
AWS
re:Invent

FWM302

Build and deploy dynamic Jamstack apps with AWS Amplify

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Sr. Developer Advocate

AWS

AWS re:Invent

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Agenda

Why Jamstack?

Building Jamstack sites with AWS Amplify Console

Problems with Jamstack

Jamstack apps: Turning the static dynamic

Adding Auth, Storage, REST, GraphQL …

AWS Amplify in the time of COVID-19



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Why Jamstack?



AWS re:Invent

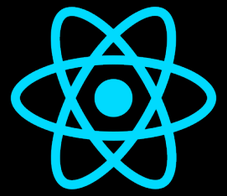
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What is Jamstack?

Jamstack is an architecture designed to make the web **faster**, **more secure**, and **easier to scale**



It builds on many of the tools and workflows developers love that bring maximum productivity







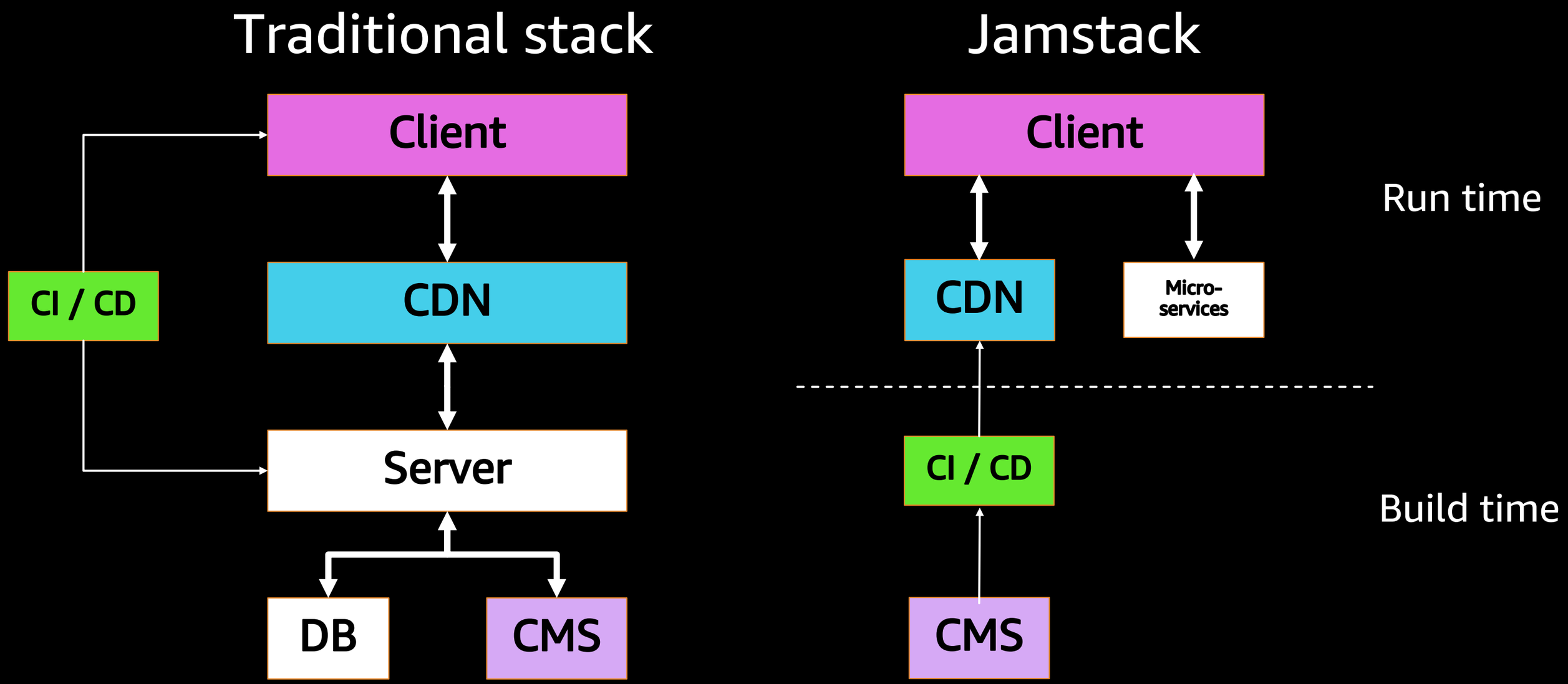




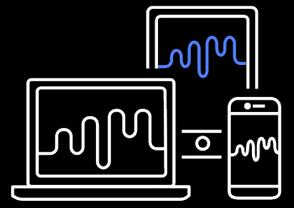




Jamstack decouples to scale and speed up



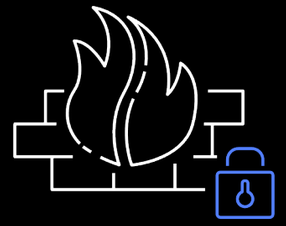
5 reasons to spread the Jam



Speed

No roundtrip to origin server

Clientside routing -> faster perceived performance

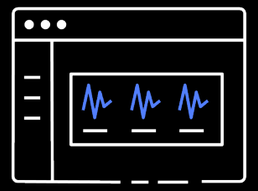


Security

No server to hack

Smaller attack surface

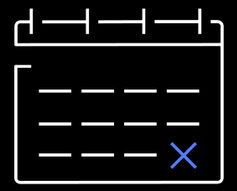
No security upgrades needed



Scalability

No “hug of death” or “slashdotting”

No monolith; serverless APIs scale easily

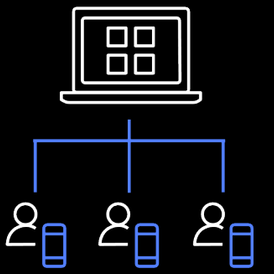


Version control

It’s 2020, use Git

Instant rollbacks

Feature branch development



Portability

Static sites are supported everywhere

No vendor lock-in

Building Jamstack sites *with Amplify Console in 3 easy steps*



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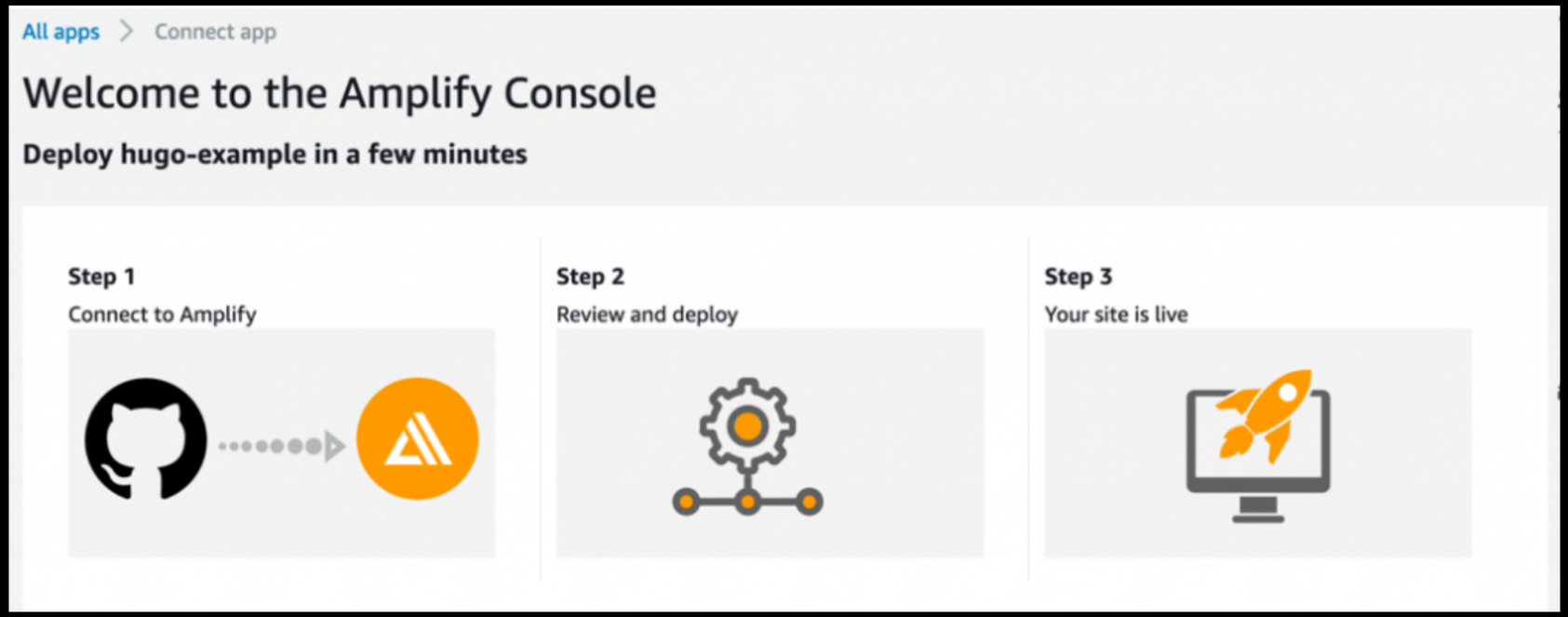
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What is Amplify Console?

Fullstack web app hosting service

- Continuous deployment
- From your preferred source code repository
- Introduced at re:Invent 2018





Step 1: Connect

Get started with the Amplify Console

The AWS Amplify Console provides a Git-based workflow for building, deploying, and hosting fullstack serverless web applications. Fullstack serverless apps comprise of backend resources such as GraphQL APIs, Data and File Storage, Authentication, or Analytics, integrated with a frontend framework such as React, Gatsby, or Angular.

From your existing code

Connect your source code from a Git repository or upload files to host a web app in minutes.

- (•) GitHub 
- ( ) BitBucket 
- ( ) GitLab 
- ( ) AWS CodeCommit 
- ( ) Deploy without Git provider 

Amplify Console requires read-only access to your repository.

Continue

Add repository branch

GitHub

GitHub authorization was successful.

Repository service provider

GitHub

Recently updated repositories

If you don't see your repository below, please push a commit and then click the refresh button.

sw-yx/gatsby-theme-dev-blog

Branch

Select a branch from your repository.

master

[ ] Connecting a monorepo? Pick a folder.

Cancel Previous Next

Step 2: Build

Configure build settings

App build and test settings

App name
Pick a name for your app.

gatsby-theme-dev-blog

Name cannot contain periods

Build and test settings
We've auto-detected your app's build settings. Please ensure your build command and output folder (baseDirectory) are correctly detected.

```
1  version: 1
2  frontend:
3    phases:
4      preBuild:
5        commands:
6          - yarn install
7      build:
8        commands:
9          - yarn run build
10   artifacts:
11     # IMPORTANT - Please verify your build output directory
12     baseDirectory: /
13     files:
14       - '**/*'
15   cache:
16     paths:
17       - node_modules/**/*
18
```

Build and test settings

Download | Edit

▼ Advanced settings

Build image
Use our default build container, or provide your own. Learn more

Reference your build image (E.g. <docker repository>/<docker imc

Environment variables
Add environment variables to save secrets and API keys that you do not want to store in your repository

Key | Value | Remove

Enter key | *Enter value*

Add

Live package updates
Override the default installed versions of packages or tools for your app.

No live updates currently configured. Use the dropdown below to add some.

Add package version override ▼

Step 3: Deploy

gatsby-starter-blog-temp1234

Actions

The app homepage lists all deployed frontend and backend environments.

▶ Learn how to get the most out of Amplify Console — 2 of 5 steps complete

Frontend environments | Backend environments

This tab lists all connected branches, select a branch to view build details.

Connect branch

master

Continuous deploys set up



https://master...amplifyapp.com

Provision — Build — Deploy — Verify

Last deployment	Last commit	Previews
25/06/2020, 23:04:43	This is an autogenerated message | Auto-build | GitHub - master	Disabled

Verify

We are generating screenshots of your app home page with headless Chrome to ensure your app renders well on different mobile resolutions.



Google Pixel



iPad Air 2



iPhone 7 Plus

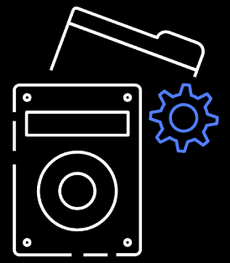


iPhone 8



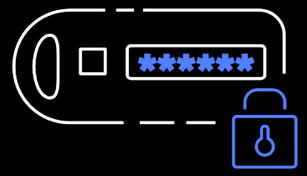
Samsung S7

5 pro tips to Amplify Console



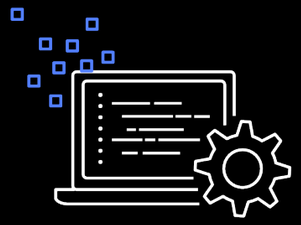
Incremental adoption

Use rewrites and redirects to gradually migrate a site



Password protection

No-code authentication for private / internal sites



Deploy previews

Preview before you merge

Virtually zero downtime



Notifications

Create an SNS Topic to send notifications via email, Slack, etc.



Build images

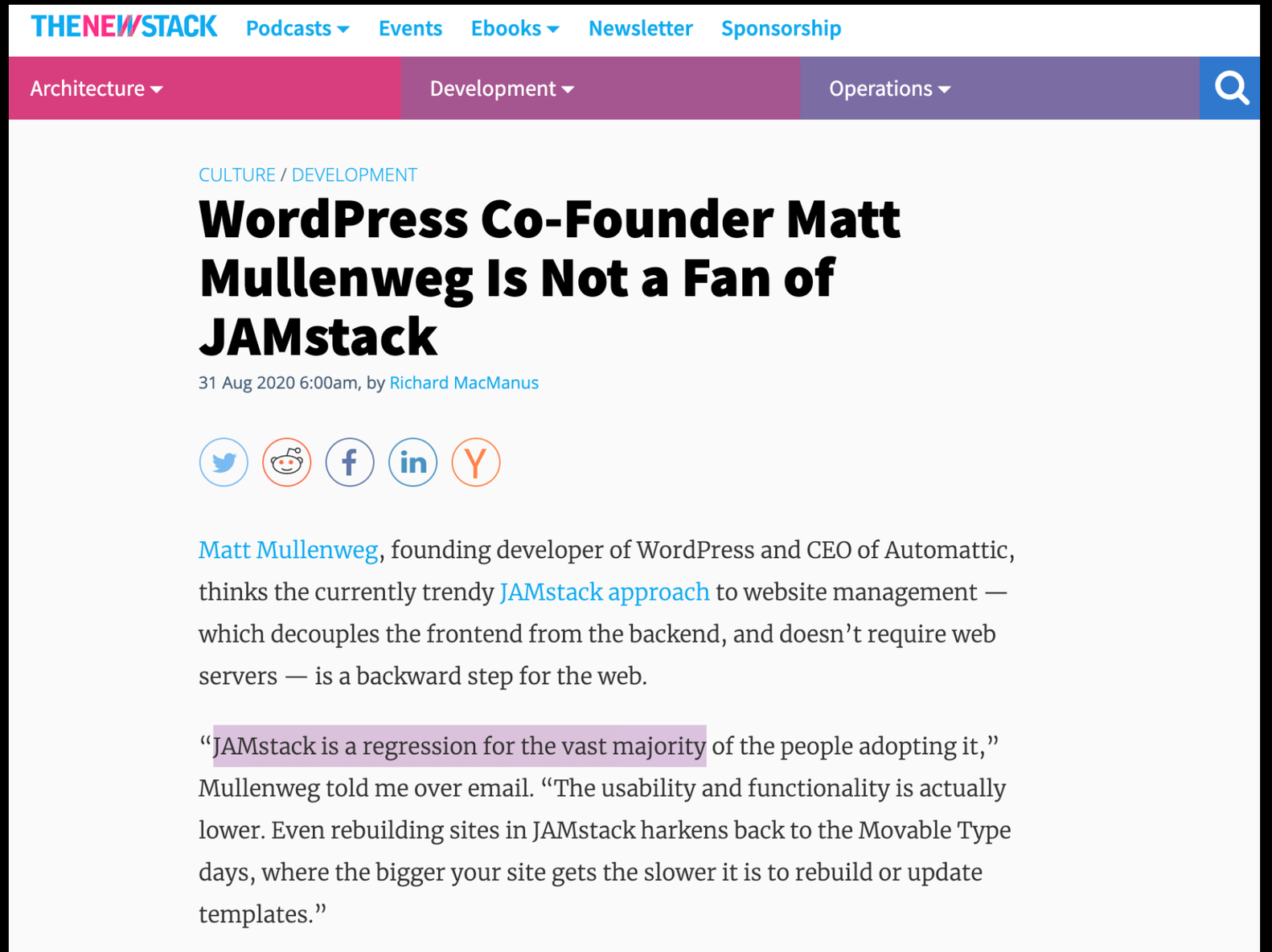
Customize the Docker image to ship whatever runtime you want

Problems with Jamstack



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Mullenweg vs. Jamstack



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Architecture Development Operations

CULTURE / DEVELOPMENT

WordPress Co-Founder Matt Mullenweg Is Not a Fan of JAMstack

31 Aug 2020 6:00am, by Richard MacManus

Matt Mullenweg, founding developer of WordPress and CEO of Automattic, thinks the currently trendy JAMstack approach to website management — which decouples the frontend from the backend, and doesn't require web servers — is a backward step for the web.

"JAMstack is a regression for the vast majority of the people adopting it," Mullenweg told me over email. "The usability and functionality is actually lower. Even rebuilding sites in JAMstack harkens back to the Movable Type days, where the bigger your site gets the slower it is to rebuild or update templates."

Problems with Jamstack

	Problems
Slow builds	Large Jamstack sites can take >30 minutes to reflect changes made
Non-technical users	Jamstack sites can be code-heavy Adding content may require a developer
Complexity dependencies	Jamstack apps can require a patchwork of services, each with their own account system, billing, and security vulnerabilities

Problems with Jamstack – solved?

	Problems	Solutions
Slow builds	Large Jamstack sites can take >30 minutes to reflect changes made	- Incremental builds - Live previews
Non-technical users	Jamstack sites can be code-heavy Adding content may require a developer	- Headless CMS - WYSIWYG editors
Complexity of dependencies	Jamstack apps can require a patchwork of services, each with their own account system, billing, and security vulnerabilities	- ???

Problems with Jamstack – solved?

	Problems	Solutions
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Complexity of dependencies	Jamstack apps can require a patchwork of services, each with their own account system, billing, and security vulnerabilities	- AWS Amplify 

Adding Auth, Storage, REST, GraphQL …



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Amplify CLI : `amplify add <category>`

Installation and configuration

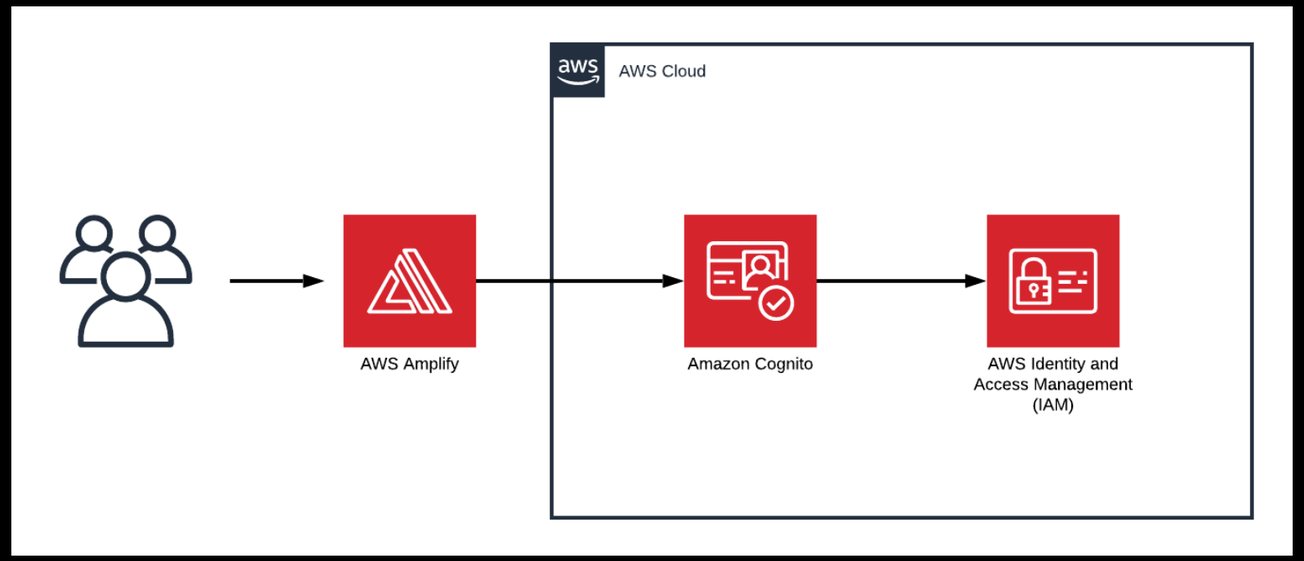
```
$ npm install -g @aws-amplify/cli
$ amplify configure
```

Usage

```
$ amplify init
$ amplify add <category>
$ amplify push
```

Authentication

```
$ amplify add auth
$ amplify push
```



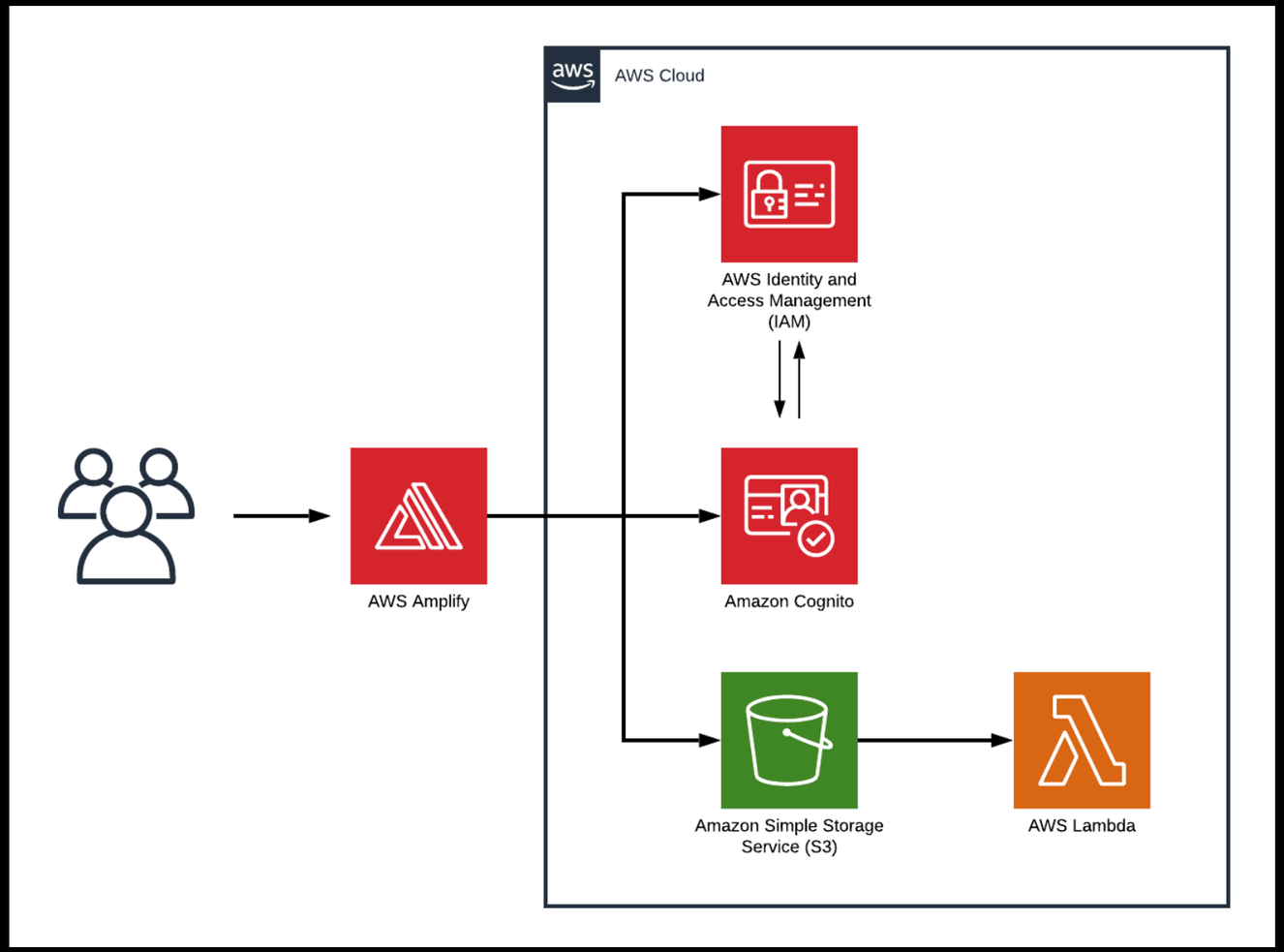
Amplify Auth

ONE COMMAND; DOZENS OF OPTIONS FOR YOUR NEEDS

- Signup / sign-in / sign-out (Amazon Cognito user pools)
  - Username / password
  - Email
  - Phone number
  - User attributes (family name, website, address, birthdate, picture, etc.)
  - Custom challenges
- Social provider (federated auth)
  - Google sign-in
  - Facebook login
  - Log in with Amazon
  - Sign in with Apple
- User management (change / forgot / new password)
- Multi-factor authentication (OTP / QRCode, SMS)

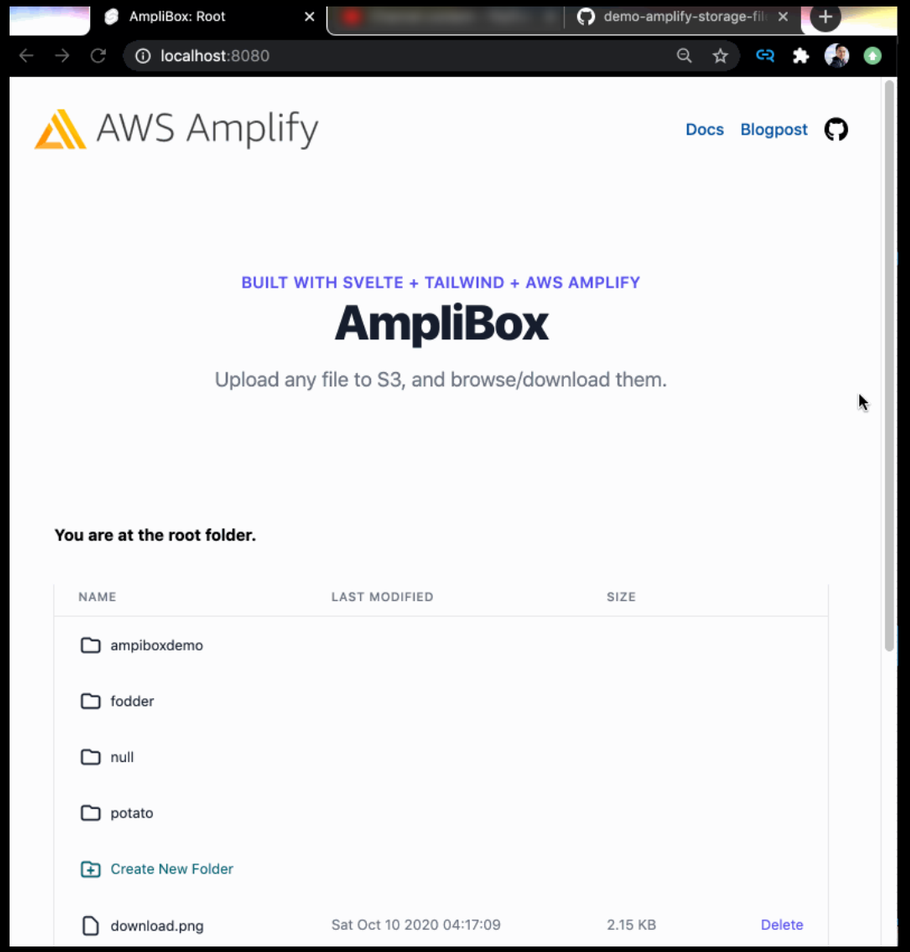
Storage

```
$ amplify add storage
$ amplify push
```



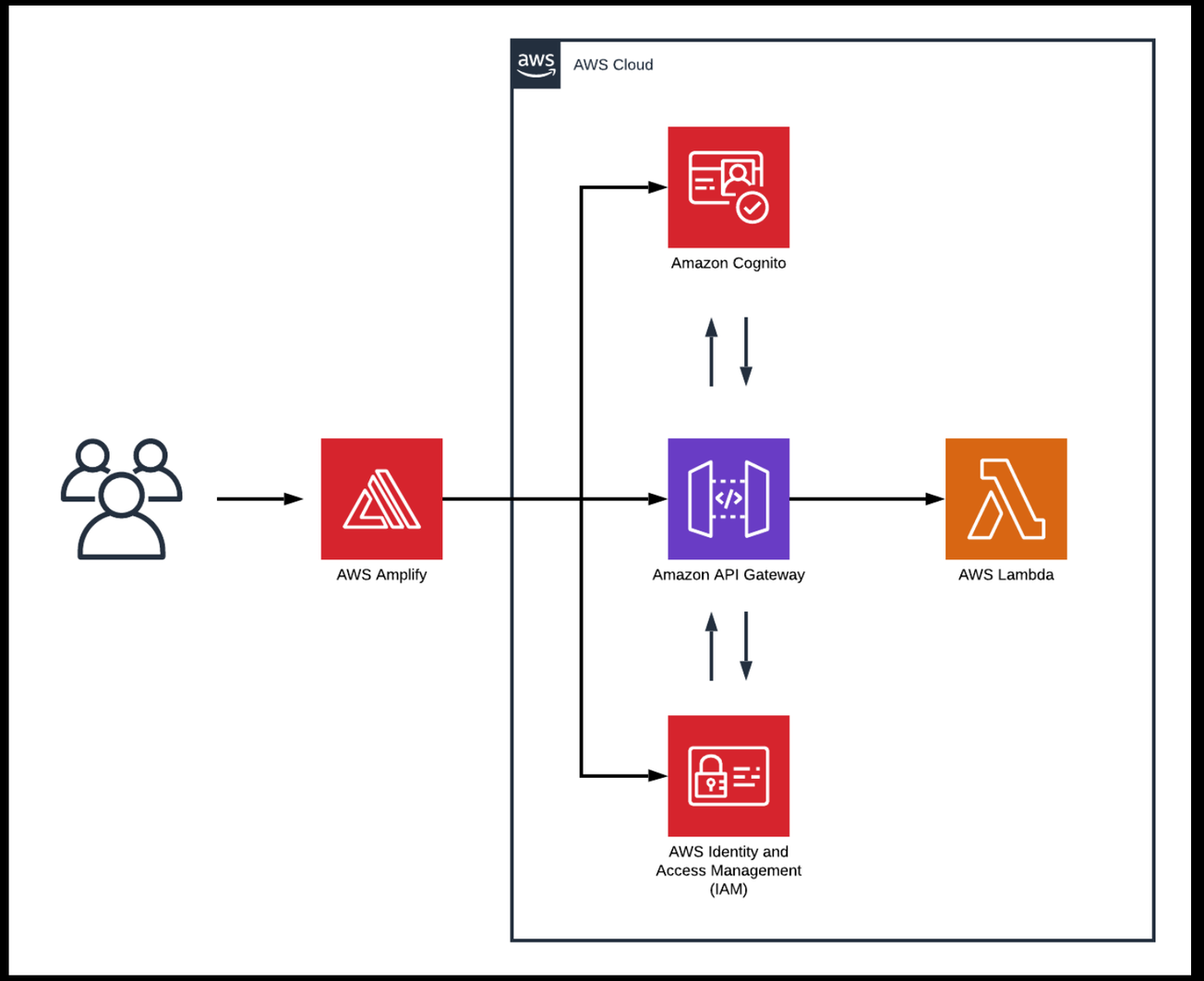
Amplify Storage: AmpliBox demo

HTTPS://GITHUB.COM/SW-YX/DEMO-AMPLIFY-STORAGE-FILE-UPLOAD



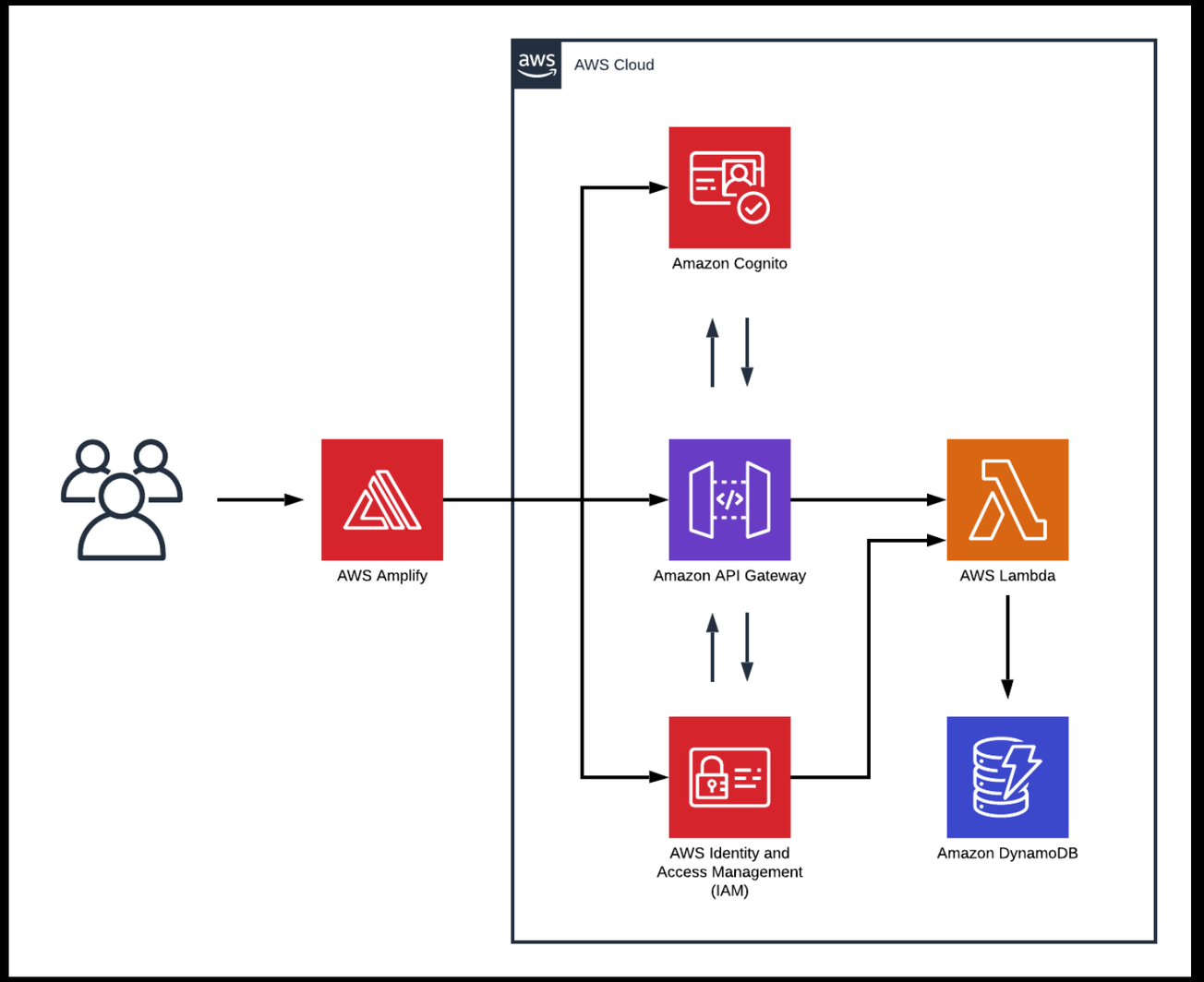
REST APIs

```
$ amplify add api
$ amplify push
```



REST API + Amazon DynamoDB

```
$ amplify add api
$ amplify push
```



Amplify REST API

AMPLIFY ADD API

- Amazon API Gateway + AWS Lambda
- Integrations
  - Auth
  - DynamoDB
  - More
- Cancelable requests
- Cron / scheduled Lambdas
- Lambda layers NEW



```
// from REST API + DynamoDB template
var awsServerlessExpressMiddleware = require('aws-serverless-express/middleware')
var bodyParser = require('body-parser')
var express = require('express')
var app = express()
var cors = require('cors') // ADDED - for avoiding CORS in local dev
app.use(cors())  // ADDED - for avoiding CORS in local dev
app.use(bodyParser.json())
app.use(awsServerlessExpressMiddleware.eventContext())

/* 1. Import the AWS SDK and create an instance of the DynamoDB Document Client */
const AWS = require('aws-sdk')
const docClient = new AWS.DynamoDB.DocumentClient();

/* 2. create a function that will generate a unique ID for each entry in the database */
function id () {
  return Math.random().toString(36).substring(2) + Date.now().toString(36);
}

/* 3. Update the app.get request with the following code for reading all contacts */
app.get('/contact', function(req, res) {
  var params = {
    TableName: process.env.STORAGE_FORMTABLE_NAME // TODO: UPDATE THIS WITH THE ACTUAL NAM
  }
  docClient.scan(params, function(err, data) {
    if (err) res.json({ err })
    else res.json({ data })
  })
});
```

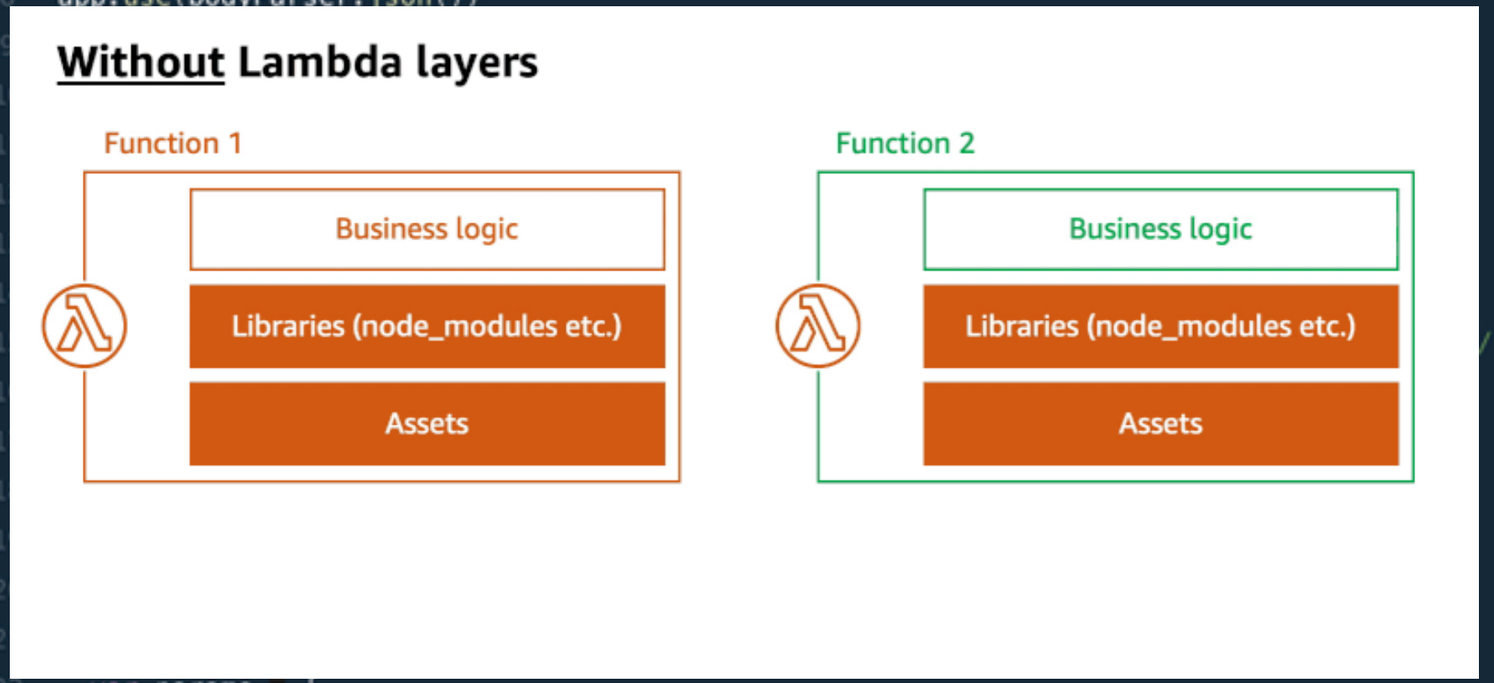
Amplify REST API

AMPLIFY ADD API

- Amazon API Gateway + AWS Lambda
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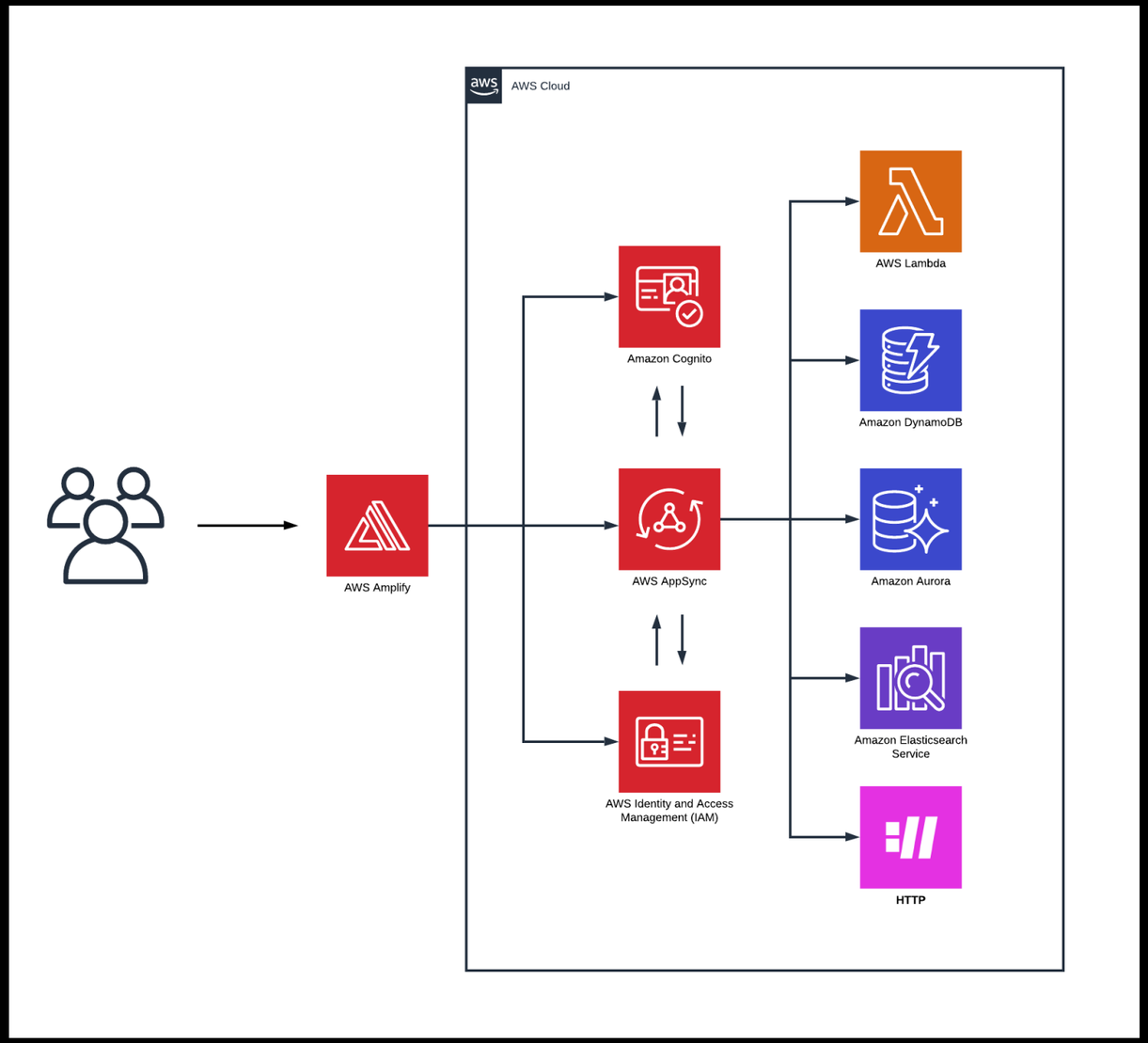
```
// from REST API + DynamoDB template
var awsServerlessExpressMiddleware = require('aws-serverless-express/middleware')
var bodyParser = require('body-parser')
var express = require('express')
var app = express()
var cors = require('cors') // ADDED - for avoiding CORS in local dev
app.use(cors())  // ADDED - for avoiding CORS in local dev
app.use(bodyParser.json())
```




```
  var params = {
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  }
  docClient.scan(params, function(err, data) {
    if (err) res.json({ err })
    else res.json({ data })
  })
});
```

GraphQL APIs

```
$ amplify add api
$ amplify push
```



AppSync GraphQL API

AMPLIFY ADD API

- Queries / mutations
  - Autogenerated CRUDL
  - Amplify Admin 🆕
- Directives
  - @model, @key, @connection
  - @function, @http
  - @auth, @predictions, @searchable
- Subscriptions
  - Secure, serverless websockets
- Amplify DataStore
  - Offline 1st, conflict resolution
  - Real-time sync
  - Selective sync 🆕

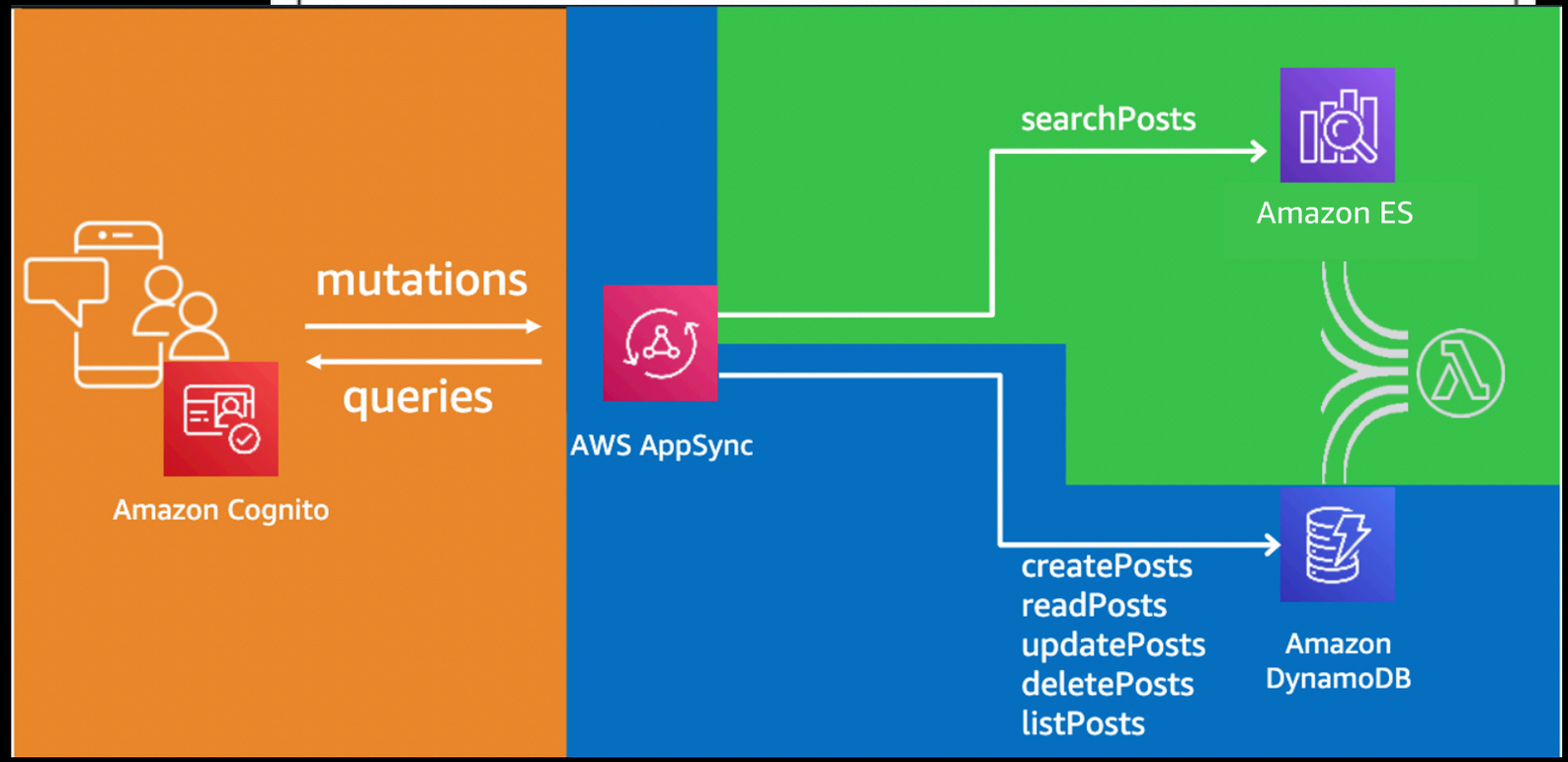
```
type Post
@model
@auth(rules: [{allow: owner}])
@searchable
{
    id: ID!
    content: String
    description: String
    ups: Int
    downs: Int
}
```

AppSync GraphQL API

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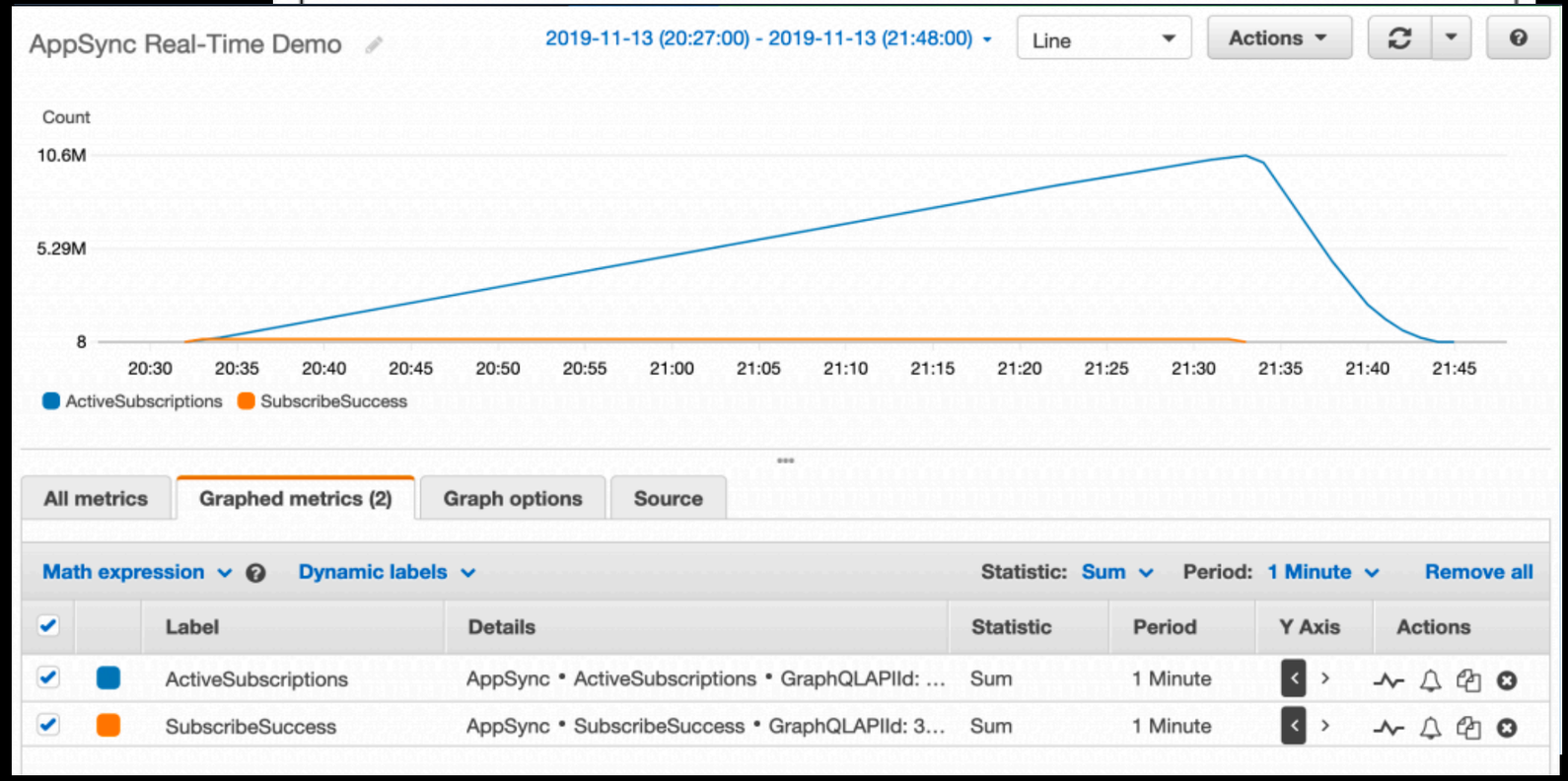


AppSync GraphQL API

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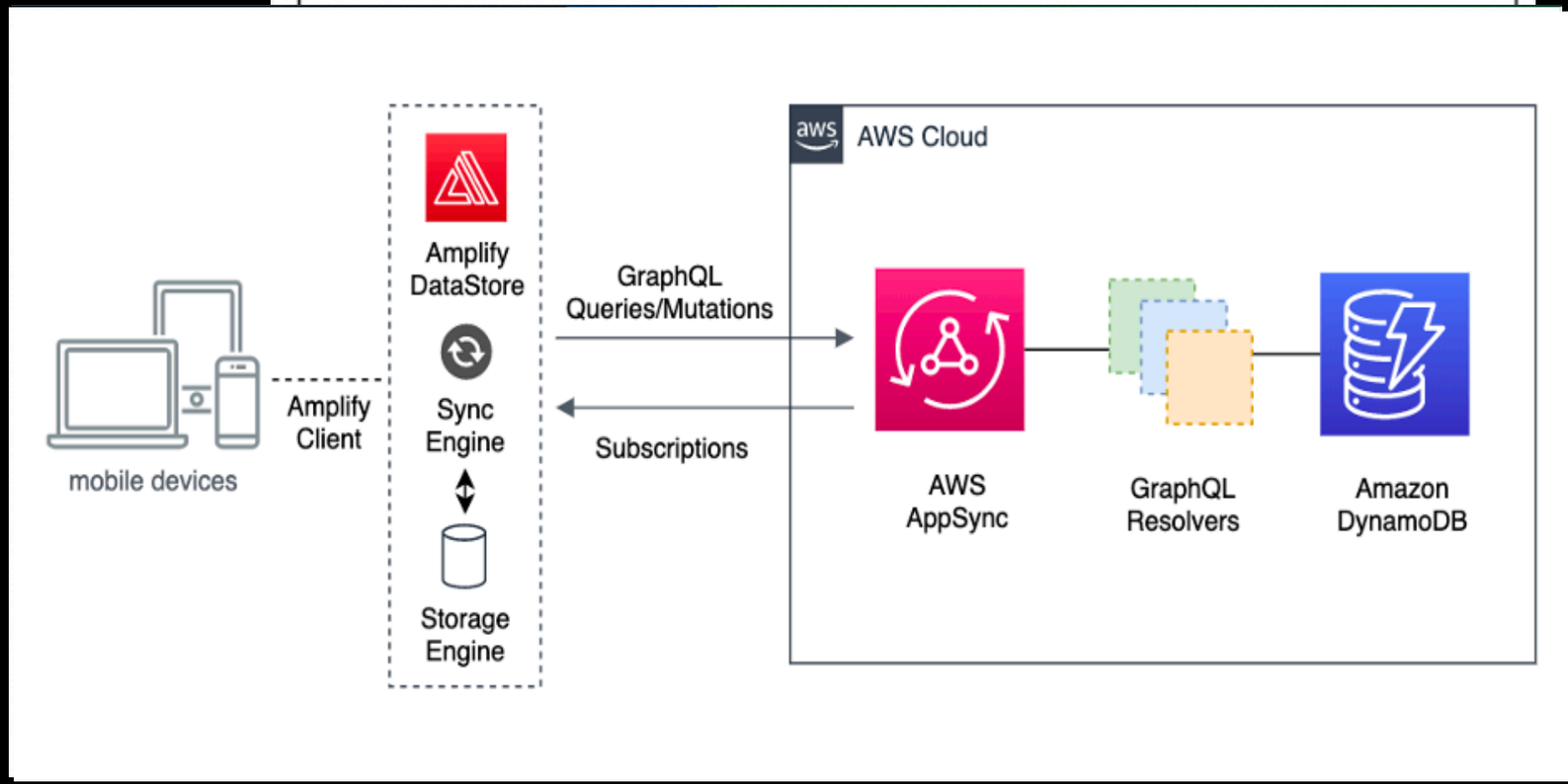


AppSync GraphQL API

AMPLIFY ADD API

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```
type Post
@model
@auth(rules: [{allow: owner}])
@searchable
```



But wait …
There’s more!



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Client libraries and codegen

```
# queries, models, mutations
$ amplify codegen statements

# Flow, TypeScript, Swift
$ amplify codegen types
```

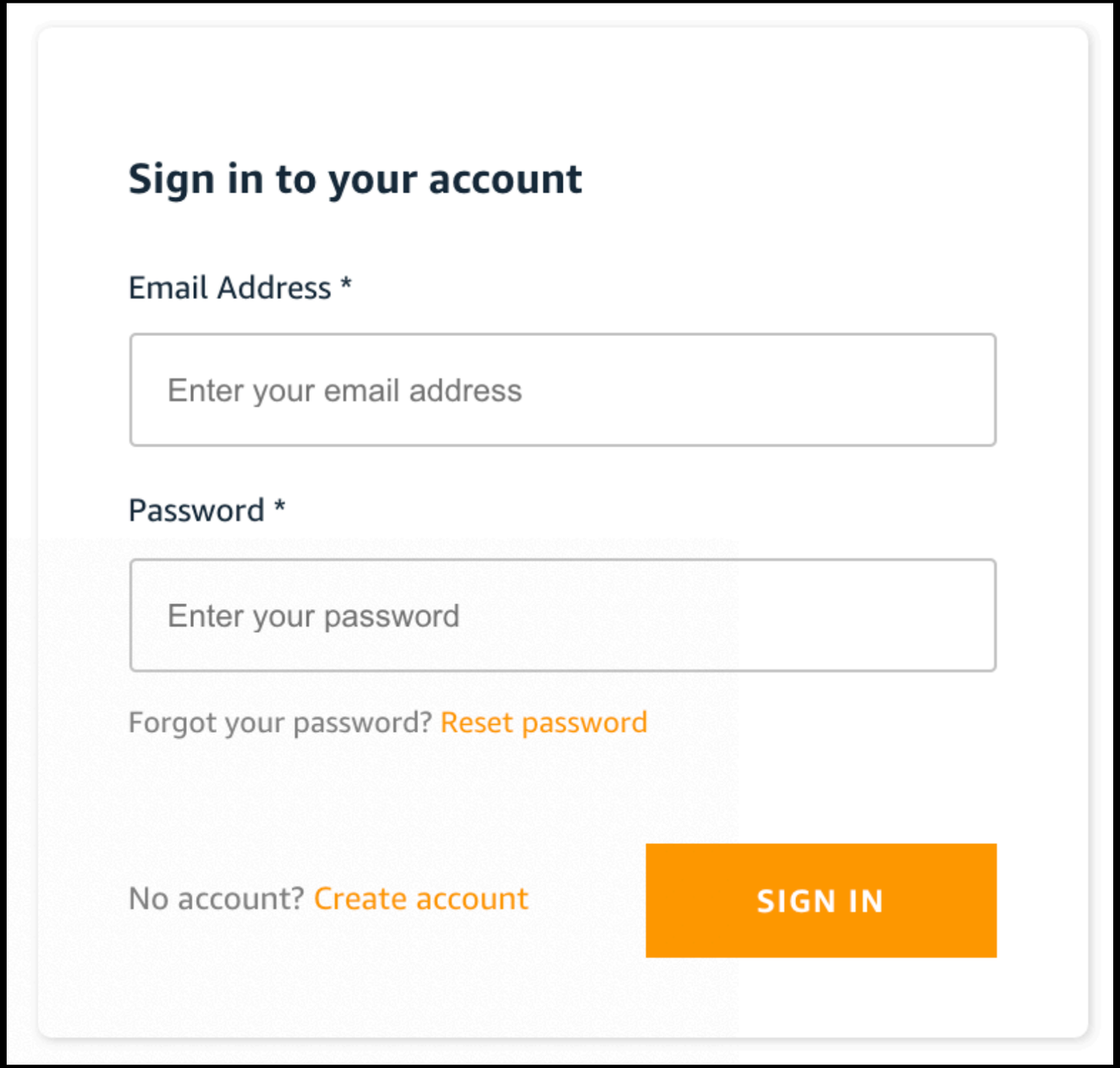
```
import { Storage, API } from 'aws-amplify';

// autogenerated
import { createProduct } from './graphql/mutations';

async function saveProduct(product) {
  await Storage.put(product.name, file);
  await API.graphql({
    query: createProduct, // directly use in code
    variables: { input: product }
  });
}
```

UI components

```
$ npm i @aws-amplify/ui-react
# or
$ npm i @aws-amplify/ui-angular
# or
$ npm i @aws-amplify/ui-vue
# or
$ npm i aws-amplify-react-native
```



Amplify overview

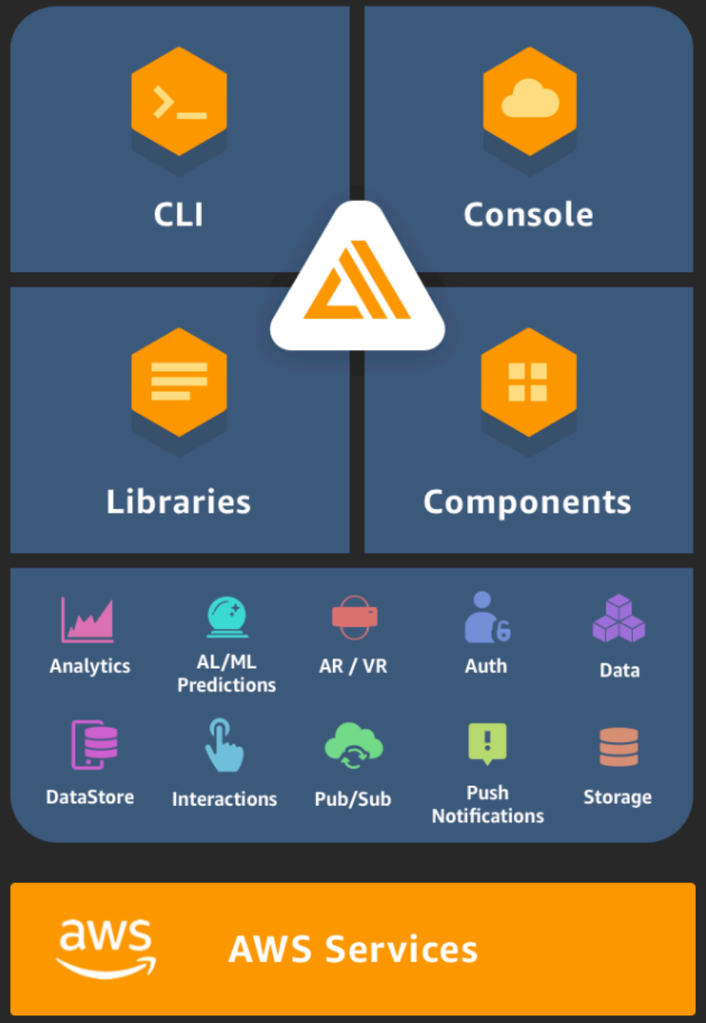
Components

- CLI
- Client Libs (iOS, Android, JS)
- UI Components

Open Source Framework

- Amplify Console – CI/CD and Hosting
- AWS Device Farm

AWS Managed Developer Services



AWS Amplify
in the time of COVID-19



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“We estimated that to build and troubleshoot the solution on their own would have taken a full week of dedicated engineering and developer time. In contrast, by using the Amplify CLI and the video plugin code repository, we transcoded the video, generated signed URLs, and deployed it to our development environment and then into production – **all within an hour**.”

Pedro González

Enterprise Solutions Architect
Orangetheory Fitness

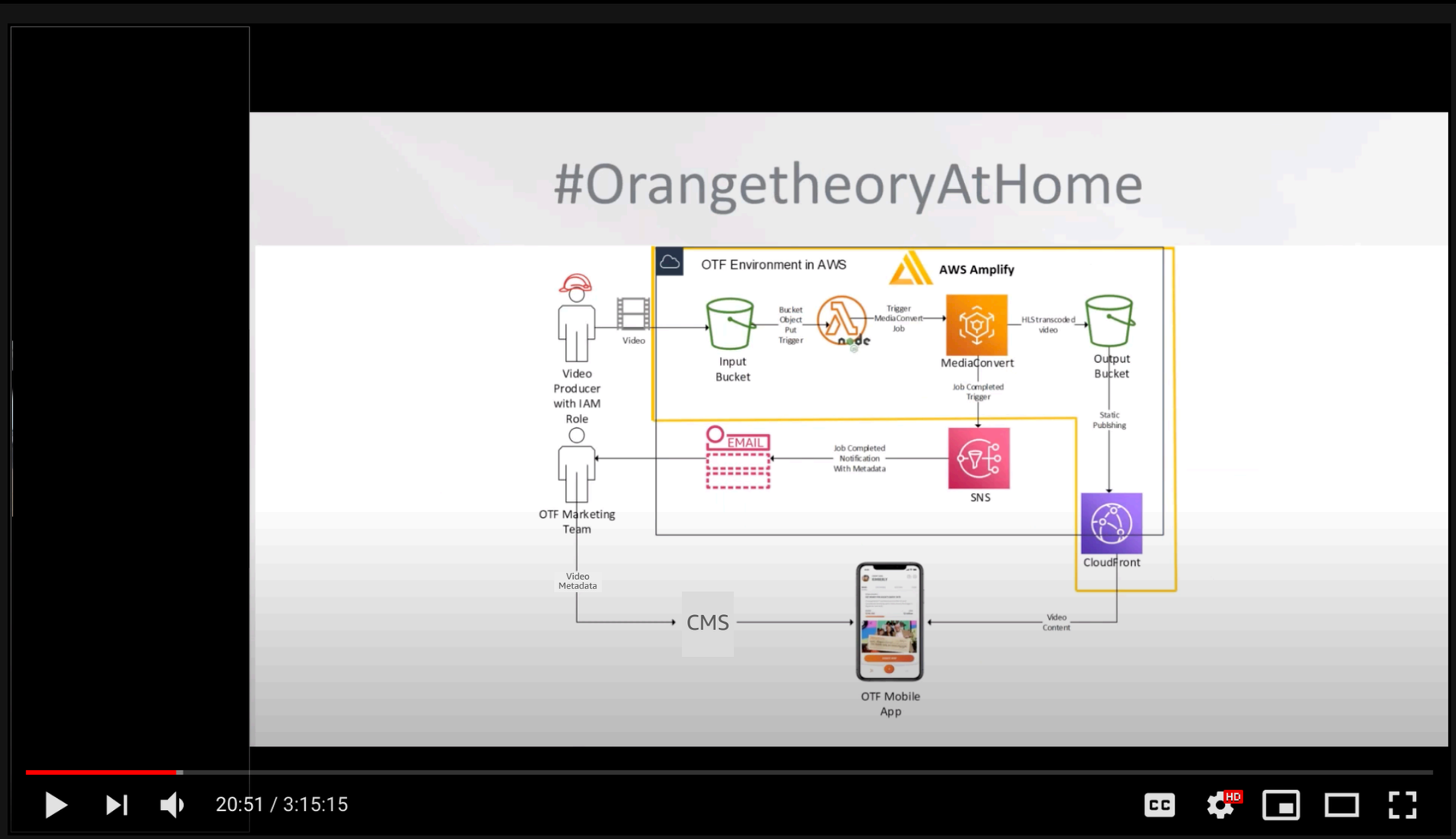
https://youtu.be/Mrw4z8LPliM



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#OrangeTheoryAtHome

HTTPS://YOUTU.BE/MRW4Z8LPLIM



AWS Amplify Days - Day 2

“Our new AssistOC application is built with AWS Amplify and was put into **production in just three weeks** – the speed was critical in helping us assist those in need. Amplify simplifies the process to get started while leveraging underlying AWS services such as authentication ‘out of the box’ using Amazon Cognito.”

Chris Ticknor

Chief Transformation Officer
Orange County United Way



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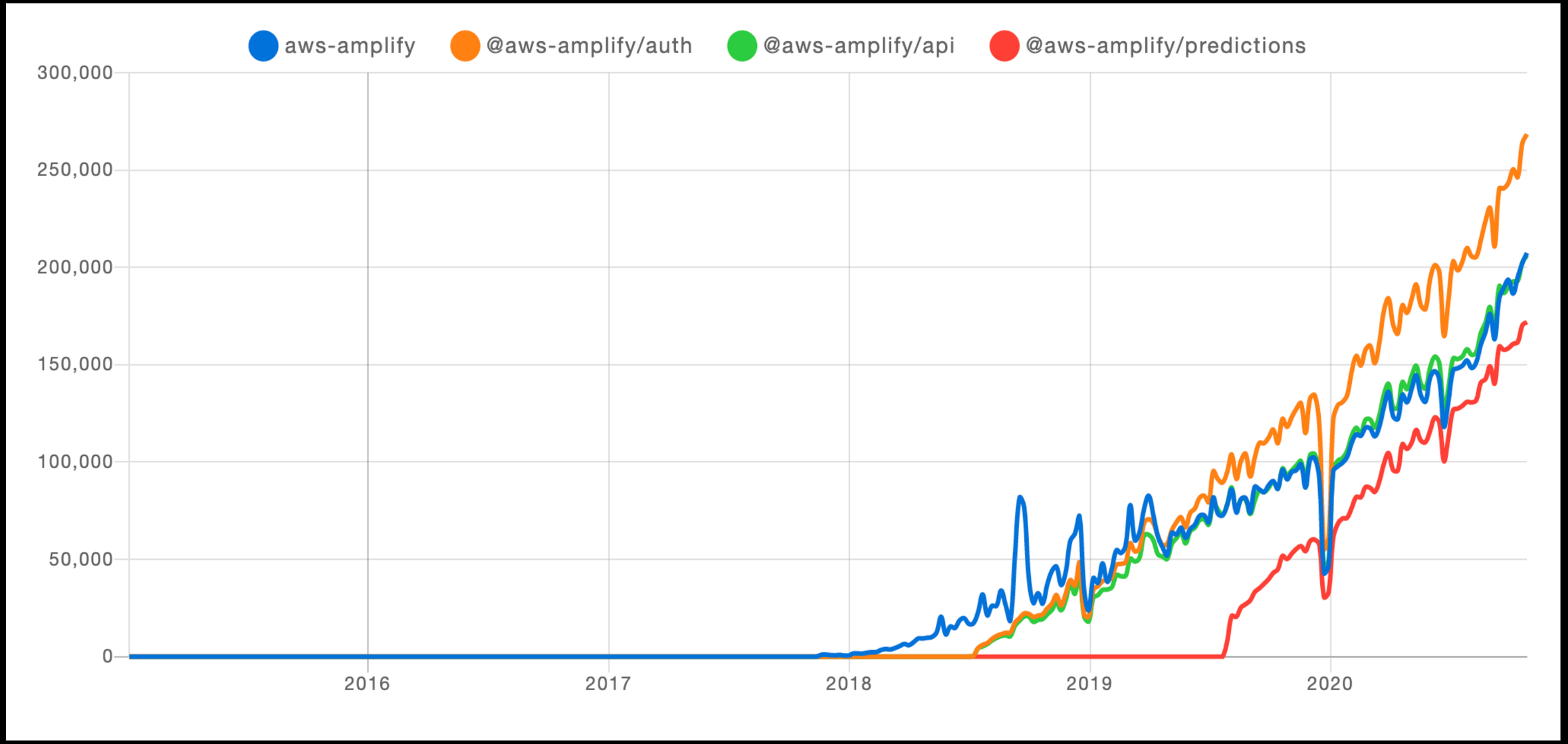
“Delight front-end web and mobile developers by making it easy for them to develop, release, and operate cloud-powered applications that have uncompromising user experience.”

AWS Amplify mission statement
https://amplify.aws/



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Developer love





Thank you!

Shawn Swyx Wang

Twitter: @swyx

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