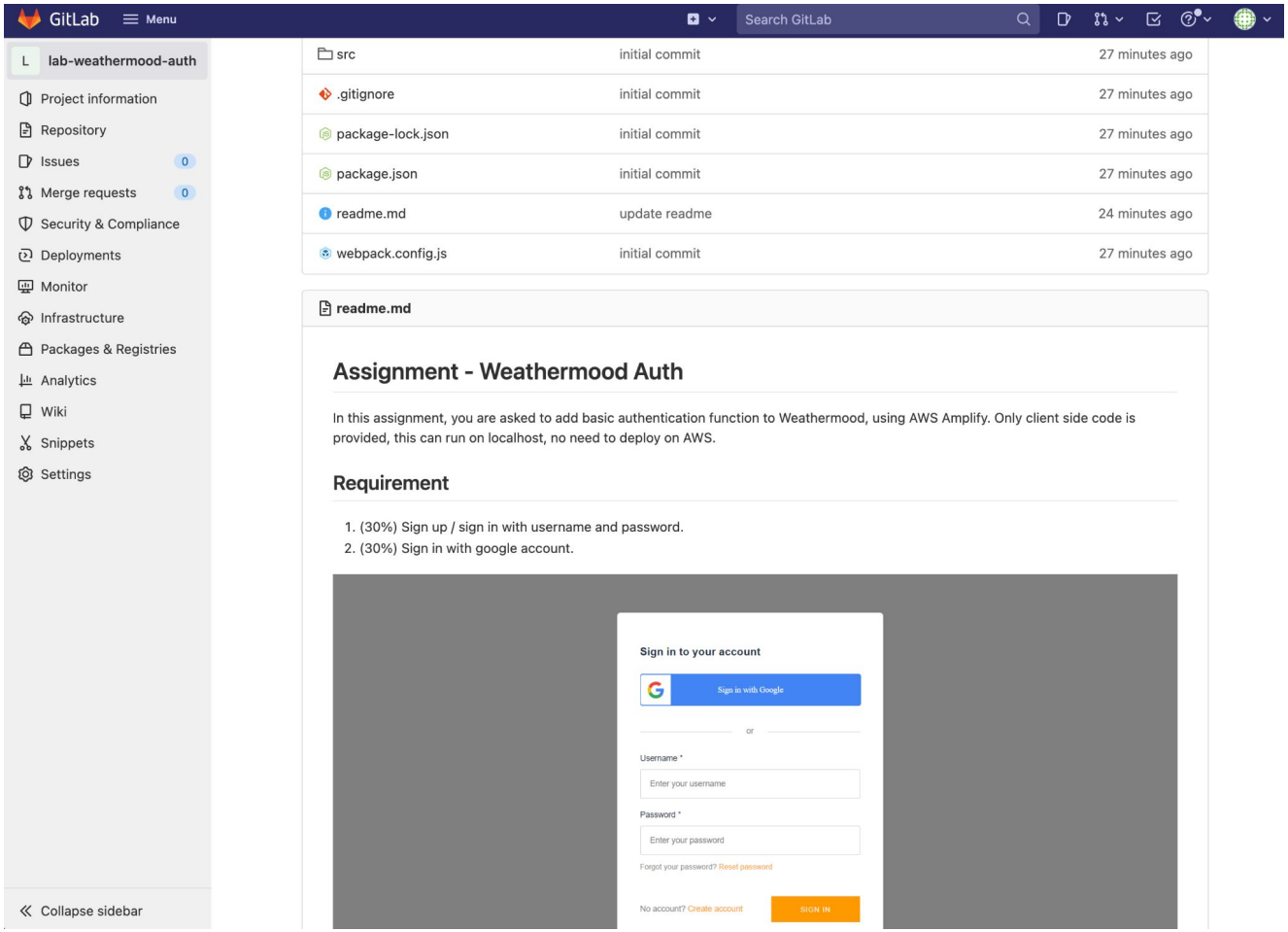
# Lab 9
# Authentication with AWS
## (Amplify + Cognito)

Software Studio
Datalab, CS, NTHU
2023

# Gitlab

## lab-weathermood-auth



# Outline

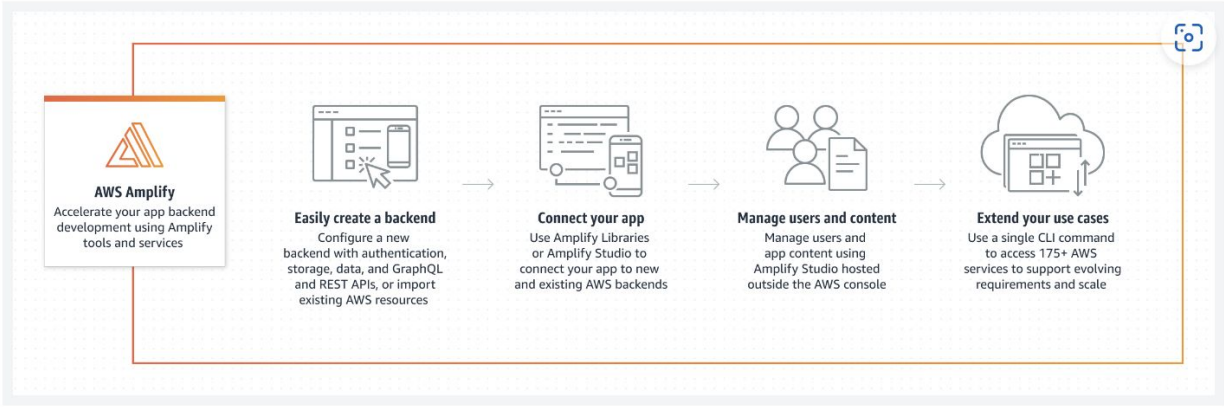
1. AWS Amplify & Cognito
2. Lab-weathermood-auth
3. Some helpful docs / tutorials

# AWS Amplify

AWS Amplify is a complete solution that lets frontend web and mobile developers easily build, ship, and host full-stack applications on AWS, with the flexibility to leverage the breadth of AWS services as use cases evolve. No cloud expertise needed.

**Create an app backend** | **Build a frontend UI** | **Host a web app**

Create a cross-platform backend for your iOS, Android, Flutter, web, or React Native app with real-time and offline functionality in just a few clicks.



# AWS Amplify

## Build

Use the Amplify Studio or Amplify CLI to configure an app backend, and use the Amplify libraries and UI components to connect your app to your backend.

### Authentication

Create seamless on-boarding flows with a fully-managed user directory and pre-built sign-up, sign-in, forgot password, and multi-factor auth workflows. Amplify also supports login with a social provider such as Facebook, Google Sign-In, or Login With Amazon and provides fine grained access control to mobile and web applications. Powered by Amazon Cognito.

### Push notifications

Improve customer engagement by using marketing and analytics capabilities. Leverage customer insights to segment and target your customers more effectively. You can tailor your content and communicate through multiple channels including email, texts as well as push notifications. Powered by Amazon Pinpoint.

### Analytics

Understand the behavior of your web, iOS or Android users. Use auto tracking to track user sessions and web page metrics or create custom user attributes and in-app metrics. Get access to real time data stream and analyze the data for customer insights and build data driven marketing strategies to drive customer adoption, engagement, and retention. Powered by Amazon Pinpoint and Amazon Kinesis.

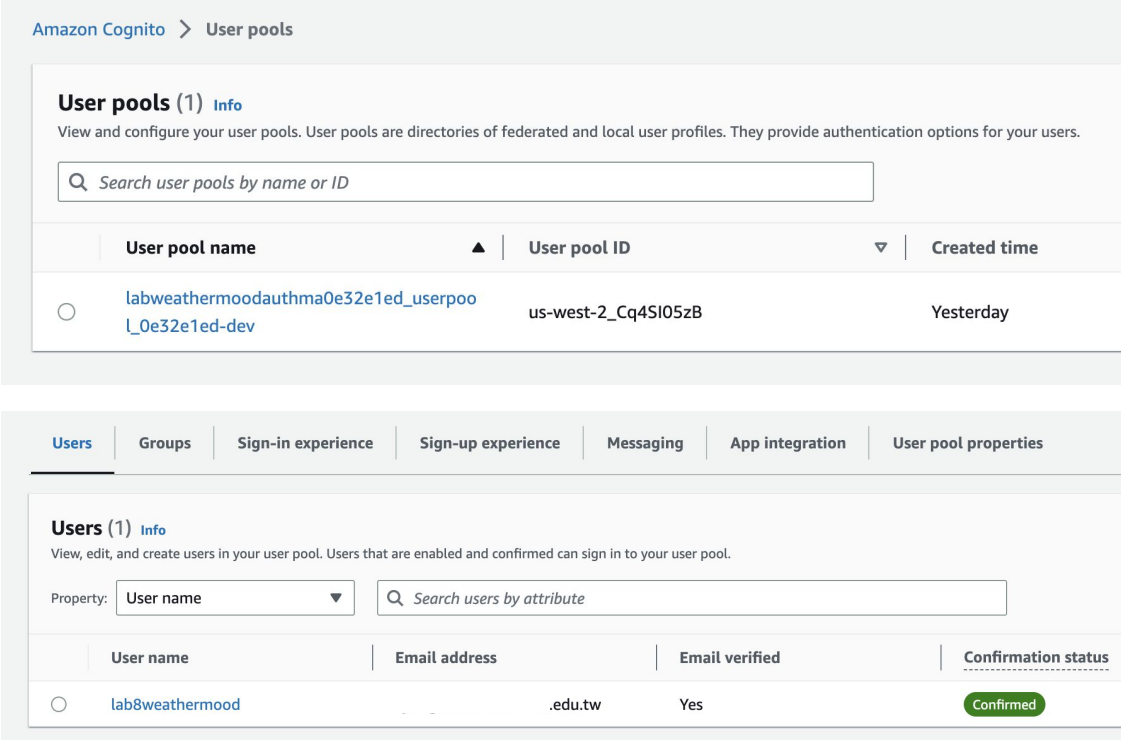
### API

Make secure HTTP requests to GraphQL and REST endpoints to access, manipulate, and combine data from one or more data sources such Amazon DynamoDB, Amazon Aurora Serverless, and your custom data sources with AWS Lambda. Amplify enables you to easily build scalable applications that require real-time updates, local data access for offline scenarios, and data synchronization with customizable conflict resolution when devices are back online. Powered by AWS AppSync and Amazon API Gateway.

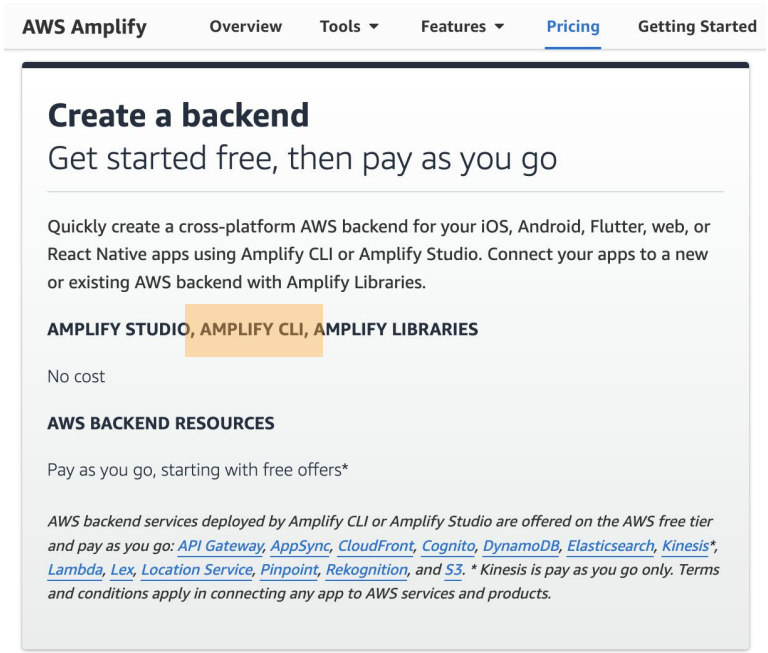
We will be using the auth service from Amplify, which is powered by Cognito

# AWS Cognito

- Cognito provides sign-up and authentication functions to your mobile and web apps
- Also enables authentication through external identity providers, and provides temporary credentials to access your app's backend resources in AWS



# Free tier policy



AWS Amplify Overview Tools Features Pricing Getting Started

## Create a backend

Get started free, then pay as you go

Quickly create a cross-platform AWS backend for your iOS, Android, Flutter, web, or React Native apps using Amplify CLI or Amplify Studio. Connect your apps to a new or existing AWS backend with Amplify Libraries.

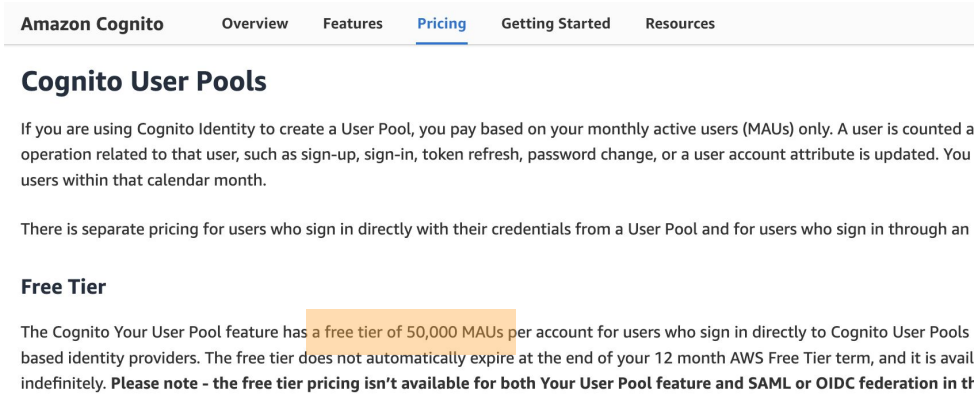
**AMPLIFY STUDIO, AMPLIFY CLI, AMPLIFY LIBRARIES**

No cost

**AWS BACKEND RESOURCES**

Pay as you go, starting with free offers*

*AWS backend services deployed by Amplify CLI or Amplify Studio are offered on the AWS free tier and pay as you go: API Gateway, AppSync, CloudFront, Cognito, DynamoDB, Elasticsearch, Kinesis*, Lambda, Lex, Location Service, Pinpoint, Rekognition, and S3. * Kinesis is pay as you go only. Terms and conditions apply in connecting any app to AWS services and products.*



Amazon Cognito Overview Features Pricing Getting Started Resources

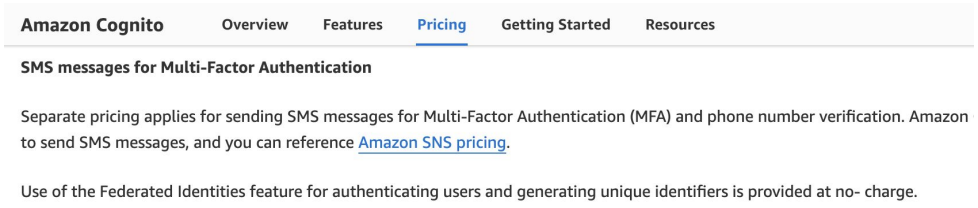
## Cognito User Pools

If you are using Cognito Identity to create a User Pool, you pay based on your monthly active users (MAUs) only. A user is counted a operation related to that user, such as sign-up, sign-in, token refresh, password change, or a user account attribute is updated. You users within that calendar month.

There is separate pricing for users who sign in directly with their credentials from a User Pool and for users who sign in through an

### Free Tier

The Cognito Your User Pool feature has a free tier of 50,000 MAUs per account for users who sign in directly to Cognito User Pools based identity providers. The free tier does not automatically expire at the end of your 12 month AWS Free Tier term, and it is avail indefinitely. **Please note - the free tier pricing isn't available for both Your User Pool feature and SAML or OIDC federation in th**



Amazon Cognito Overview Features Pricing Getting Started Resources

**SMS messages for Multi-Factor Authentication**

Separate pricing applies for sending SMS messages for Multi-Factor Authentication (MFA) and phone number verification. Amazon to send SMS messages, and you can reference Amazon SNS pricing.

Use of the Federated Identities feature for authenticating users and generating unique identifiers is provided at no- charge.

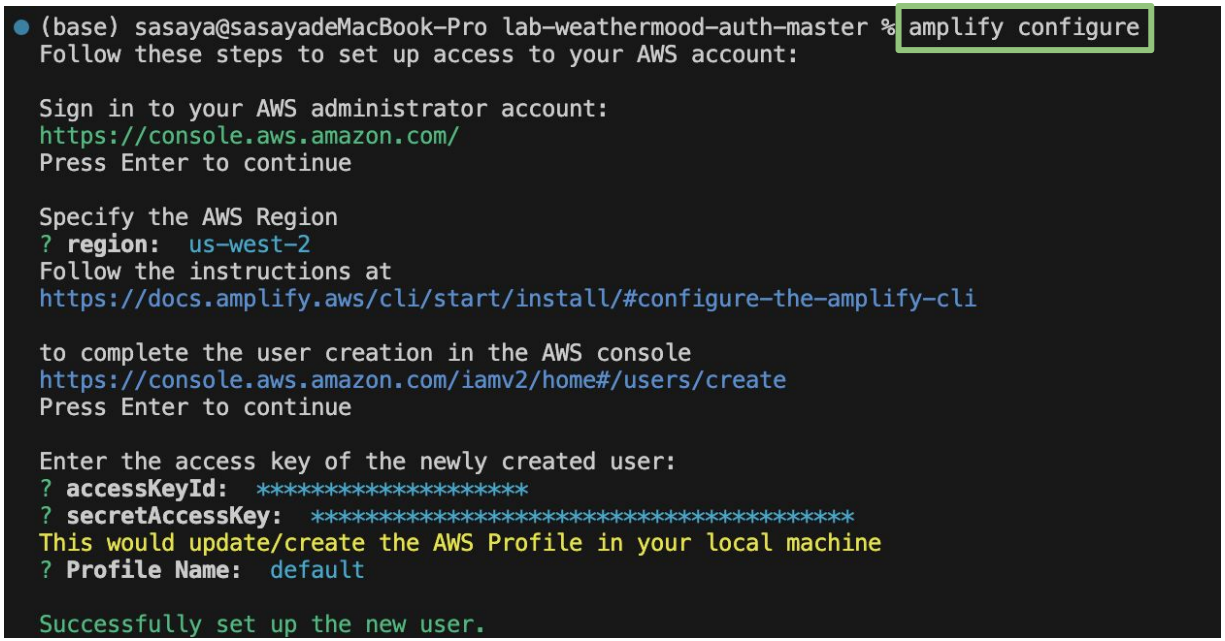
# Lab-weathermood-auth

In today's lab, we will show you how to

1. Install Amplify CLI
2. Init authentication service
3. Add packages to your project
4. Add authentication to your project
5. Add sign in with Google
6. Get user data
7. Create greeting components and customize the components

# Install Amplify

1. `npm install -g @aws-amplify/cli`
   - troubleshooting: `Error: EACCES: permission denied` see [npm Docs]
2. `amplify configure`
   - An AWS browser page will popup and ask you to create an IAM user
   - Give the user the “AdministratorAccess” permission



# Install Amplify

3. `amplify init`

```
● (base) sasaya@sasayadeMacBook-Pro lab-weathermood-auth-master % amplify init
Note: It is recommended to run this command from the root of your app directory
? Enter a name for the project labweathermoodauthma
The following configuration will be applied:

Project information
| Name: labweathermoodauthma
| Environment: dev
| Default editor: Visual Studio Code
| App type: javascript
| Javascript framework: react
| Source Directory Path: src
| Distribution Directory Path: build
| Build Command: npm run-script build
| Start Command: npm run-script start

? Initialize the project with the above configuration? No
? Enter a name for the environment dev
? Choose your default editor: Visual Studio Code
✔ Choose the type of app that you're building · javascript
Please tell us about your project
? What javascript framework are you using react
? Source Directory Path:  src
? Distribution Directory Path: dist
? Build Command:  npm run-script build
? Start Command: npm run-script start
Using default provider  awscloudformation
? Select the authentication method you want to use: AWS profile

For more information on AWS Profiles, see:
https://docs.aws.amazon.com/cli/latest/userguide/cli-configure-profiles.html

? Please choose the profile you want to use default
Adding backend environment dev to AWS Amplify app: d3pvw3tqv8zok3

Deployment completed.
Deploying root stack labweathermoodauthma [ ====================-------------------- ]
        amplify-labweathermoodauthma-… AWS::CloudFormation::Stack     CREATE_IN_PROGRES
        AuthRole                       AWS::IAM::Role                 CREATE_COMPLETE
        DeploymentBucket               AWS::S3::Bucket                CREATE_IN_PROGRES
        UnauthRole                     AWS::IAM::Role                 CREATE_COMPLETE

✔ Help improve Amplify CLI by sharing non sensitive configurations on failures (y/N) ·
Deployment state saved successfully.
✔ Initialized provider successfully.
✅ Initialized your environment successfully.

Your project has been successfully initialized and connected to the cloud!
```

# Install Amplify

More amplify commands

```
Some next steps:
"amplify status" will show you what you've added already and if it's locally configured or deployed
"amplify add <category>" will allow you to add features like user login or a backend API
"amplify push" will build all your local backend resources and provision it in the cloud
"amplify console" to open the Amplify Console and view your project status
"amplify publish" will build all your local backend and frontend resources (if you have hosting categ

Pro tip:
Try "amplify add api" to create a backend API and then "amplify push" to deploy everything
```

Note: for Windows users running amplify cli, there will be many option-choosing operation. If you are experiencing difficulty operating it, don’t use git bash, use the build-in cmd or power shell.

# Add authentication service

1. `amplify add auth`
2. `amplify push`
   - Push local changes to the cloud
   - This will generate an export file, which will be used later

```
(base) sasaya@sasayadeMacBook-Pro lab-weathermood-auth-master % amplify add auth
Using service: Cognito, provided by: awscloudformation

 The current configured provider is Amazon Cognito.

 Do you want to use the default authentication and security configuration? Default configuration
 Warning: you will not be able to edit these selections.
 How do you want users to be able to sign in? Username
 Do you want to configure advanced settings? No, I am done.
✅ Successfully added auth resource labweathermoodauthma0e32e1ed locally
```

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# Add packages to your project

1. Install package for development `npm install --save aws-amplify @aws-amplify/ui-react`

2. Import packages and call Amplify in index.jsx

```
import Amplify from 'aws-amplify';
import config from "./aws-exports";

Amplify.configure(config);
```

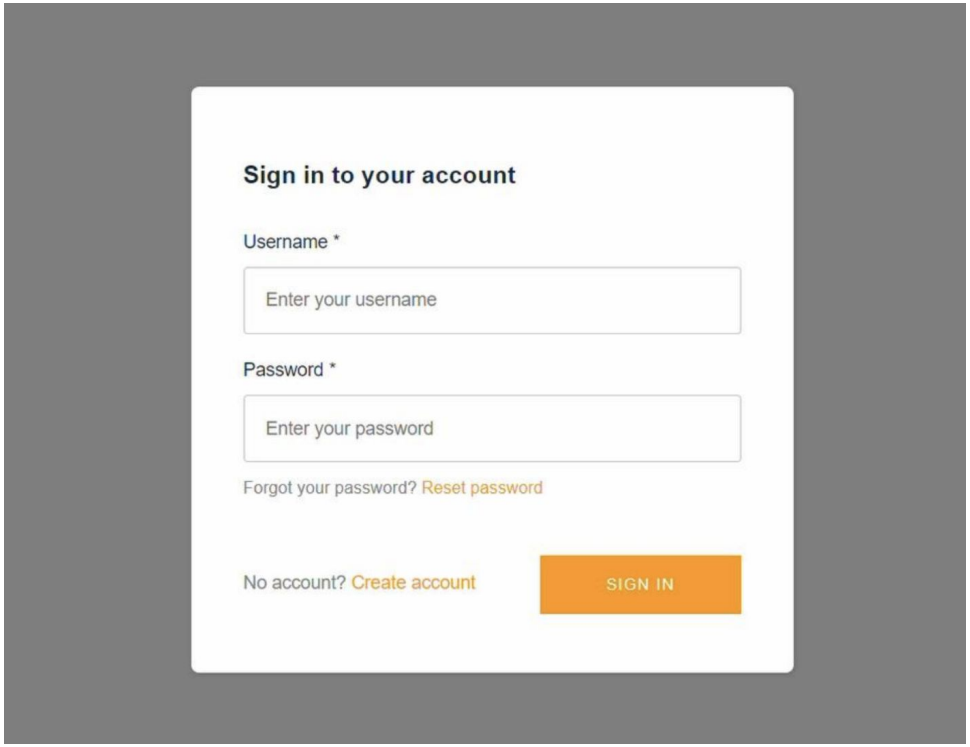
# Add authentication in your project

1. In main.jsx, wrap your main component with HOC function
2. `amplify push`
3. `npm run start`
4. Then you could see a login screen in your website

```
import {withAuthenticator} from "@aws-amplify/ui-react";
```

```
export default withAuthenticator(connect(state => ({
    ...state.main,
    searchText: state.searchText,
}))(Main));
```

# Add authentication in your project



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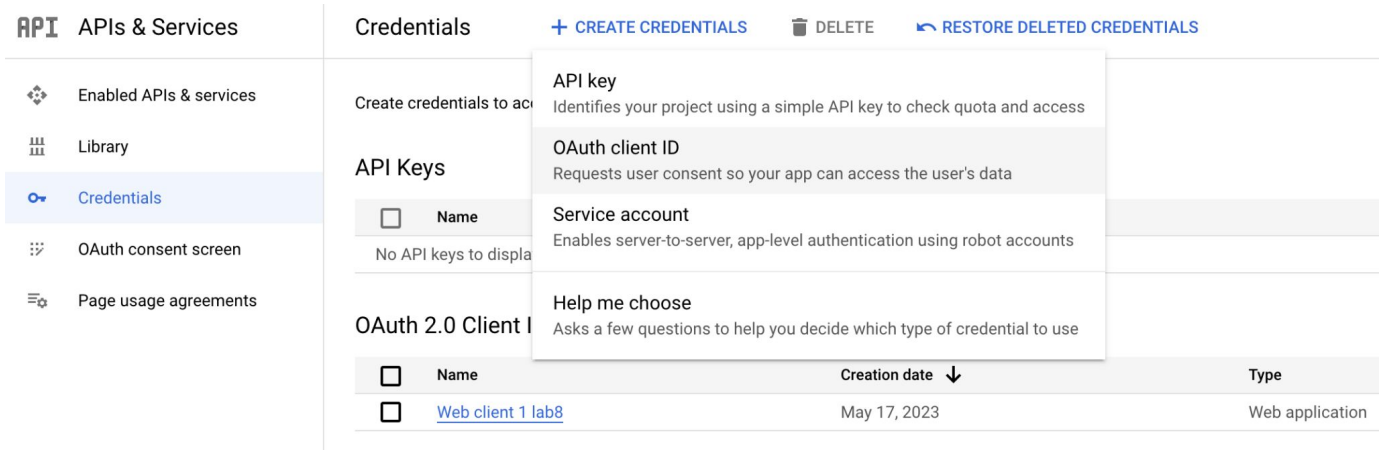
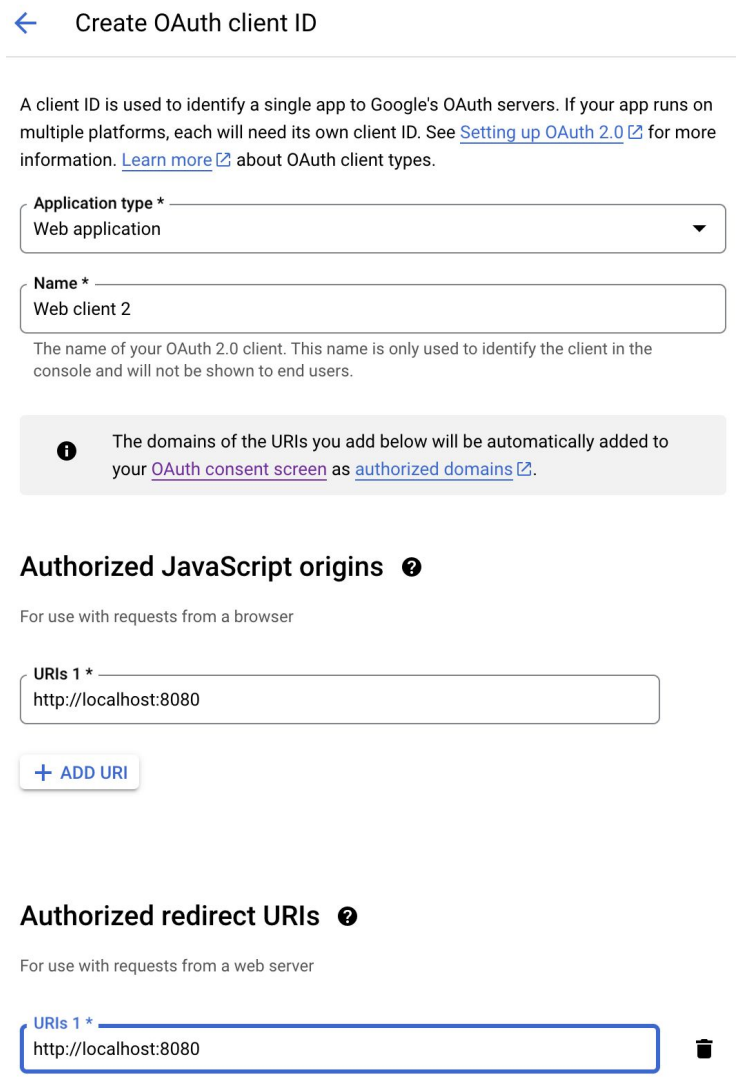
# Add sign in with Google

Create Google client id for Google sign in

1. Google Cloud Console > APIs & Services > Create project
2. APIs & Services > Credentials > Create credentials > OAuth client ID
   - Configure consent screen
   - Configure your url (in this lab, http://localhost:8080)
   - Save your client ID and client secret



# Add sign in with Google



# Add login with Google

`amplify update auth`, then `amplify push`

```
● (base) sasaya@sasayadeMacBook-Pro lab-weathermood-auth-master % amplify update auth
  Please note that certain attributes may not be overwritten if you choose to use defaults settings.
  Using service: Cognito, provided by: awscloudformation
   What do you want to do? Walkthrough all the auth configurations
   Select the authentication/authorization services that you want to use: User Sign-Up, Sign-In, connected with AWS IAM controls (Enables per-user Storage features for
   Allow unauthenticated logins? (Provides scoped down permissions that you can control via AWS IAM) No
   Do you want to enable 3rd party authentication providers in your identity pool? Yes
   Select the third party identity providers you want to configure for your identity pool: Google

   You've opted to allow users to authenticate via Google.  If you haven't already, you'll need to go to https://developers.google.com/identity and create an App ID.

   Enter your Google Web Client ID for your identity pool:  543569104988-aticenfgnbdsjvdpag9          5gq.apps.googleusercontent.com
   Do you want to add User Pool Groups? No
   Do you want to add an admin queries API? No
   Multifactor authentication (MFA) user login options: OFF
   Email based user registration/forgot password: Enabled (Requires per-user email entry at registration)
   Specify an email verification subject: Your verification code
   Specify an email verification message: Your verification code is {####}
   Do you want to override the default password policy for this User Pool? No
   Specify the app's refresh token expiration period (in days): 30
   Do you want to specify the user attributes this app can read and write? No
   Do you want to enable any of the following capabilities?
   Do you want to use an OAuth flow? No
  ? Do you want to configure Lambda Triggers for Cognito? No
  ✅ Successfully updated auth resource labweathermoodauthma0e32e1ed locally

  ✅ Some next steps:
  "amplify push" will build all your local backend resources and provision it in the cloud
  "amplify publish" will build all your local backend and frontend resources (if you have hosting category added) and provision it in the cloud

  ✅ Successfully updated resource update locally
```

# Add login with Google

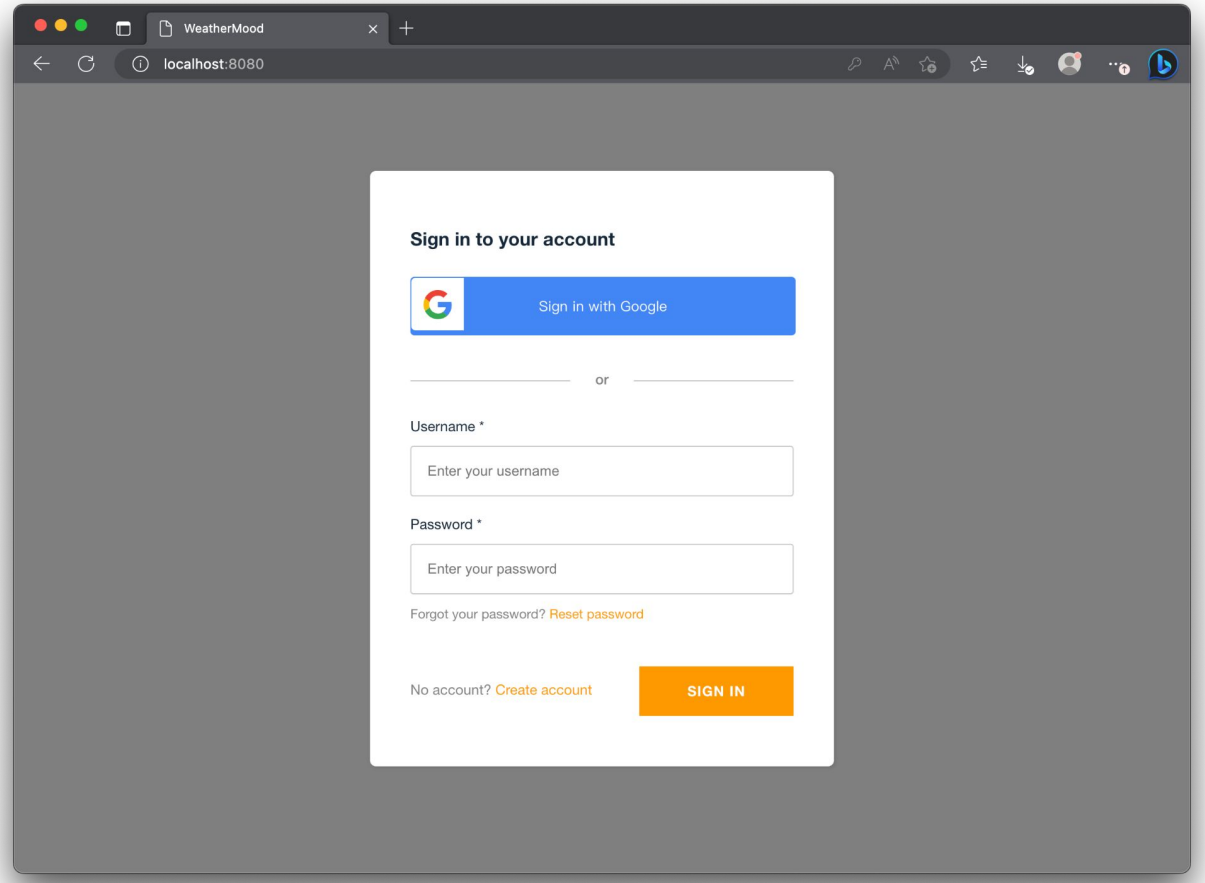
In index.jsx, pass your Google client ID to <main>

```
const federated = {
    googleClientId: "543569104988-aticenf        pag93a1s1ut41l5gq.apps.googleusercontent.com"
}

window.onload = function() {
    const composeEnhancers = window.__REDUX_DEVTOOLS_EXTENSION_COMPOSE__ || compose;
    const store = createStore(combineReducers({
        unit, weather, weatherForm, forecast,
        searchText, post, postForm, postItem,
        todoForm, todo,
        main,
    }), composeEnhancers(applyMiddleware(thunkMiddleware/*, loggerMiddleware*/)));

    ReactDOM.render(
        <Provider store={store}>
            <Main federated = {federated}/>
        </Provider>,
        document.getElementById('root')
    );
};
```

# Add login with Google



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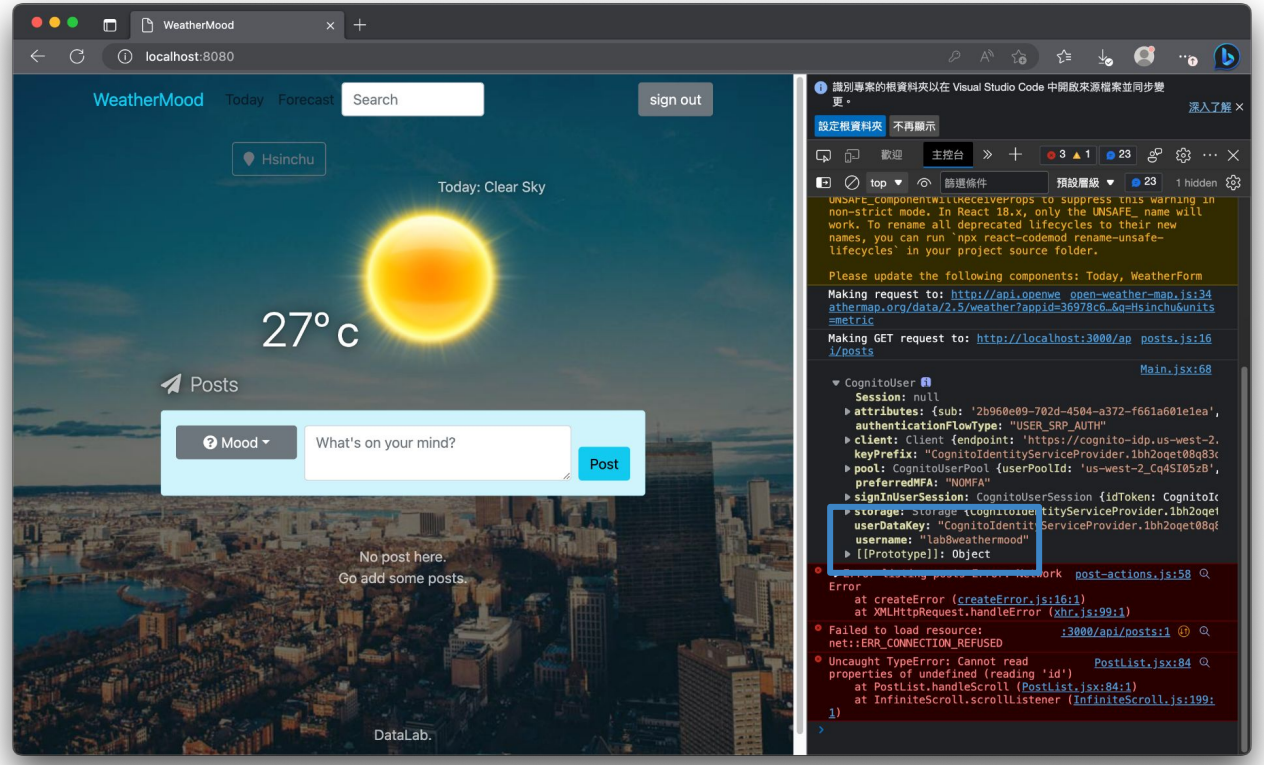
# Get user data in your component

You can use Auth to get user data

```
Auth.currentAuthenticatedUser().then(user =>
{console.log(user)})
```

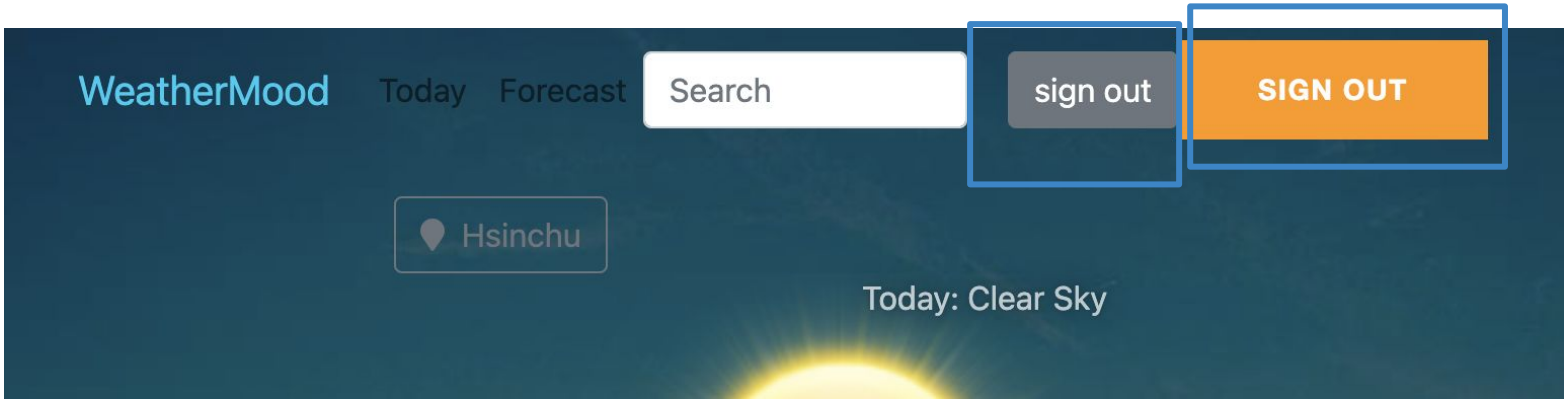


# Create customized component

You can use built-in component, for example the sign out button `import {AmplifySignOut} from "@aws-amplify/ui-react"`
then use <AmplifySignOut/> directly.

Or customize it, e.g., `<Button onClick = {() => Auth.signOut().then(() => window.location.reload())}>sign out</Button>`

Customized / built-in




There are more built-in components, e.g., {AmplifyGreeting}, which are very handy

# More tutorials

Amplify Document

- Authentication: getting started
  https://docs.amplify.aws/lib/auth/getting-started/q/platform/js/
- Tutorial: add authentication
  https://docs.amplify.aws/start/getting-started/auth/q/integration/react/
- Authenticator
  https://ui.docs.amplify.aws/react/connected-components/authenticator
- AuthClass methods
  https://aws-amplify.github.io/amplify-js/api/classes/authclass.html

Some tutorials that might help (api version may be different)

- https://richardzcode.github.io/Journal-AWS-Amplify-Tutorial/step-02/
- https://blog.kylegalbraith.com/2020/03/31/customizing-the-aws-amplify-authentication-ui-with-your-own-react-components/