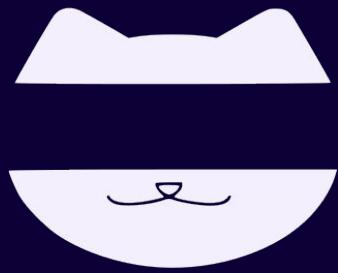


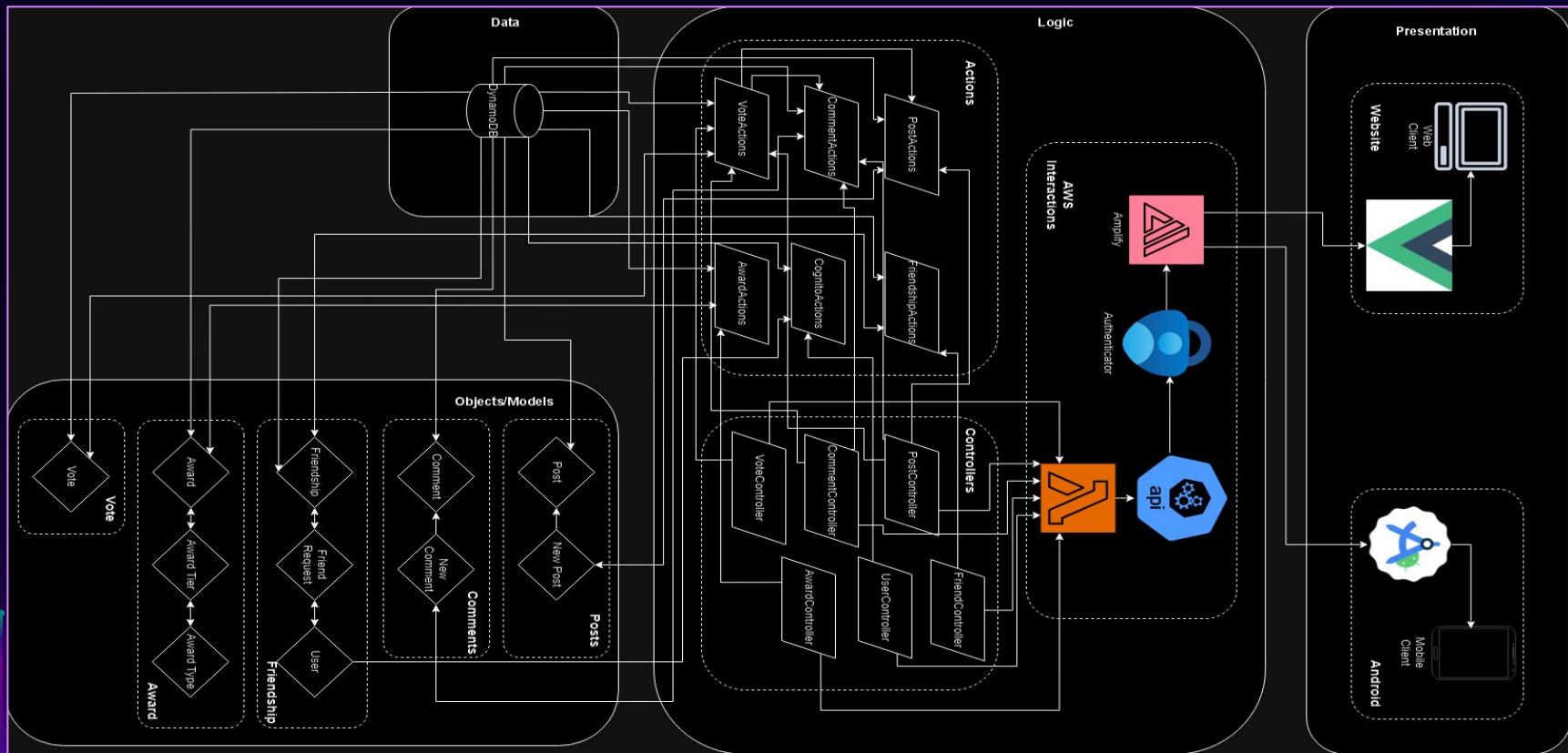
# yAPP: AWS Cloud Stack

Group 4: Cynthia, Kelly, Qiwen, & Tara

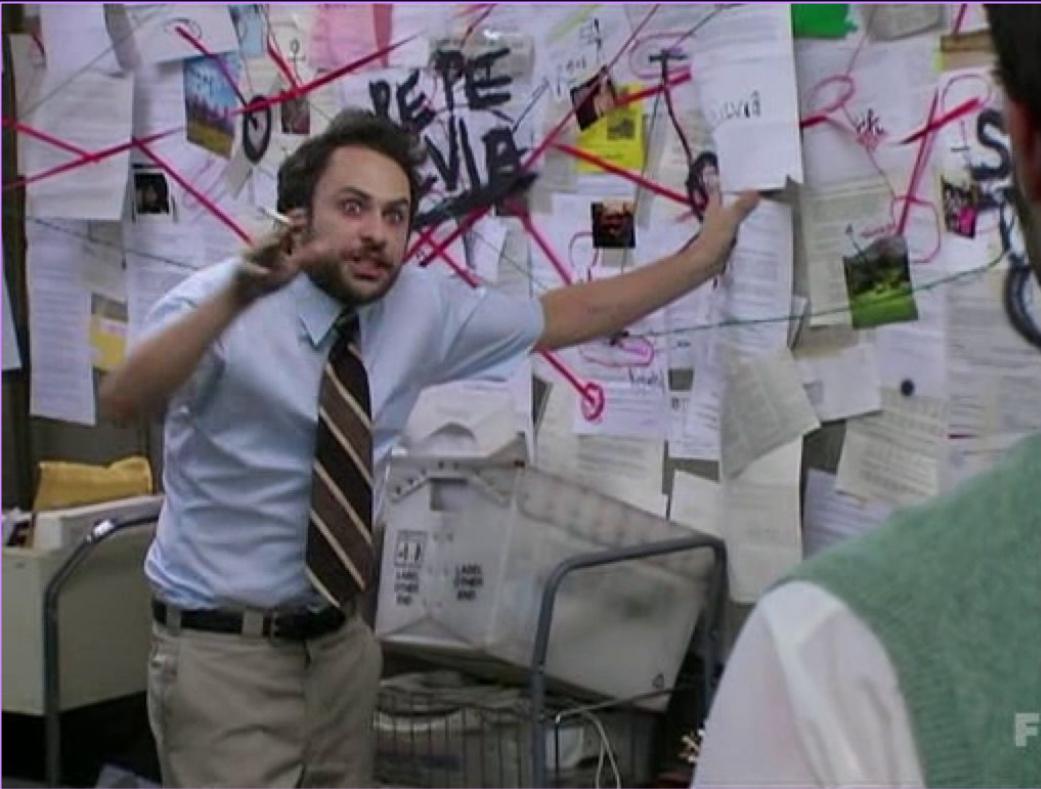


What have we  
been yAPP to?

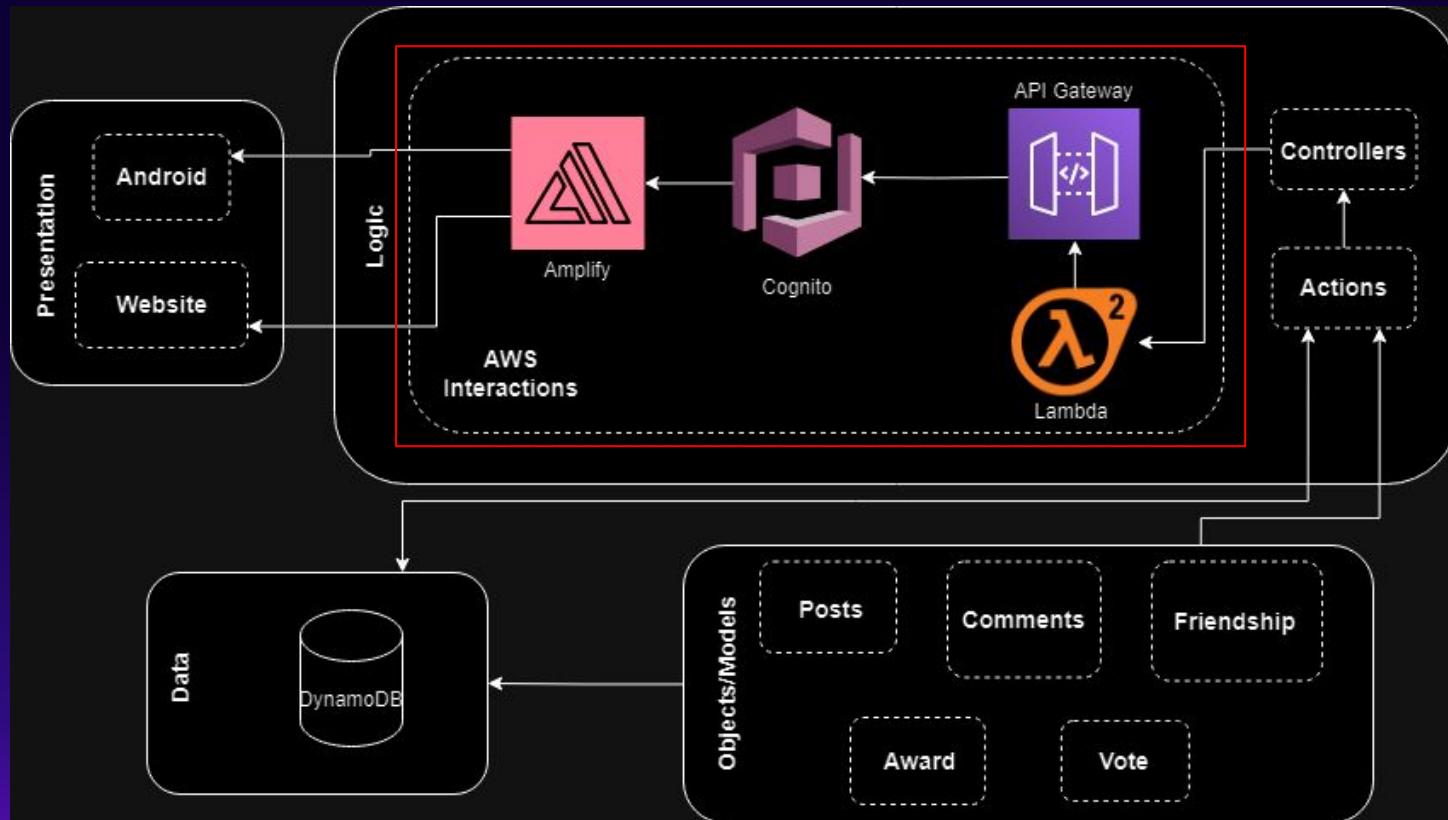
# Project Architecture

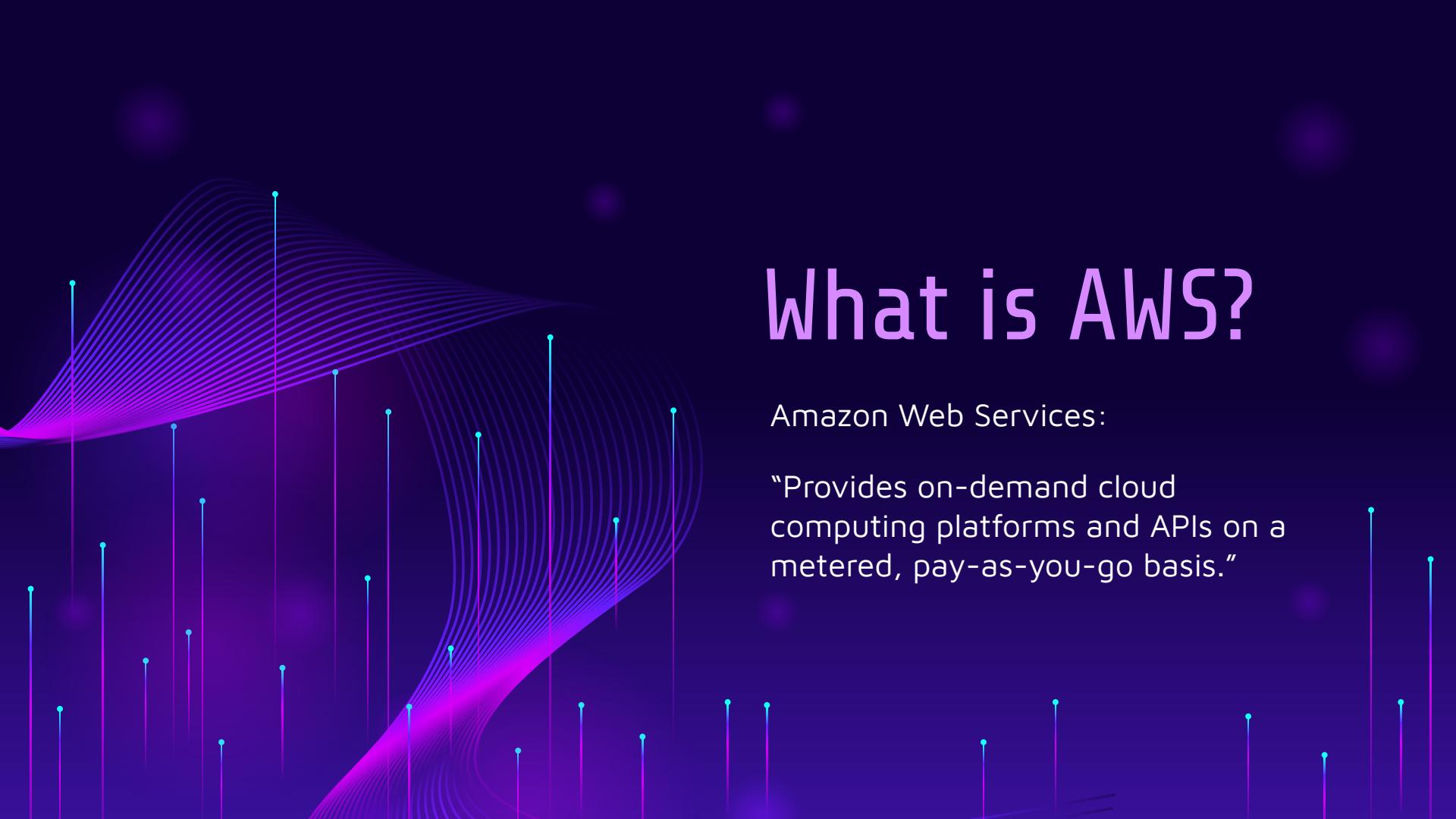


# Yikes...



# There! Much better.





# What is AWS?

Amazon Web Services:

“Provides on-demand cloud computing platforms and APIs on a metered, pay-as-you-go basis.”

# AWS Services

01

## DynamoDB

- NoSQL database

02

## Lambda

- Lets you run code without having to provision or manage servers

03

## API Gateway

- Accepts and processes API calls
- Includes...
  - Authorization and access control
  - Monitoring traffic

04

## Cognito

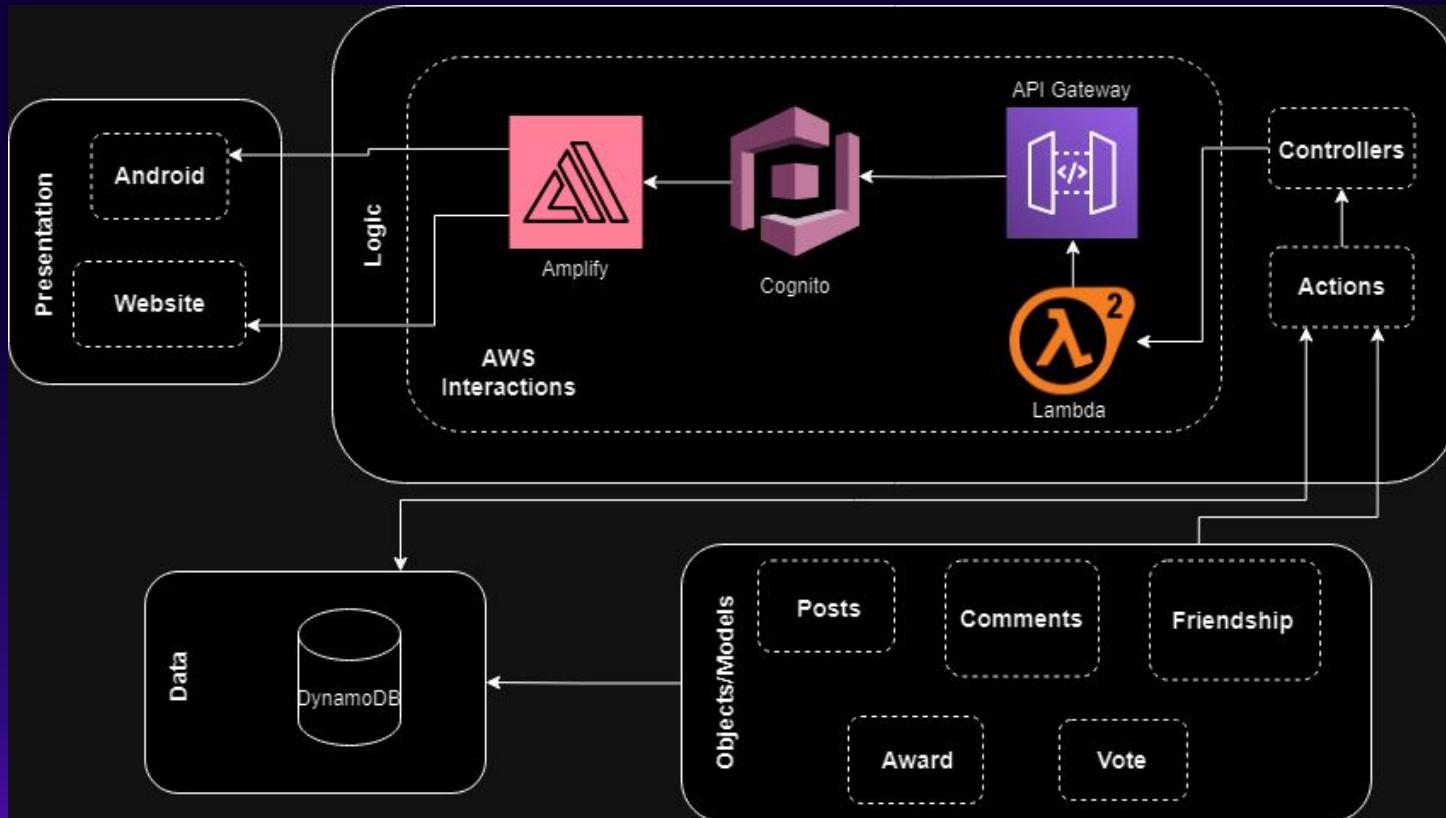
- Handles registration and sign in
- Provisions identity tokens

05

# AWS Amplify

The star of the show

# AWS Interactions



# Setting up an environment



# 01

# Add configuration

amplify configure

Terminal

- 1 Specify the AWS Region
- 2 ? region: # Your preferred region
- 3 Follow the instructions at
- 4 <https://docs.amplify.aws/cli/start/install/#configure-the-amplify-cli>
- 5
- 6 to complete the user creation in the AWS console
- 7 <https://console.aws.amazon.com/iamv2/home#/users/create>

02

# Initialize Project

```
amplify init
```

```
1 ? Enter a name for the project (nextamplified)
2 The following configuration will be applied:
3
4 Project information
5 | Name: nextamplified
6 | Environment: dev
7 | Default editor: Visual Studio Code
8 | App type: javascript
9 | Javascript framework: <detected framework>
10 | Source Directory Path: src
11 | Distribution Directory Path: build
12 | Build Command: npm run-script build
13 | Start Command: npm run-script start
14
15 ? Initialize the project with the above configuration? Yes
16 Using default provider awscloudformation
17 ? Select the authentication method you want to use: AWS profile
18
19 For more information on AWS Profiles, see:
20 https://docs.aws.amazon.com/cli/latest/userguide/cli-configure-profiles.h
21
22 ? Please choose the profile you want to use default
```

The screenshot shows a terminal window with the following text:

```
SEARCH ...  
> SEARCH  
v YAPP (WORKSPACE) E+ C ⌂ ...  
  > yAPP  
    > .idea  
  > .vscode  
    > amplify  
      > backend  
        > api  
      > auth/yapp  
        > build  
          > parameters.json  
          > yapp-cloudformation-template.json  
          > cli-inputs.json  
        > function  
        > hosting  
        > storage  
        > types  
      > backend-config.json  
      > tags.json  
    > hooks  
  > cli.json  
  README.md  
  team-provider-info.json
```

A red box highlights the 'amplify' directory and its sub-directories. A blue box highlights the 'team-provider-info.json' file in the terminal list.

The right side of the image shows a code editor with the 'team-provider-info.json' file open. The file content is as follows:

```
1  {
2   > "main": { ...
32  > "dev": { ...
33
34 },
35
36 },
37 "test": {
38   "awscloudformation": {
39     "AuthRoleName": "amplify-yapp-test-d66f4-authRole",
40     "UnauthRoleArn": "arn:aws:iam::746669205882:role/amplify-yapp-test-d66f4-
41     "AuthRoleArn": "arn:aws:iam::746669205882:role/amplify-yapp-test-d66f4-
42     "Region": "us-east-2",
43     "DeploymentBucketName": "amplify-yapp-test-d66f4-deployment",
44     "UnauthRoleName": "amplify-yapp-test-d66f4-unauthRole",
45     "StackName": "amplify-yapp-test-d66f4",
46     "StackId": "arn:aws:cloudformation:us-east-2:746669205882:stack/amplify-
47     "AmplifyAppId": "d34oy4ulicq89e",
48     "APIGatewayAuthURL": "https://s3.amazonaws.com/amplify-yapp-test-d66f4-
49   },
50   "categories": {
51     "auth": {
52       "yapp": {}
53     },
54     "function": {
55       "yAppLambda": {
56         "deploymentBucketName": "amplify-yapp-test-d66f4-deployment",
57         "s3Key": "amplify-builds/yAppLambda-61733038617850706a50-build.zip"
58       }
59     }
60   }
61 }
```

03

# Add Authentication

amplify add auth

- ```
1 ? Do you want to use the default authentication and security configuration?
2 ? How do you want users to be able to sign in? Username
3 ? Do you want to configure advanced settings? No, I am done.
```

The screenshot shows the AWS Cognito console with the following details:

- Current user pool:** `yapp_userpool_58b70b0c-test`
- Users:** A table listing 9 users with their status as confirmed and enabled.
- Navigation:** The left sidebar includes sections for Applications, User management, Authentication, and Security.

| User name                             | Email add... | Email verified | Confirmation status | Status  |
|---------------------------------------|--------------|----------------|---------------------|---------|
| <a href="#">taralb6@gmail.com</a>     | taralb6@...  | Yes            | Confirmed           | Enabled |
| <a href="#">heck_test</a>             | ksvillama... | Yes            | Confirmed           | Enabled |
| <a href="#">Cynthia</a>               | calvo.cyn... | Yes            | Confirmed           | Enabled |
| <a href="#">rob3</a>                  | robert.gu... | Yes            | Confirmed           | Enabled |
| <a href="#">calvoc@mymanitoba.ca</a>  | calvoc@m...  | Yes            | Confirmed           | Enabled |
| <a href="#">psyche_test</a>           | ksvillama... | Yes            | Confirmed           | Enabled |
| <a href="#">zhangq7@mymanitoba.ca</a> | zhangq7...   | Yes            | Confirmed           | Enabled |
| <a href="#">shayes_test</a>           | ksvillama... | Yes            | Confirmed           | Enabled |
| <a href="#">calvocyn@gmail.com</a>    | calvocyn...  | Yes            | Confirmed           | Enabled |

The terminal window displays the following command output:

```
SEARCH ... > SEARCH > YAPP (WORKSPACE) ... > yAPP > .idea > .vscode > amplify > backend > api > auth/yapp > build > parameters.json > yapp-cloudformation-template.yaml > cli-inputs.json > function > hosting > storage > types > backend-config.json > tags.json > hooks > cli.json
```

The file `cli-inputs.json` is highlighted with a red box. The content of the file is as follows:

```
version: "1",
cognitoConfig: {
  "identityPoolName": "yapp_identitypool_58b70b0c",
  "allowUnauthenticatedIdentities": false,
  "resourceNameTruncated": "yapp58b70b0c",
  "userPoolName": "yapp_userpool_58b70b0c",
  "autoVerifiedAttributes": [
    "email"
  ],
  "mfaConfiguration": "OFF",
  "mfaTypes": [
    "SMS Text Message"
  ],
  "smsAuthenticationMessage": "Your authentication code is #####",
  "smsVerificationMessage": "Your verification code is #####",
  "emailVerificationSubject": "Your verification code",
  "emailVerificationMessage": "Your verification code is #####",
  "defaultPasswordPolicy": false,
  "passwordPolicy.minLength": 8,
  "passwordPolicyCharacters": [
    "email"
  ],
  "requiredAttributes": [
    "email"
  ],
}
```

# 04

# Add a Function

amplify add function

```
1 ? Select which capability you want to add: Lambda function (serverless fu
2 ? Provide a friendly name for your resource to be used as a label for thi
3 ? Provide the AWS Lambda function name: lambdafunction
4 ? Choose the runtime that you want to use: NodeJS
5 ? Choose the function template that you want to use: (Use arrow keys)
6 > Hello world function
7  CRUD function for Amazon DynamoDB table (Integration with Amazon API Ga
8  Serverless express function (Integration with Amazon API Gateway)
```

The screenshot shows the AWS Amplify CLI interface with the following details:

- Code Editor (Startup.cs):**

```
yAPP > amplify > backend > function > yAppLambda > src > C Startup.cs
1  using Microsoft.AspNetCore.Builder;
2  using Microsoft.AspNetCore.Hosting;
3  using Microsoft.AspNetCore.Http.Json;
4  using Microsoft.Extensions.Configuration;
5  using Microsoft.Extensions.DependencyInjection;
6  using Microsoft.Extensions.Hosting;
7  using Microsoft.Extensions.Logging;
8  using System.Text.Json;
9  using Amazon.DynamoDBv2;
10 using Amazon.DynamoDBv2.DataModel;
11 using Amazon.Extensions.NETCore.Setup;
12 using Unchase.Swashbuckle.AspNetCore.Extensions.Extensions;
13 using yAppLambda.Common;
14 using yAppLambda.DynamoDB;
15 using yAppLambda.Models;
16
17 namespace yAppLambda;
18
19 public class Startup
{
    public IConfiguration Configuration { get; set; }
    private bool IsLocal { get; set; }
    private IAppSettings _appSettings;
    ...
}
```
- Function Overview Panel (yAppLambda-test):**
  - This function belongs to an application. [Click here](#) to manage it.
  - Function overview** (Info, Diagram, Template):
    - Diagram:** Shows the function's architecture.
    - Template:** Shows the function's configuration.
  - Layers:** (0)
- Trigger Configuration Panel:**
  - API Gateway:** (Add trigger)

# 05

# Add an endpoint

amplify add api

```
1 /  
2 |_ /items  
3   ANY  
4   OPTIONS  
5   |_ /{proxy+}  
6     ANY  
7     OPTIONS
```

Main resource. Eg: /items  
Includes methods: DELETE, GET, HEAD, OPTIONS,  
Allow pre-flight requests in CORS by browser

Proxy resource. Eg: /items/, /items/id, items/o  
Includes methods: DELETE, GET, HEAD, OPTIONS,  
Allow pre-flight requests in CORS by browser

yapp (v0o5pgdx91)

Resources

Create resource

- /
- |\_ /api
- ANY
- OPTIONS
- |\_ /(proxy+)
- ANY
- OPTIONS

Resource details

Path /api/{proxy+}

Resource ID ha5x59

API actions Deploy API

Methods (2)

| Method type | Integration type | Authorization | API key      |
|-------------|------------------|---------------|--------------|
| ANY         | Lambda           | None          | Not required |
| OPTIONS     | Mock             | None          | Not required |

Function overview

Diagram Template

yAppLambda-test

Layers (0)

API Gateway

+ Add trigger

```
graph LR; API[API Gateway] --> Lambda[yAppLambda-test];
```

# 06

# Push Changes

amplify push

```
● (base) qz@wens-MacBook-Pro yAPP % amplify push

  Update available:
    Run amplify upgrade for the latest features and fixes!

✓ Successfully pulled backend environment test from the cloud.

  Current Environment: test

  Category | Resource name | Operation | Provider plugin
  Api      | yapp          | Update     | awscloudformation
  Auth     | yapp          | Update     | awscloudformation
  Function | yAppLambda   | Update     | awscloudformation
  Hosting  | S3AndCloudFront | No Change | awscloudformation

  ✓ Are you sure you want to continue? (Y/n) · yes

  Deployment completed.
  Deploying root stack yApp [ ===== ] 4/5
    amplify-yapp-test-d66f4  AWS::CloudFormation::Stack   UPDATE_COMPLETE_CLEANUP_IN_PROGRESS Sat Nov 23 2024 14:53:10...
    functionyAppLambda       AWS::CloudFormation::Stack   UPDATE_COMPLETE               Sat Nov 23 2024 14:52:56...
    hostingS3AndCloudFront  AWS::CloudFormation::Stack   UPDATE_COMPLETE               Sat Nov 23 2024 14:52:35...
    authyapp                AWS::CloudFormation::Stack   UPDATE_COMPLETE               Sat Nov 23 2024 14:52:35...
    apiyapp                 AWS::CloudFormation::Stack   UPDATE_COMPLETE               Sat Nov 23 2024 14:52:35...

  Deployed api yapp [ ===== ] 5/5
  Deployed auth yapp [ ===== ] 6/6
  Deployed function yAppLambda [ ===== ] 3/3
    LambdaFunction          AWS::Lambda::Function        UPDATE_COMPLETE               Sat Nov 23 2024 14:52:45...

  Deployment state saved successfully.

  REST API endpoint: https://cwleg57r56.execute-api.us-east-2.amazonaws.com/test
```

| Latest deployment activity |                                  |                   |                                     |
|----------------------------|----------------------------------|-------------------|-------------------------------------|
| Time                       | Resource ID                      | Deployment status |                                     |
| 11/23/2024, 2:53:33 PM     | amplify-yapp-test-d66f4          | ✓                 | UPDATE_COMPLETE                     |
| 11/23/2024, 2:53:32 PM     | functionyAppLambda (function)    | ✓                 | UPDATE_COMPLETE                     |
| 11/23/2024, 2:53:22 PM     | apiyapp (api)                    | ✓                 | UPDATE_COMPLETE                     |
| 11/23/2024, 2:53:11 PM     | authyapp (auth)                  | ✓                 | UPDATE_COMPLETE                     |
| 11/23/2024, 2:53:11 PM     | hostingS3AndCloudFront (hosting) | ✓                 | UPDATE_COMPLETE                     |
| 11/23/2024, 2:53:10 PM     | amplify-yapp-test-d66f4          | ✓                 | UPDATE_COMPLETE_CLEANUP_IN_PROGRESS |
| 11/23/2024, 2:53:07 PM     | apiyapp (api)                    | ✓                 | UPDATE_COMPLETE                     |
| 11/23/2024, 2:52:57 PM     | apiyapp (api)                    | ✗                 | UPDATE_IN_PROGRESS                  |
| 11/23/2024, 2:52:56 PM     | functionyAppLambda (function)    | ✓                 | UPDATE_COMPLETE                     |
| 11/23/2024, 2:52:35 PM     | authyapp (auth)                  | ✓                 | UPDATE_COMPLETE                     |

# 07

# Publish Changes

amplify publish

```
| (base) qz@wens-MacBook-Pro yAPP % cd yAppWeb  
| (base) qz@wens-MacBook-Pro yAppWeb % amplify publish  
✓ Successfully pulled backend environment dev from the cloud.
```

Current Environment: dev

| Category | Resource name   | Operation | Provider plugin   |
|----------|-----------------|-----------|-------------------|
| Api      | yapp            | No Change | awscloudformation |
| Auth     | yapp            | No Change | awscloudformation |
| Function | yAppLambda      | No Change | awscloudformation |
| Hosting  | S3AndCloudFront | No Change | awscloudformation |

No changes detected

? Do you still want to publish the frontend? Yes

```
> yappweb@0.0.0 build  
> vue-tsc -b && vite build  
  
vite v5.4.6 building for production...  
✓ 875 modules transformed.  
dist/index.html      0.63 kB  gzip:  0.38 kB  
dist/assets/yAPP-icon-light-D_24f6a0.svg 1.25 kB  gzip:  0.68 kB  
dist/assets/settings-Dork05Ay.svg        4.25 kB  gzip:  1.86 kB  
dist/assets/index-BpI6UnYy.css          318.66 kB  gzip: 33.04 kB  
dist/assets/index-WJw3l8c.js            538.00 kB  gzip: 164.43 kB | map: 2,389.98 kB
```

(!) Some chunks are larger than 500 kB after minification. Consider:

- Using dynamic import() to code-split the application
- Use build.rollupOptions.output.manualChunks to improve chunking: <https://rollupjs.org/configuration-options/#output-manualchunks>
- Adjust chunk size limit for this warning via build.chunkSizeWarningLimit.

✓ built in 3.75s

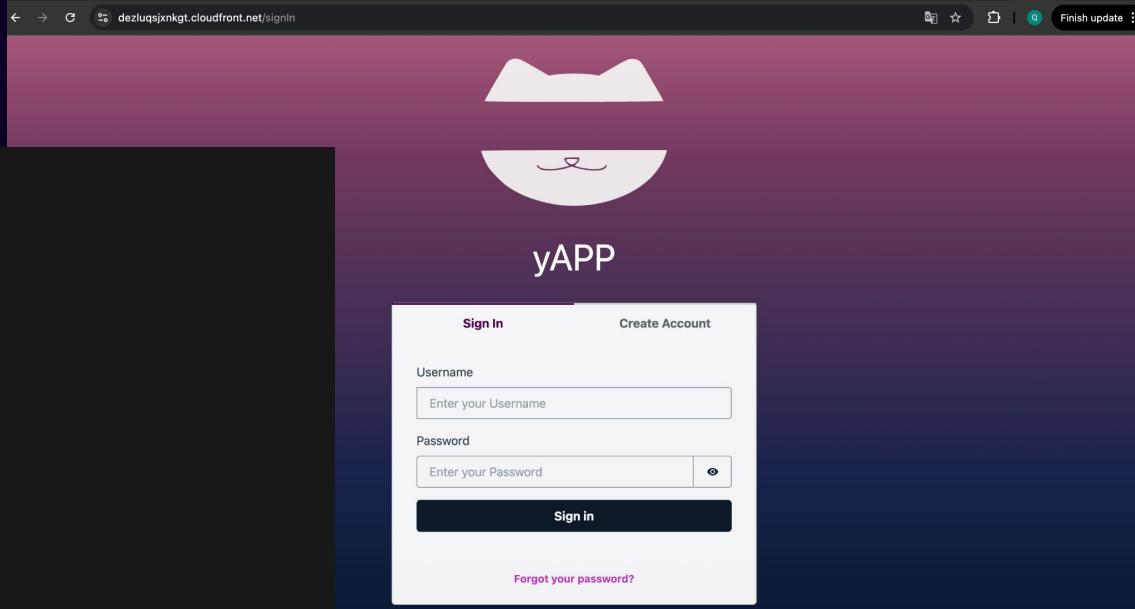
frontend build command exited with code 0

Publish started for S3AndCloudFront

✓ Uploaded files successfully.

Your app is published successfully.

<https://dezluqsjxnkt.cloudfront.net>



yAPP © All Rights Reserved

# 08

# Add Env

1. amplify add env
2. amplify checkout env

```
● (base) qz@wens-MacBook-Pro yAPP % amplify env checkout test
✓ Initialized provider successfully.
✓ Initialized your environment successfully.
● (base) qz@wens-MacBook-Pro yAPP % amplify status
```

Current Environment: test

| Category | Resource name   | Operation | Provider plugin   |
|----------|-----------------|-----------|-------------------|
| Function | yAppLambda      | Update    | awscloudformation |
| Api      | yapp            | No Change | awscloudformation |
| Auth     | yapp            | No Change | awscloudformation |
| Hosting  | S3AndCloudFront | No Change | awscloudformation |

REST API endpoint: <https://cw1eg57r56.execute-api.us-east-2.amazonaws.com/test>  
Hosting endpoint: <https://d11q9y9q3t36h5.cloudfront.net>

## Functions (12)

Filter by attributes or search by keyword

yapplambda X Clear filters

Function name

[yAppLambda-dev](#)

[yAppLambda-main](#)

[yAppLambda-test](#)

dev

Continuous deploys not set up.

Set up Amplify Studio

A visual interface for managing your backend outside the AWS console.

▶ Edit backend

Deployment status

Deployment completed 11/23/2024, 5:16:49 PM

Categories added

API

Authentication

Functions

main

Continuous deploys not set up.

Set up Amplify Studio

A visual interface for managing your backend outside the AWS console.

▶ Edit backend

Deployment status

Deployment completed 11/16/2024, 10:00:43 PM

Categories added

API

Authentication

Functions

test

Continuous deploys not set up.

Set up Amplify Studio

A visual interface for managing your backend outside the AWS console.

▶ Edit backend

Deployment status

Deployment completed 11/23/2024, 2:52:32 PM

Categories added

API

Authentication

Functions

## APIs (3/3)

Find APIs

| Name                                       | Description | ID         |
|--------------------------------------------|-------------|------------|
| <input type="radio"/> <a href="#">yapp</a> |             | cw1eg57r56 |
| <input type="radio"/> <a href="#">yapp</a> |             | v0o5pgdx91 |
| <input type="radio"/> <a href="#">yapp</a> |             | y4cvw78v4d |

# Challenges We Faced



# Flaky Tests

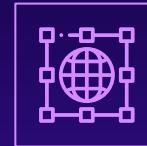
## PROBLEM

Cloud based integration tests  
Tests affect the test database  
Timing and race conditions



## SOLUTION

Extend wait times within tests to ensure operation completion



# Limited Documentation

## PROBLEM

Limited documentation on  
some AWS services  
Mainly Amplify and DynamoDB



## SOLUTION

Reliance on outside sources  
Debugging and researching  
Trial and error  
Getting more eyes on the problem



# Cost & Resource Duplication

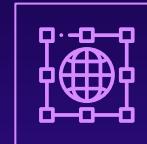
## PROBLEM

AWS services can be expensive  
Amplify environments  
DynamoDB tables



## SOLUTION

Reduce number of environments  
Reduce number of database tables



# Using AWS Cloud Services

Good for getting started quickly

Limited scalability for complex projects

Hand wavy

Steep learning curve

Balance between simplicity, functionality, and cost



An abstract background featuring a dark blue gradient with a subtle radial blur effect. Overlaid on this are several thin, light blue wavy lines that create a sense of depth and motion. Scattered throughout the scene are numerous small, bright cyan dots connected by thin vertical lines, resembling a digital or futuristic landscape.

# Any Questions?