Hands-on tutorials

Deploy a Web App on AWS Amplify



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Deploy a Web App on AWS Amplify: Hands-on tutorials

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Congratulations	

Deploy a Web App on AWS Amplify

Overview

In this tutorial, you will learn how to deploy a web application with AWS Amplify. Amplify offers a Git-based CI/CD workflow for building, deploying, and hosting single-page web applications or static sites with serverless backends. With fullstack TypeScript capabilities, Amplify brings the power and breadth of AWS services to a familiar frontend developer experience. Simply author app requirements like data models, business logic, and auth rules in TypeScript. Amplify automatically configures the correct cloud resources and deploys them to per-developer cloud sandbox environments for fast, local iteration.

What you will accomplish

In this tutorial, you will learn how to:

- Create your first Amplify project
- Use Amplify to add authentication, a real-time API, and a database to your application
- Use Amplify libraries to connect the fronted with with AWS services
- Deploy a web app with AWS Amplify

Prerequisites

Before starting this tutorial, you will need:

- An AWS account: if you don't already have one follow the Setup Your Environment tutorial.
- Configure your AWS profile for local development.
- Installed on your environment: Nodejs and npm.
- Familiarity with git and a GitHub account.

Tasks

This tutorial is divided into the following tasks. You must complete each task before moving to the next one.

Overview 1

- 1. Task 1: Create a new Amplify Project (5 mins): Create a new application with Amplify.
- 2. <u>Task 2: Initialize the Amplify Backend</u> (10 mins): Initialize the AWS Amplify backend for your app.
- 3. Task 3: Build the Frontend (5 mins): Connect the app to the backend.
- 4. Task 4: Deploy the App: (10 mins): Deploy your new application.
- 5. Task 5: Clean up Resources: (2 mins): Clean up resources.

Tasks 2

Task 1: Create a new Amplify Project

Time to complete	5 minutes
Requires	 A <u>GitHub account</u> GitHub <u>SSH connection</u> <u>Nodejs</u> and <u>npm</u>
Get help	Troubleshooting Amplify

Overview

In this task, you will create a new web application using <u>React</u>, a JavaScript library for building user interfaces, and learn how to configure AWS Amplify for your first project.

What you will accomplish

- Create a new web application
- Set up Amplify on your project

Implementation

Step 1: Create a new Amplify Project

1. Check environment

In a new terminal window or command line, **run** the following commands to verify that you are running at least Node.js version 18.16.0 and npm version 6.14.4 or greater.

 If you are not running these versions, visit the <u>nodejs</u> and <u>npm website</u> for more information.

Overview 3



Note

Your output might differ based on the version installed.

```
node -v
npm -v
```

```
- -zsh - 80×24
aws-testing ~ % node -v
v20.14.0
aws-testing ~ % npm -v
10.7.0
```

Create a new React application

In a new terminal or command line window, run the following command to use Vite to create a React application:

```
npm create vite@latest expensetracker -- --template react
cd expensetracker
npm install
npm run dev
```

```
- npm create vite@latest expensetracker -- template react __CFBu...

aws-testing584962325871 ~ % npm create vite@latest expensetracker -- -- template re

act

cd expensetracker

npm install

npm run dev

Need to install the following packages:

create-vite@5.2.3

Ok to proceed? (y) y...
```

3. Open the local development server

In the terminal window, select and open the **Local link** to view the Vite + React application.



4. Install Amplify CLI

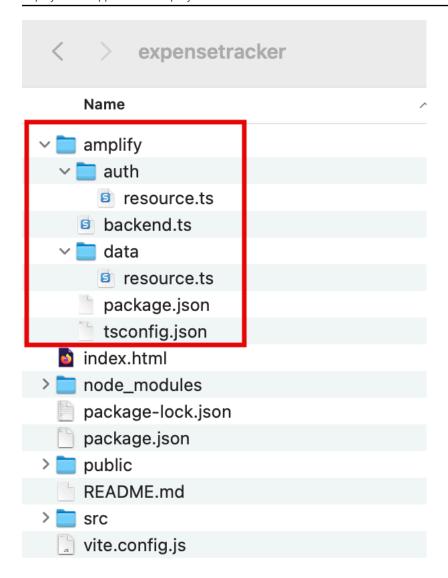
Open a new terminal window, **navigate** to your projects root folder (**expensetracker**), and **run** the following command:

```
npm create amplify@latest -y

    — npm create amplify@latest __CFBundleIdentifier=com.apple.Ter...

aws-testing5987498632157 ~ % npm create amplify@latest -y
١١:
 - aws-cdk-lib@^2
 - constructs@^10.0.0
 - typescript@^5.0.0
 - tsx
 esbuild
Installing dependencies:
 aws-amplify
✓ DevDependencies installed
✓ Dependencies installed
✓ Template files created
Successfully created a new project!
Welcome to AWS Amplify!
 - Get started by running npx ampx sandbox.
 - Run npx ampx help for a list of available commands.
Amplify Gen 2 collects anonymous telemetry data about general usage of the CLI.
Participation is optional, and you may opt-out by using npx ampx configure telem
etry disable. To learn more about telemetry, visit https://docs.amplify.aws/gen2
/reference/telemetry
```

Running the previous command will scaffold a lightweight Amplify project in the app's directory where you installed the packages.



Conclusion

In this task, you learned how to create a React frontend application, and installed the amplify packages in preparation to configure a backend for the app.

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Task 2: Initialize the Amplify Backend

Time to complete	10 minutes
Requires	 AWS profile <u>configured</u> for local developme nt A text editor. Here are a few free ones: Atom Notepad++ Sublime Vim Visual Studio Code
Get help	Troubleshooting Amplify

Overview

In this task you will use AWS Amplify to configure a cloud backend for the app. AWS Amplify Gen 2 uses a fullstack TypeScript developer experience (DX) for defining backends. Amplify offers a unified developer experience with hosting, backend, and UI-building capabilities and a code-first approach.

The app that you build in this tutorial is an expense tracker app that will allow users to create, delete, and list expenses. This example app is a starting point to learn how to build many popular types of CRUD+L (create, read, update, delete, and list) applications.

What you will accomplish

In this task, you will:

- Set up Amplify Authentication
- · Set up Amplify Data

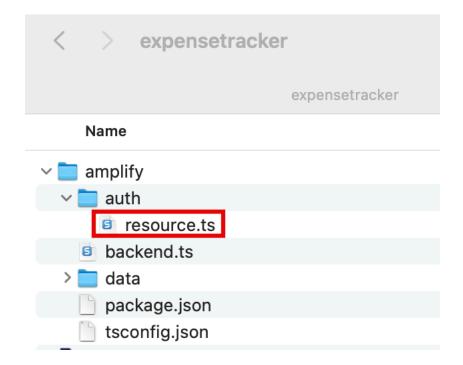
Overview 8

Step 1: Set up Amplify Auth

The app uses email as the default login mechanism. When the users sign up, they receive a verification email. In this step, you will customize the verification email.

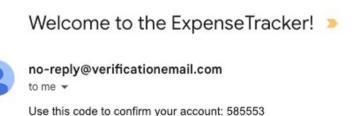
1. Update the resource file

On your local machine, navigate to the **amplify/auth/resource.ts** file, and use the following code to customize the verification email. Then, **save** the file.



2. View the customized email

This image shows an example of the customized verification email.



Step 2: Set up Amplify Data

In this step, you will define the schema for the Expense data model, and use a per-owner authorization rule **allow.owner()** to restrict the expense record's access to the owner of the record. Amplify will automatically add a **owner: a.string()** field to each expense which contains the expense owner's identity information upon record creation.

Update the resource file

On your local machine, navigate to the **amplify/data/resource.ts** file, and update the file with the following code to define the schema. Then, **save** the file.

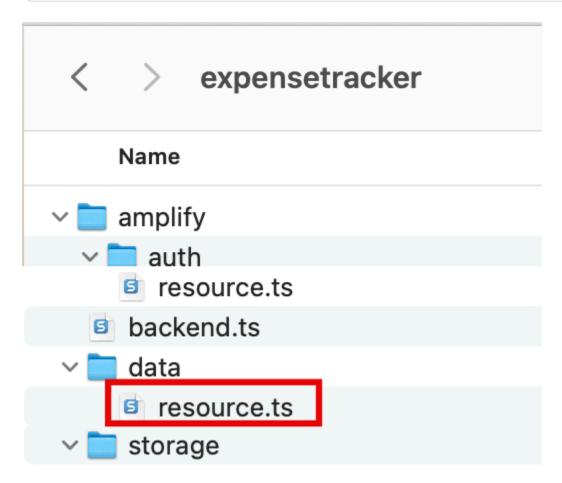
```
import { type ClientSchema, a, defineData } from '@aws-amplify/backend';

const schema = a.schema({
    Expense: a
        .model({
            name: a.string(),
            amount: a.float(),
        })
        .authorization((allow) => [allow.owner()]),
});

export type Schema = ClientSchema
<typeof schema>
;

export const data = defineData({
        schema,
        authorizationModes: {
```

```
defaultAuthorizationMode: 'userPool',
    },
});
```



Step 3: Deploy Amplify Cloud sandbox

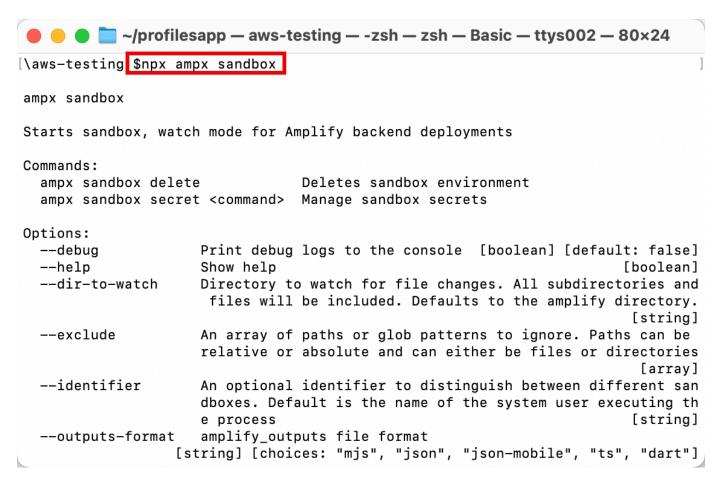
Note

The **amplify/backend.ts** file is already configured to import the auth and data backend definitions. You don't need to change it.

1. Deploy sandbox

Open a new terminal window, **navigate** to your app's root folder (**expensetracker**), and **run** the following command to deploy cloud resources into an isolated development space so you can iterate fast.

npx ampx sandbox



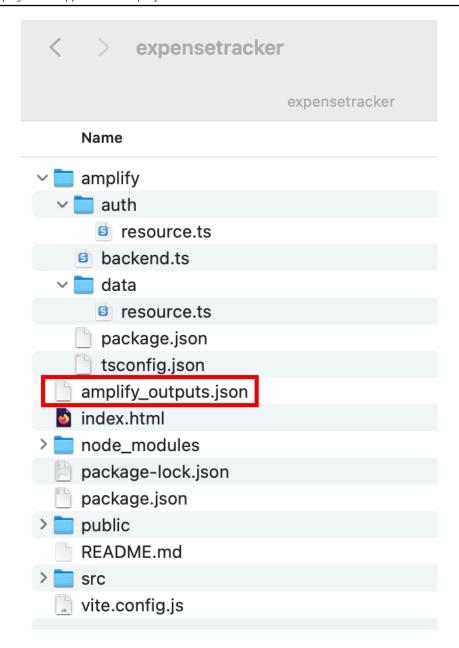
2. View confirmation message

After the cloud sandbox has been fully deployed, your terminal will display a **confirmation message.** This deployment will take several minutes to complete.

```
~/profilesapp — aws-testing — node ◄ npm exec ampx sandbox __CFBundleIdentifier...
amplify-profilesapp-
                             -sandbox-16ba761c9c.oauthRedirectSignOut =
amplify-profilesapp-
                             -sandbox-16ba761c9c.oauthResponseType = code
                             -sandbox-16ba761c9c.oauthScope = ["profile", "phone", "email", "o
amplify-profilesapp-
                             ser.admin"]
penid", "aws.cognito.
amplify-profilesapp-
                             -sandbox-16ba761c9c.passwordPolicyMinLength = 8
amplify-profilesapp-
                             -sandbox-16ba761c9c.passwordPolicyRequirements = ["REQUIRES_NU
MBERS", "REQUIRES_LOW
                             "REQUIRES_UPPERCASE", "REQUIRES_SYMBOLS"]
amplify-profilesapp-
                             -sandbox-16ba761c9c.region = us-east-1
amplify-profilesapp-
                             -sandbox-16ba761c9c.signupAttributes = ["email"]
amplify-profilesapp-
                             -sandbox-16ba761c9c.socialProviders =
amplify-profilesapp-
                             -sandbox-16ba761c9c.userPoolId = us-east-1_k6GaOT9pW
amplify-profilesapp-
                             -sandbox-16ba761c9c.usernameAttributes = ["email"]
amplify-profilesapp-
                             -sandbox-16ba761c9c.verificationMechanisms = ["email"]
amplify-profilesapp-
                             -sandbox-16ba761c9c.webClientId = 2sdo9
                                                                                   bg3dg1g
Stack ARN:
                                              :stack/amplify-profilesapp-
arn:aws:cloudformation:us-east-1:
                                                                                  -sandbox-1
6ba761c9c/381d7e30-
                                            153
    Total time: 192.38s
[Sandbox] Watching for file changes...
File written: amplify_outputs.json
```

Verify output file

Verify that the amplify_outputs.json file was generated and added to your project.



Conclusion

In this task, you used Amplify to configure auth and data resources. You also started your own cloud sandbox environment. In the next module, you will connect your app's frontend to your backend and build app features.

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Task 3: Build the Frontend

Time to complete	5 minutes
Get help	Troubleshooting Amplify

Overview

In this task, you will learn how to use the Amplify UI component library to scaffold out an entire user authentication flow, allow users to sign up, sign in, and reset their password with just few lines of code. Additionally, you will build an app frontend that allows users to create, update, and delete their expenses.

What you will accomplish

In this task, you will:

- Install the Amplify client libraries
- Configure your React app to include authentication, data, and storage for the expenses feature

Implementation

Step 1: Install the Amplify libraries

You will need two Amplify libraries for your project. The main **aws-amplify library** contains all of the client-side APIs for connecting our app's frontend to our backend, and the **@aws-amplify/ui-react** library contains framework-specific UI components.

Install the libraries

Open a new terminal window, **navigate** to your projects root folder (**expensetracker**), and **run** the following command to install these libraries in the root of the project.

```
npm install aws-amplify @aws-amplify/ui-react
```

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```
| Aws-testing $cd expensetracker | Aws-testing | Aws-testing $cd expensetracker | Aws-testing $npm install aws-amplify @aws-amplify/ui-react | Added 75 packages, and audited 1642 packages in 10s |

178 packages are looking for funding run `npm fund` for details |

found @ vulnerabilities | Aws-testing $ |
```

Step 2: Style the App UI

Navigate to the CSS

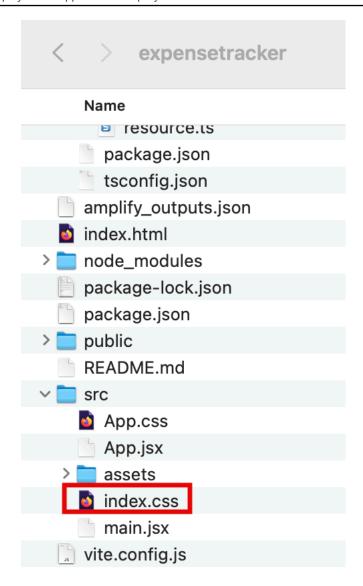
On your local machine, navigate to the **expensetracker/src/index.css** file. Replace your CSS with the following CSS:

```
:root {
  font-family: Inter, system-ui, Avenir, Helvetica, Arial, sans-serif;
  line-height: 1.5;
  font-weight: 400;

color: rgba(255, 255, 255, 0.87);

font-synthesis: none;
  text-rendering: optimizeLegibility;
  -webkit-font-smoothing: antialiased;
  -moz-osx-font-smoothing: grayscale;
```

```
max-width: 1280px;
  margin: 0 auto;
  padding: 2rem;
}
.card {
  padding: 2em;
}
.read-the-docs {
  color: #888;
}
.box:nth-child(3n + 1) {
  grid-column: 1;
}
.box:nth-child(3n + 2) {
  grid-column: 2;
.box:nth-child(3n + 3) {
  grid-column: 3;
}
```



Step 3: Implement the UI flow for Expenses feature

In this step, you will update the **src/App.jsx** file to configure the Amplify library with the client configuration file (**amplify_outputs.json**). Then, it will generate a data client using the **generateClient()** function.

The code uses the Amplify Authenticator component to scaffold out an entire user authentication flow allowing users to sign up, sign in, reset their password, and confirm sign-in for multifactor authentication (MFA).

Additionally, the code contains the following:

• A code to use a real-time **observeQuery** to subscribe to a live feed of the user's expenses data.

- createExpense Get the data from the form and use the data client to create a new expense.
- **deleteExpense** Use the data client to delete the selected expense.
- 1. Update the App.jsx file

On your local machine, navigate to the expensetracker/src/app.jsx file.

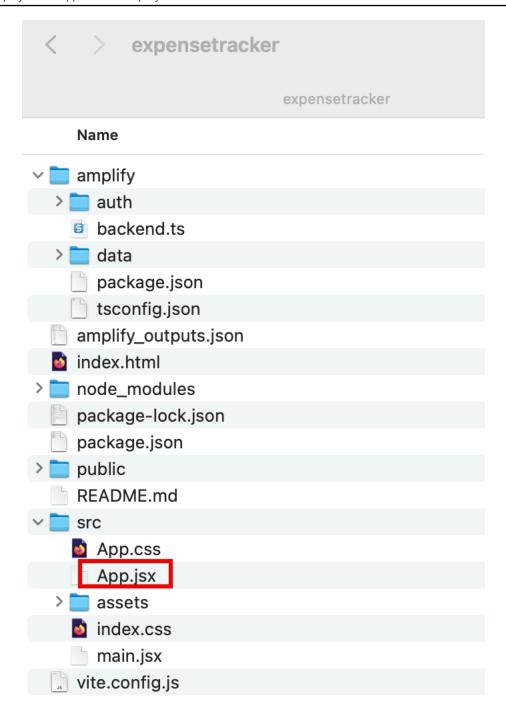
Replace the code in the App.jsx with the following code from this file. Then, save the updated file.

```
import { useState, useEffect } from "react";
import {
  Authenticator,
  Button,
 Text,
 TextField,
  Heading,
  Flex,
  View,
  Grid,
  Divider,
} from "@aws-amplify/ui-react";
import { Amplify } from "aws-amplify";
import "@aws-amplify/ui-react/styles.css";
import { generateClient } from "aws-amplify/data";
import outputs from "../amplify_outputs.json";
/**
 * @type {import('aws-amplify/data').Client<import('../amplify/data/
resource').Schema>}
 */
Amplify.configure(outputs);
const client = generateClient({
  authMode: "userPool",
});
export default function App() {
  const [expenses, setExpenses] = useState([]);
  useEffect(() => {
    client.models.Expense.observeQuery().subscribe({
```

```
next: (data) => setExpenses([...data.items]),
  });
}, []);
async function createExpense(event) {
  event.preventDefault();
  const form = new FormData(event.target);
  await client.models.Expense.create({
    name: form.get("name"),
    amount: form.get("amount"),
  });
  event.target.reset();
}
async function deleteExpense({ id }) {
  const toBeDeletedExpense = {
    id,
  };
  await client.models.Expense.delete(toBeDeletedExpense);
}
return (
  <Authenticator>
    {({ signOut }) => (
      <Flex
        className="App"
        justifyContent="center"
        alignItems="center"
        direction="column"
        width="70%"
        margin="0 auto"
        <Heading level={1}>Expense Tracker</Heading>
        <View as="form" margin="3rem 0" onSubmit={createExpense}>
          <Flex
            direction="column"
            justifyContent="center"
            gap="2rem"
            padding="2rem"
            <TextField
```

```
name="name"
      placeholder="Expense Name"
      label="Expense Name"
      labelHidden
      variation="quiet"
      required
    />
    <TextField
      name="amount"
      placeholder="Expense Amount"
      label="Expense Amount"
      type="float"
      labelHidden
      variation="quiet"
      required
    />
    <Button type="submit" variation="primary">
      Create Expense
    </Button>
  </Flex>
</View>
<Divider />
<Heading level={2}>Expenses/Heading>
<Grid
 margin="3rem 0"
  autoFlow="column"
  justifyContent="center"
  gap="2rem"
  alignContent="center"
  {expenses.map((expense) => (
    <Flex
      key={expense.id || expense.name}
      direction="column"
      justifyContent="center"
      alignItems="center"
      gap="2rem"
      border="1px solid #ccc"
      padding="2rem"
      borderRadius="5%"
      className="box"
      <View>
```

```
<Heading level="3">{expense.name}</Heading>
                </View>
                <Text fontStyle="italic">${expense.amount}</Text>
                <Button
                  variation="destructive"
                  onClick={() => deleteExpense(expense)}
                  Delete note
                </Button>
              </Flex>
            ))}
          </Grid>
          <Button onClick={signOut}>Sign Out</Button>
        </Flex>
      )}
    </Authenticator>
  );
}
```



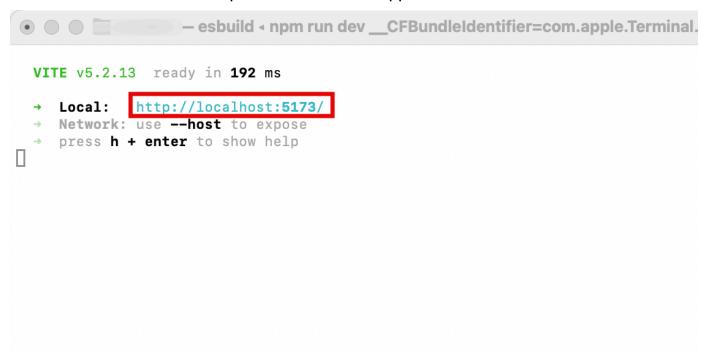
2. Launch the app

Open a new terminal window, **navigate** to your projects root folder (**expensetracker**), and **run** the following command to launch the app:

npm run dev

3. Open the app

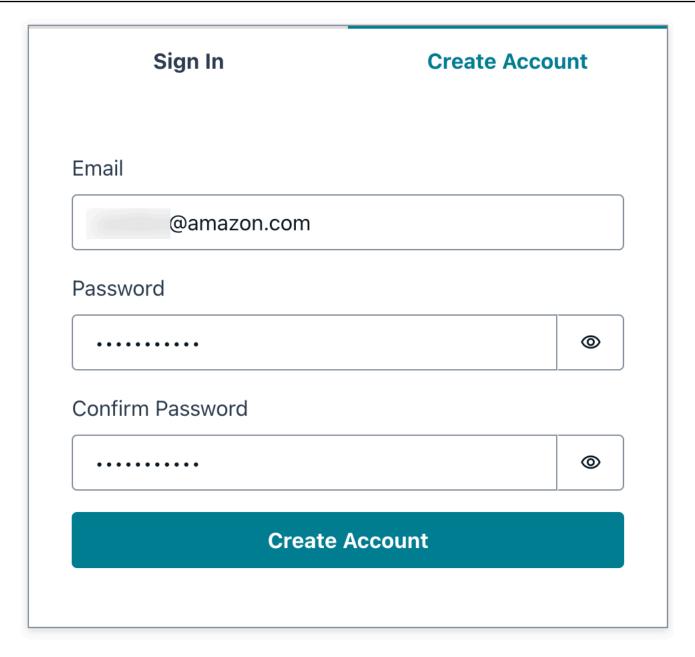
Select the **Local host link** to open the Vite + React application.



4. Create an account

Choose the **Create Account** tab, and use the authentication flow to create a new user by entering your **email address** and a **password**.

Then, choose **Create Account**.



5. Enter verification code

You will get a verification code sent to your email.

Enter the **verification code** to log into the app.

We Emailed You Your code is on the way. To log in, enter the code we emailed to @a***. It may take a minute to arrive. Confirmation Code 123456 Confirm

Resend Code

6. Create and delete expenses

When signed in, you can start creating expenses and delete them.

Expense Tracker

Hotel

162.00

Create Expense

Conclusion

You have now connected your App to the Amplify backend and built a frontend allowing the users to create, edit, and delete expenses.

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Task 4: Deploy the App

Time to complete	10 minutes
Get help	Troubleshooting Amplify

Overview

In this task, you will store your application on a GitHub repository, and then set up continuous deployment using the Amplify Console.

What you will accomplish

In this task, you will:

- Connect a Github repository to Amplify
- Set up continuous deployment using Amplify

Implementation

Step 1: Initialize GitHub repository

In this step, you will create a GitHub repository and commit your code to the repository. You will need a GitHub account to complete this step. If you do not have an account, sign up here.



Note

If you have never used GitHub on your computer, follow these steps before continuing to allow connection to your account.

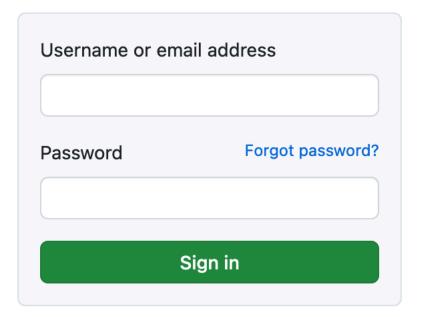
Sign in to GitHub

Sign in to GitHub at https://github.com/.

Overview



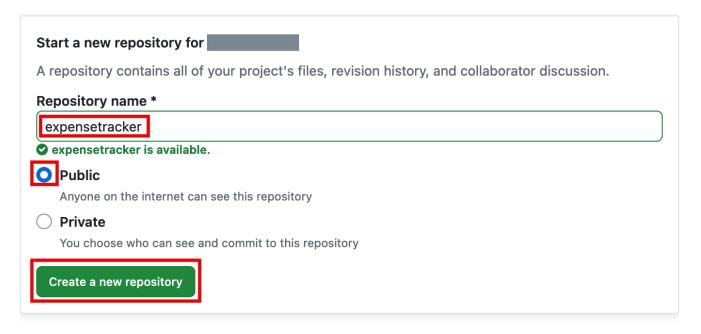
Sign in to GitHub



2. Start a new repository

In the **Start a new repository** section, make the following selections:

- For Repository name, enter expensetracker, and choose the Public radio button.
- Then select, Create a new repository.



3. Initialize git and push the application

Open a new terminal window, **navigate** to your projects root folder (**expensetracker**), and run the following commands to initialize a git and push of the application to the new GitHub repo:



Note

Replace the SSH GitHub URL in the command with your GitHub URL.

```
git init
git add .
git commit -m "first commit"
git remote add origin git@github.com:<your-username>/profilesapp.git git branch -M
git push -u origin main
```

```
💿 🔘 📗 expensetracker — git-remote-https ∢ git push -u origin main — 84×29
        6c7e67ba14d4 ~ % cd expensetracker
        6c7e67ba14d4 expensetracker % git init
Initialized empty Git repository in /Users/
                                                  /expensetracker/.git/
       @6c7e67ba14d4 expensetracker % git add .
       @6c7e67ba14d4 expensetracker % git commit -m "first commit"
[main (root-commit) e31a872] first commit
19 files changed, 4746 insertions(+)
create mode 100644 .eslintrc.cjs
create mode 100644 .gitignore
create mode 100644 README.md
create mode 100644 amplify/auth/resource.ts
create mode 100644 amplify/backend.ts
create mode 100644 amplify/data/resource.ts
create mode 100644 amplify/package.json
create mode 100644 amplify/tsconfig.json
create mode 100644 amplify_outputs.json
create mode 100644 index.html
create mode 100644 package-lock.json
create mode 100644 package.json
create mode 100644 public/vite.svg
create mode 100644 src/App.css
create mode 100644 src/App.jsx
create mode 100644 src/assets/react.svg
create mode 100644 src/index.css
create mode 100644 src/main.jsx
create mode 100644 vite.config.js
       @6c7e67ba14d4 expensetracker % git branch -M main
       @6c7e67ba14d4 expensetracker % git remote add origin https://github.com/
        /expensetracker
        6c7e67ba14d4 expensetracker % git push -u origin main
```

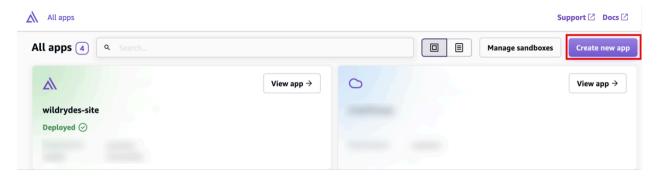
Step 2: Create your app with AWS Amplify

In this step, you will connect the GitHub repository you just created to the AWS Amplify. This will allow you to build, deploy, and host your app on AWS.

1. Create a new app

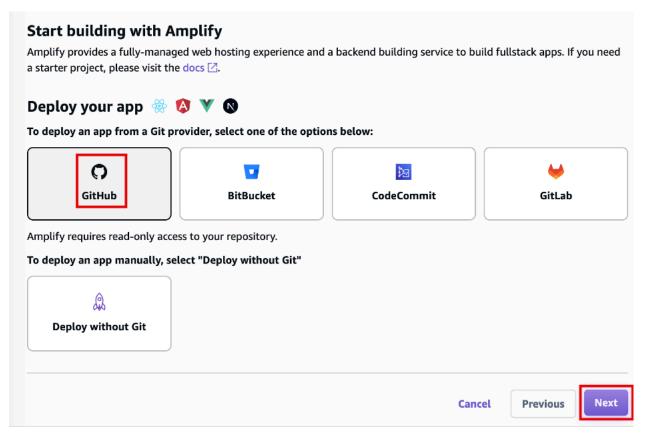
Sign in to the AWS Management Console in a new browser window, and **open** the AWS Amplify console at https://console.aws.amazon.com/amplify/apps.

Choose Create new app.



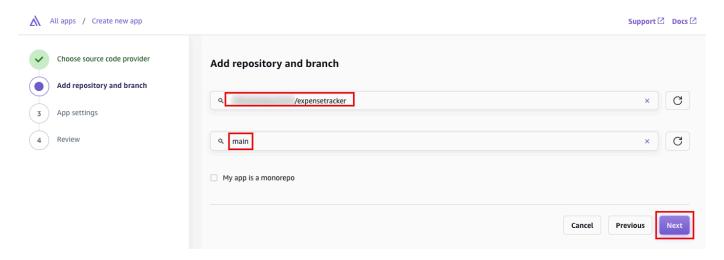
2. Choose GitHub for deployment

On the **Start building with Amplify** page, for **Deploy your app**, select **GitHub**, and select **Next**.



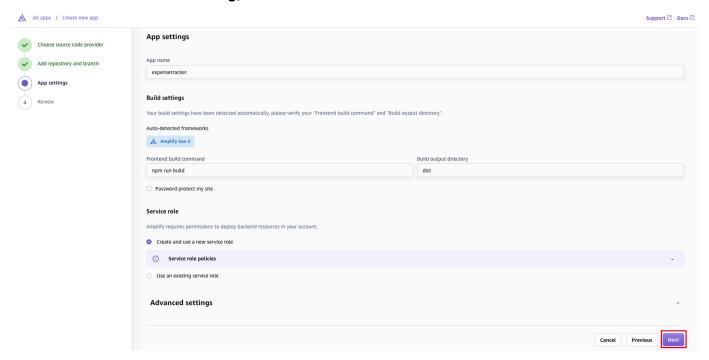
3. Add your repository and main branch

When prompted, **authenticate** with GitHub. You will be automatically redirected back to the Amplify console. Choose the **repository** and **main branch** that you created earlier. Then, select **Next**.



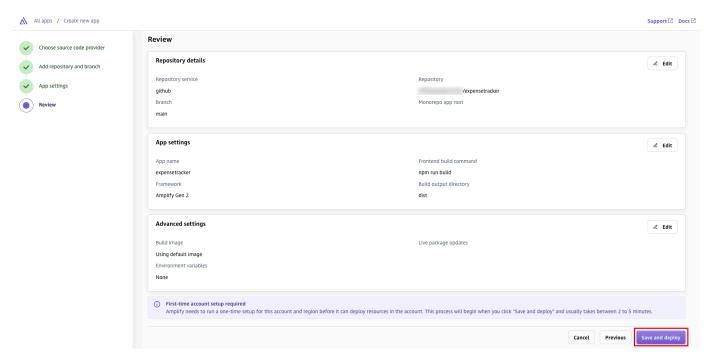
4. Confirm default settings

Leave the default **build setting**, and select **Next**.



5. Review settings

Review the inputs selected and choose Save and deploy.



6. Verify app deployment

AWS Amplify will now **build** your source code and **deploy** your app at **https://...amplifyapp.com**, and on every git push your deployment instance will update. It may take up to 5 minutes to deploy your app.

Once the build completes, select the **Visit deployed URL** button to see your web app up and running live.



Task 5: Clean up Resources

Time to complete < 2 minutes

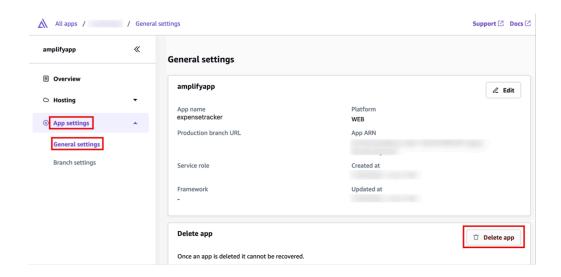
Overview

In this task, you will go through the steps to delete all the resources you created throughout this tutorial. It is a best practice to delete resources you are no longer using to avoid unwanted charges.

Implementation

Step 1: Delete the app

- In the Amplify console, in the left-hand navigation for the expensetracker app, choose App settings, and select General settings.
- 2. In the **General settings** section, choose **Delete app**.



Congratulations

You have deployed a React application in the AWS Cloud by integrating with GitHub and using AWS Amplify. With AWS Amplify, you can continuously deploy your application in the cloud and host it on a globally available CDN.

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