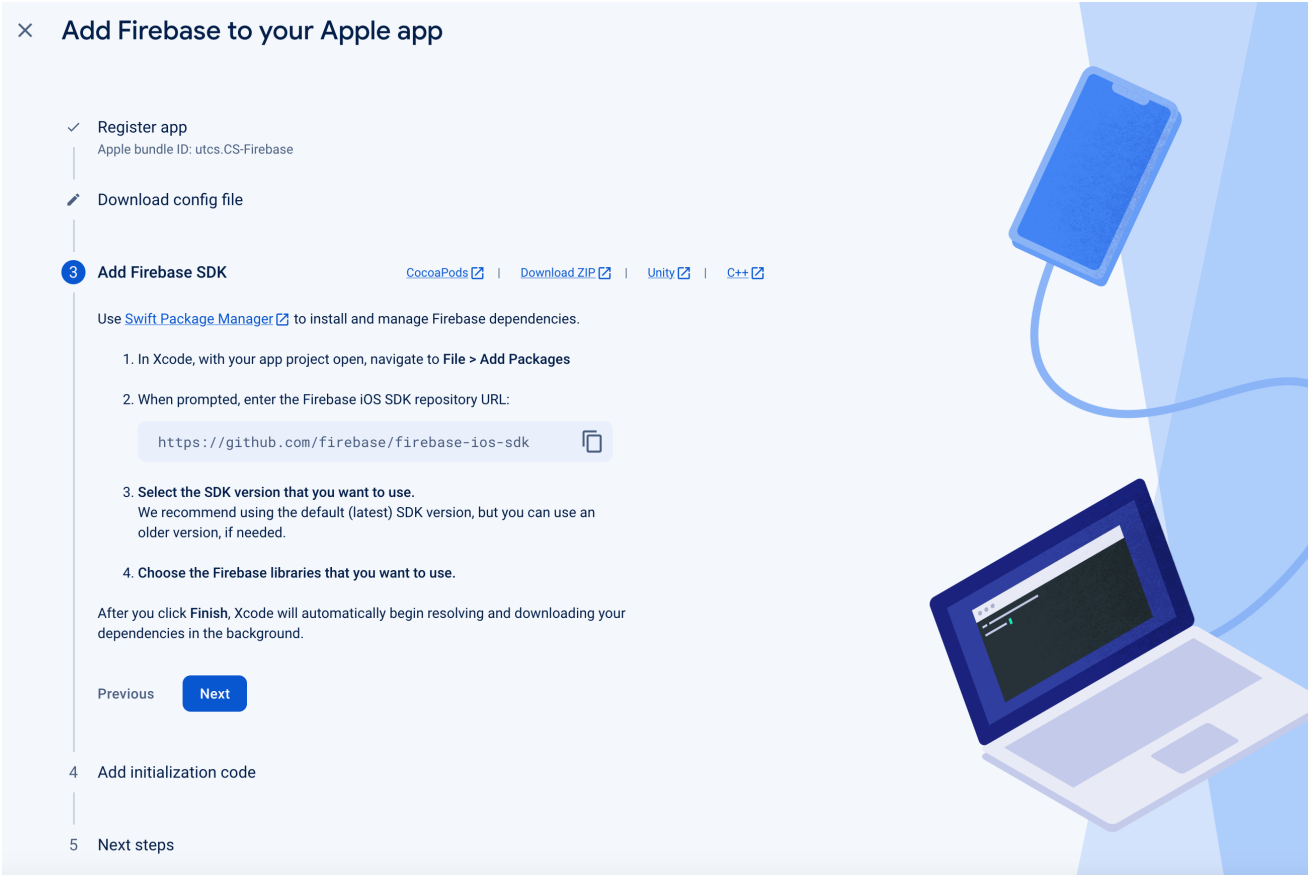
Setting up Firebase (cont.)

This will create a `GoogleService-Info.plist` file. Follow the instructions, and move it to your project in Xcode. (Be sure to check "Copy Items if needed" in Xcode.)



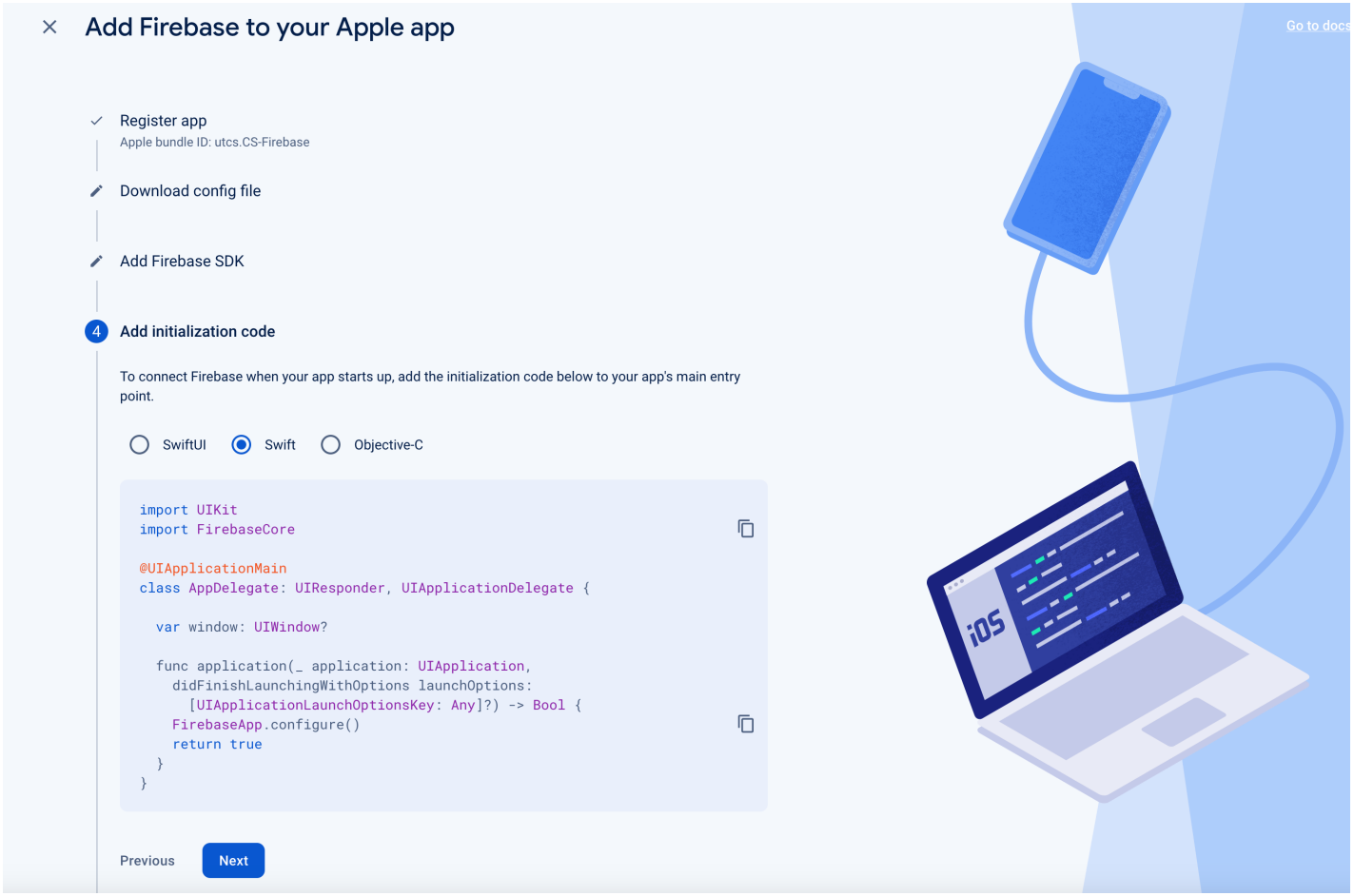
Setting up Firebase (cont.)

Clicking “Next” will give you the instructions on how to add the Firebase SDK to your project. By default, it will show you the instructions for Swift Package Manager, but you can switch it to CocoaPods if you need to.



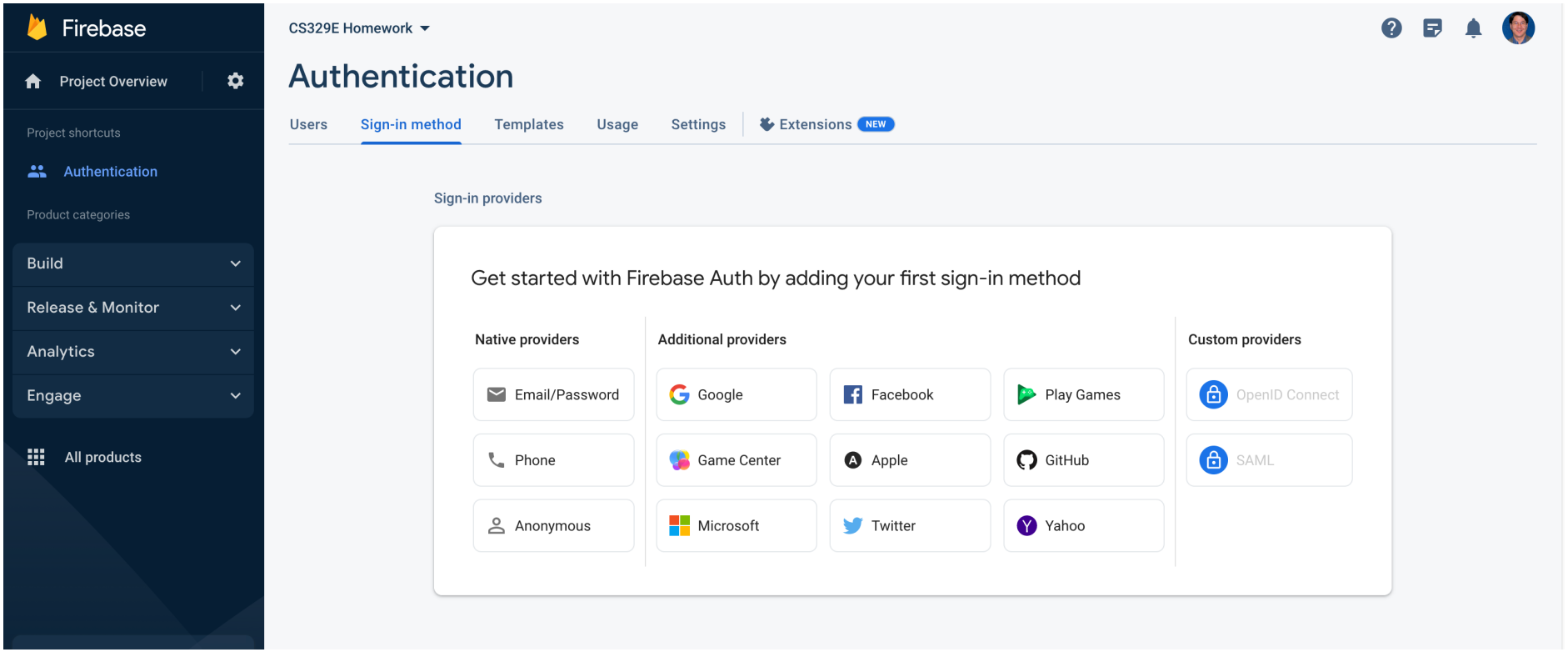
Setting up Firebase (cont.)

Select Swift (or SwiftUI if you're using that). Click “Next”. On the next screen, click “Continue to console”, and you're done! Build and run your app.



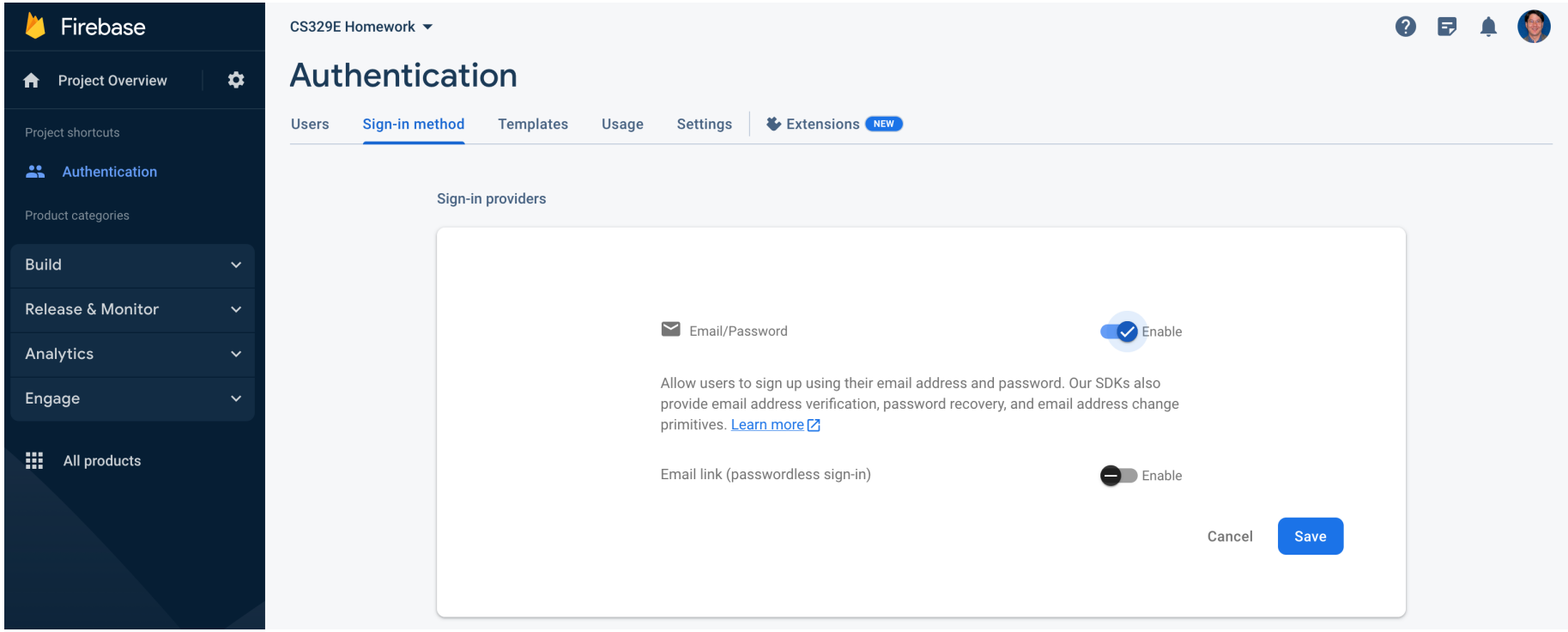
Authentication by email address

Find “Authentication” and either click on “Set up sign-in method” or click on the “Sign-in method” tab. Select "Email/password".



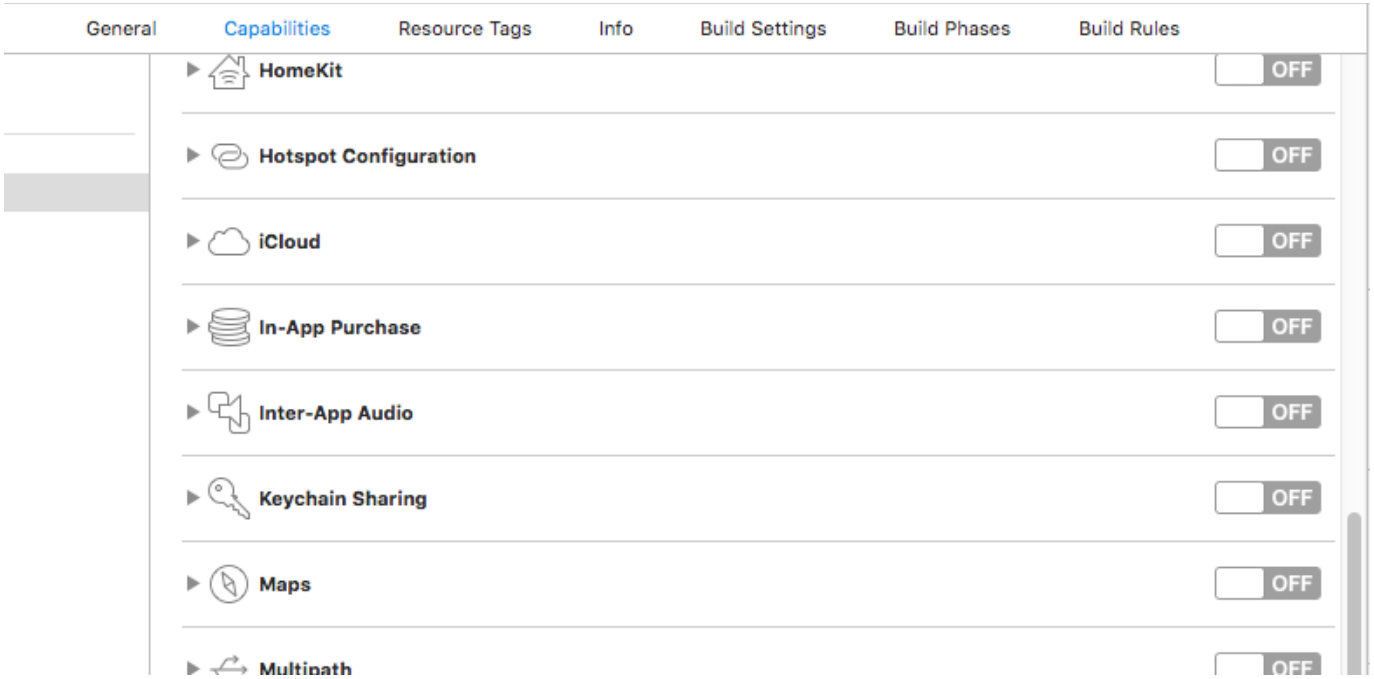
Authentication by email address (cont.)

Select “Enable” and then “Save”.



Authentication by email address (cont.)

Since Firebase stores credentials in the keychain, in Xcode, go to your project properties, and under the Capabilities tab, toggle “Keychain Sharing” on.



Now you can authenticate users for your app using their email and password.

Authenticating by email address (cont.)

Use `Auth.auth().createUser` to register a new user into the authentication database. It takes three arguments:

- `withEmail:` a text string, ideally the `text` parameter from a `textField` object.
- `password:` a similar text string.
- a closure specifying what to do once the user is created.

Authenticating by email address (cont.)

If there are no errors with the email address or password, use `Auth.auth().signIn` to authenticate an email address / password pair. It takes two arguments:

- `withEmail:` a text string, ideally the `text` parameter from a `textField` object.
- `password:` a similar text string.

Note: Firebase expects both the userid and password and be at least 7 characters long!

Authenticating by email address (cont.)

If we want to immediately log the user in once the account is created, we put the call to `signIn()` in the closure of `createUser()`:

```
// Assume uidField and pwdField are outlets of text fields

Auth.auth().createUser(
       withEmail: uidField.text!,
       password: pwdField.text!) { user, error in

     if error == nil {
         Auth.auth().signIn(
            withEmail: uidField.text!,
            password: pwdField.text!)
      }
}
```

Firestore

Using Firestore to store data

- Set up the Firebase server as shown earlier.
- When you add packages, include Firestore.
- In your project:

```
import FirebaseCore
import FIrebaseFirestore
```

- On the Firebase console, go to "Cloud Firestore" to set up a database. Define:
  - at least one *collection*: kind of like defining a class
  - at least one *document* within that collection: kind of like defining an object within a class
  - at least one *field* in each document: kind of like defining a property that all objects have

Firestore methods

`addDocument()` inserts a new item into a specified collection. It takes two arguments:

- `data`: a dictionary containing field names and values
- a *closure* that takes one argument, a Boolean that tells you whether an error occurred.

```
let db = Firestore.firestore()
var ref: DocumentReference? = nil

ref = db.collection("colName").addDocument(data:
        ["fieldName": valueToAssign]) { err in
    if let err = err {
        < code to run if an error occurs >
    } else {
        < code to run if no error occurs >
    }
}
```

Firestore methods

`getDocuments()` retrieves items from a specified collection. It takes one argument:

- a *closure* that takes two arguments, a *querySnapshot* that contains the items, and a Boolean that tells you whether an error occurred.

```
let db = Firestore.firestore()
var ref: DocumentReference? = nil

ref = db.collection("colName").getDocuments() {
    (querySnapshot, err) in
    if let err = err {
        < code to run if an error occurs >
    } else {
        < code to run if no error occurs >
    }
}
```