

MOB201

From Idea to Customers: Developing Modern Cloud-Enabled Apps with AWS

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Goodreads

aws
re:Invent

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aws

Do you have an idea for an app but don't know where to start? In this session, we walk you through the process of taking your idea to reality, and we show you all the infrastructure you need to understand along the way. We also show you how **AWS platform services** and **SDKs** can help you get to a quality release faster and then scale for success with serverless technologies. In addition, we demonstrate how you can build a scalable production-ready app quickly with GraphQL and machine language capabilities. Please join us for a speaker meet-and-greet following this session at the Speaker Lounge (ARIA East, Level 1, Willow Lounge). The meet-and-greet starts 15 minutes after the session and runs for half an hour.

App Lifecycle at Goodreads

What is Goodreads?

The world's largest site for readers and book recommendations.

Our mission is to help people find and share books they love.

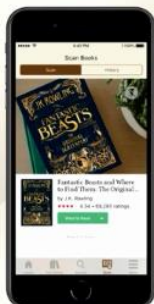
goodreads

Our platforms

Discover books
you'll love



Scan books
on the go



goodreads



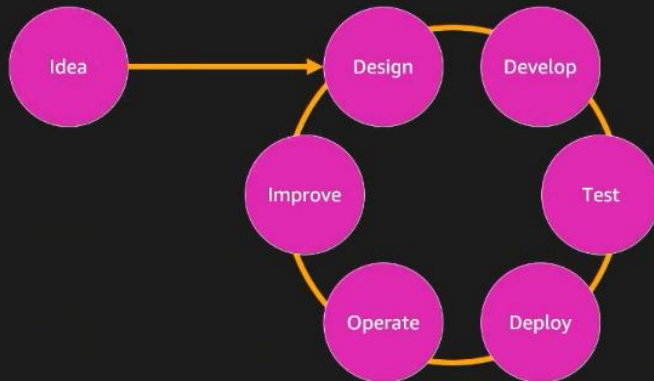
We have a lot of content

goodreads

- 80 million users
- 2.3 billion books shelved
- 83 million text reviews
- With all this content, how can we help our users' discover the next great book for them?

Product Lifecycle

goodreads



Idea

goodreads

Great, but... ★★★★★

by

May 30, 2018

[Reply](#)

AMAZING APP! but there should be an update to include all of the listopia lists, not just the featured ones. It's my favorite parts about goodreads as it allows other people to recommend you book lists and creates more specific genres, like "books with movie adaptations". I know you can go online but it would be nice to see listopia on the app!! Thanks!!

Version 3.9.6 United States [Report a Concern](#)

ACTIVISION

Aug 28, 2017 at 2:58 AM · 1 · 0

[Flag](#) [Share](#)

★ ★

[Show history \(2 items\)](#)

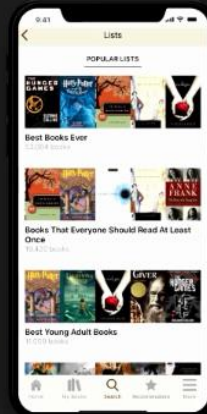
I like the goodreads app, however it is missing key features from the website most notably [Listopia](#), which I use quite often to help pick my next book. Adding this feature to the app would easily jump my rating up to 5 stars.

[Reply to this review](#)

Design

- UI
- But also technology
 - What platform will you use?
 - How are you going to fetch the data?

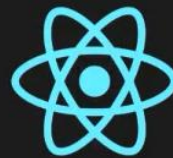
goodreads



Why cross-platform?

- Feature parity across mobile surfaces (especially if design is "product specific")
- Cost of development
- Over the air (OTA) updates
- Large open-source community support

goodreads



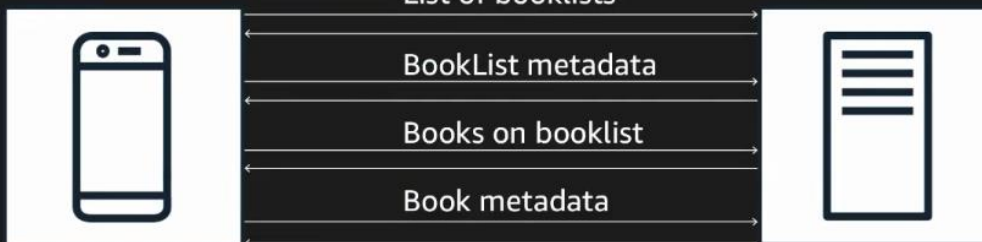
Why not cross-platform?

- Need to learn JavaScript
- Another surface to maintain
- Nascent technology

goodreads

Getting the data

goodreads



Solving our data fetching problem

goodreads

- Does it solve the problem?
- Scale
- Domain Development
- Consistency
- Bonus: Fun



But it's a service

We don't want to run ops

goodreads



Design

goodreads



Develop

goodreads

- Scope
- Unit tests
 - Test Driven Development (TDD) — Red, Green, Refactor
- Use environments
- Code review



Deployments

goodreads

- Test
- Preprod environments
- Production

App testing

goodreads

- QA testing — Manual and Automated
- Beta/internal release

Deploy

Release the app to our users

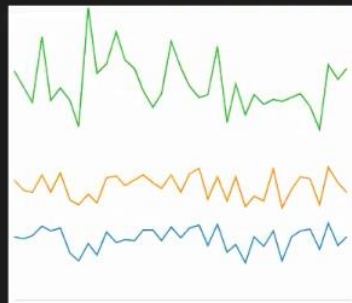
goodreads



Operational Metrics

- Crashes
- Latency
- Client errors and server errors
- Transactions per second (TPS)

goodreads



Business metrics

- Shelvings
- Users
- Page views

goodreads

Want to Read

Improve

- How are customers responding?
- What do the metrics say?

goodreads



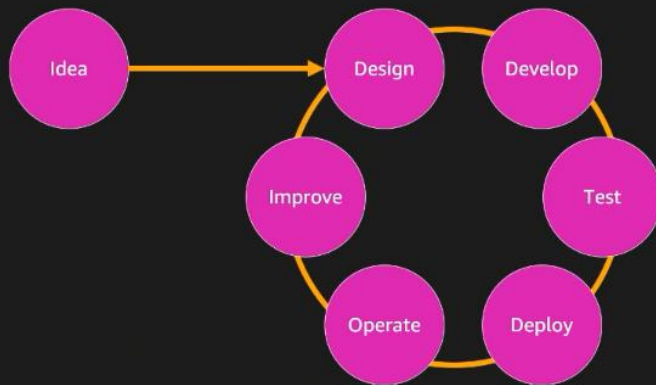
Building on the feature

goodreads



Back to Design

goodreads



Idea

What problem am I solving?

Design

What does my app look like?

What does my app look like?



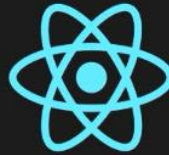
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aws

Which platforms to support?

Platforms

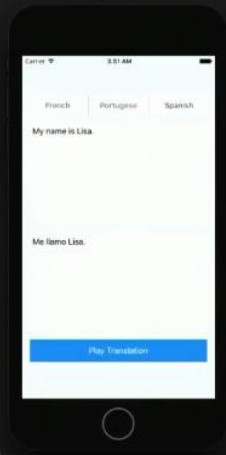


What is the MVP for my app?

What is the MVP for my app?

- Given a sentence
- And a language
- Return the translation in that language

Interacting with services



request
sentence
language



response
translation



aws
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Develop

Domain objects

Input

- sentence: String
- language: String

Output

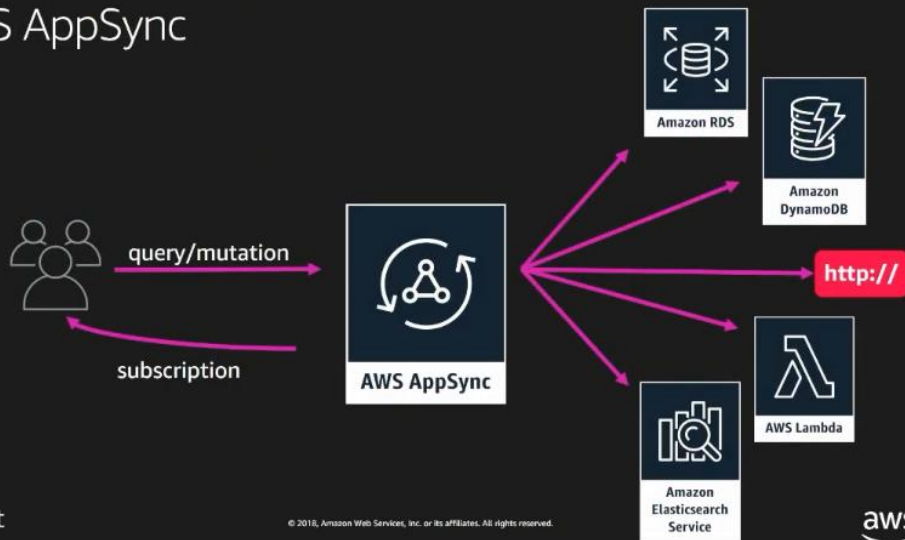
- sentence: String

GraphQL

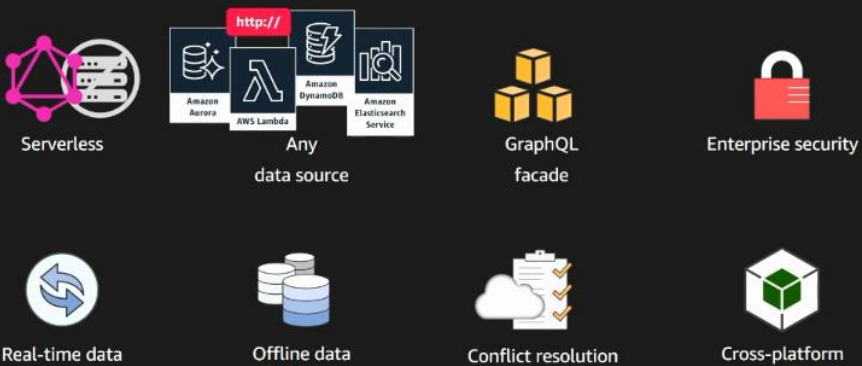
- Strong typing
- Queries, mutations, subscriptions
- Client-specified shape of response
- Efficient
- Extensible



AWS AppSync



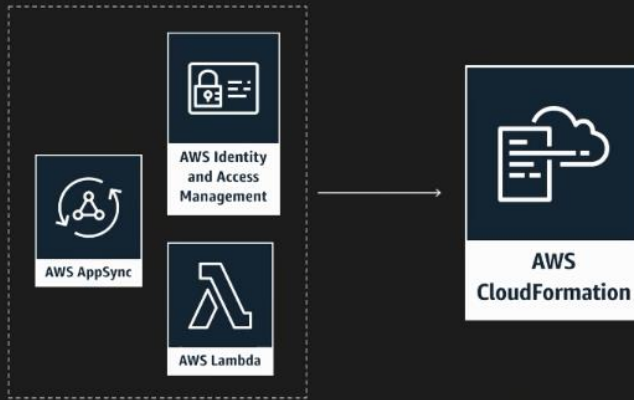
AWS AppSync



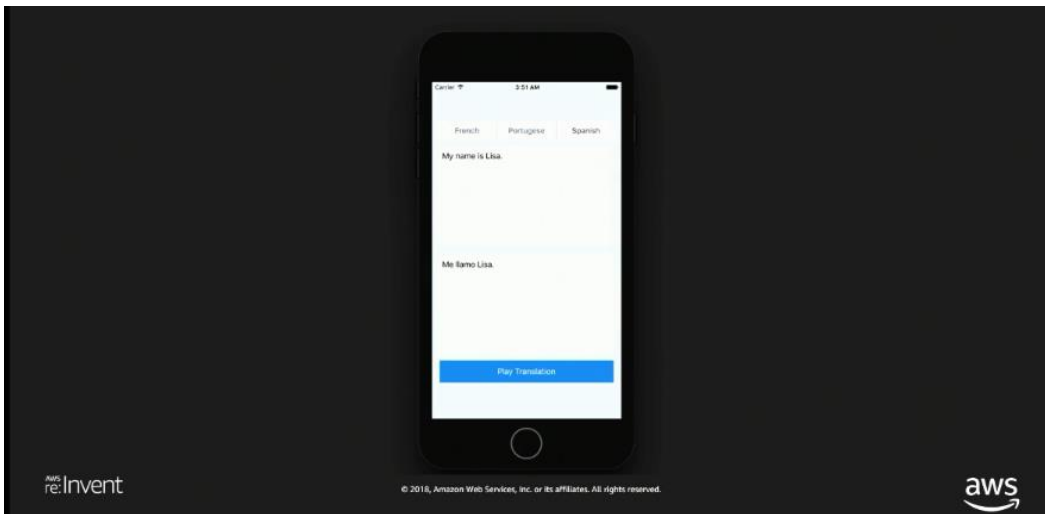
AWS Amplify

Demo: Build the app & backend

Resources in the Cloud



```
JS index.js x JS codes.js JS App.js JS aws-exports.js
1 const AWS = require('aws-sdk')
2 AWS.config.update({region: 'us-west-2'})
3 const uuidV4 = require('uuid/v4')
4 const translate = new AWS.Translate();
5 const polly = new AWS.Polly();
6 const s3 = new AWS.S3({
7   params: {
8     Bucket: 'reinvent-sample-lisa',
9   }
10 })
11 const voices = {
12   'es': 'Penelope',
13   'pt': 'Vitoria',
14   'de': 'Vicki',
15   'en': 'Joanna',
16   'fr': 'Celine'
17 }
18
19 exports.handler = (event, context, callback) => {
20   // prepare translate params
```



```
Code  File  Edit  Selection  View  Go  Debug  Terminal  Window  Help
AppJS - appsync-lambda-4

JS index.js  JS codes.js  JS App.js  JS aws-exports.js

4   View,
5   TextInput
6 } from 'react-native';
7
8   import { ButtonGroup, Button } from 'react-native-elements'
9   import { API, graphqlOperation } from 'aws-amplify'
10
11   var Sound = require('react-native-sound')
12   Sound.setCategory('Playback')
13
14   import codes from './codes'
15   import query from './query'
16
17   const buttons = [
18     'French',
19     'Portugese',
20     'Spanish',
21     'German'
22   ]
23
```

```
QuickTime Player  File  Edit  View  Window  Help
translationCFN.yaml

1  AWSTemplateFormatVersion: 2010-09-09
2  Parameters:
3    LambdaFunctionName:
4      Default: appsync-lambda-example
5      Description: Name of the AWS Lambda Function.
6      Type: String
7      MinLength: 1
8    GraphQLApiName:
9      Default: appsync-api
10     Description: Name of the AppSync GraphQL Api
11     Type: String
12     MinLength: 1
13  Resources:
14    LambdaExecutionRole:
15      Type: 'AWS::IAM::Role'
16      Properties:
17        AssumeRolePolicyDocument:
18          Version: 2012-10-17
19          Statement:
20            - Effect: Allow
21              Principal:
22                Service:
23                  - lambda.amazonaws.com
24              Action:
25                - 'sts:AssumeRole'
26        Path: /
27        ManagedPolicyArns:
28          - 'arn:aws:iam:aws:policy/TranslateReadOnly'
29          - 'arn:aws:iam:aws:policy/AmazonPollyFullAccess'
30          - 'arn:aws:iam:aws:policy/AmazonS3FullAccess'
31          - 'arn:aws:iam:aws:policy/AWSLambdaFullAccess'
32        Policies:
33          - PolicyName: LambdaExecutionRoleLogAccess
```

CloudFormation

Stacks > Stack Detail > Update Stack

Update reinvent-translation stack

Select Template

Specify Details

Options

Review

Select Template

To update an existing stack, provide a template that specifies the changes for the resources and properties that you want to update. AWS CloudFormation updates only the resources that have changed. [Learn more.](#)

Choose a template A template is a JSON/YAML-formatted text file that describes your stack's resources and their properties. [Learn more.](#)

☐ Use current template

☒ Upload a template to Amazon S3

☐ Specify an Amazon S3 template URL

Choose File translationCFN.yaml

CancelNext

CloudFormation

Stacks > Stack Detail > Update Stack

Update reinvent-translation stack

Select Template

Specify Details

Options

Review

Specify Details

Specify parameter values. You can use or change the default parameter values, which are defined in the AWS CloudFormation template. [Learn more.](#)

Stack name reinvent-translation

Parameters

GraphQLApiName	reinvent-translation	Name of the AppSync GraphQL Api
LambdaFunctionName	reinvent-translation	Name of the AWS Lambda Function.

CancelPreviousNext

Capabilities

The following resource(s) require capabilities: [AWS::IAM::Role]

This template contains Identity and Access Management (IAM) resources that might provide entities access to make changes to your AWS account. Check that you want to create each of these resources and that they have the minimum required permissions. [Learn more.](#)

☒ I acknowledge that AWS CloudFormation might create IAM resources.

Preview your changes

Based on your input, CloudFormation will change the following resources. For more information, choose [View change set details](#).

Error creating change set: The submitted information didn't contain changes. Submit different information to create a change set.

CancelPreviousUpdate

CloudFormation

Stacks > Stack Detail

reinvent-translation

Other Actions

Update Stack

Stack name: reinvent-translation

Stack ID: arn:aws:cloudformation:us-west-2:864215584934:stack/reinvent-translation/d51f37f0-ec4d-11e8-bfb2-503acbd4dcfd

Status: CREATE_COMPLETE

Status reason:

Termination protection: Disabled

Drift status: NOT_CHECKED [View details](#)

Last drift check time:

IAM role:

Description:

► Outputs

reinvent-translation

Throttle Qualifiers Actions Select a test event... Test Save

Environment

- reinvent-translation
 - index.js
 - package.json

```
1 const AWS = require('aws-sdk')
2 AWS.config.update({region: 'us-west-2'})
3 const uuidv4 = require('uuid/v4')
4 const translate = new AWS.Translate()
5 const polly = new AWS.Polly()
6 const s3 = new AWS.S3({
7   params: {
8     Bucket: 'reinvent-sample-lisa',
9   }
10 })
11
12 exports.handler = (event, context, callback) => {
13   // Step 1: translate the text
14   let message = ''
15   const translateParams = {
16     SourceLanguageCode: 'en',
17     TargetLanguageCode: event.code,
18     Text: event.sentence
19   }
20
21   translate.translateText(translateParams, function (err, data) {
22     if (err) callback(err)
23     message = data.TranslatedText
24     console.log('message = ' + message)
25
26     const voices = {
27       'es': 'Penelope',
28       'pt': 'Vitoria',
29       'de': 'Vicki',
30       'en': 'Joanna',
31       'fr': 'Gabrielle'
```

Test

Test

- Local testing in simulators and emulators
- Functional testing
- User experience testing
- Real-device testing
- Different form factors

Real-device testing



Test Android, iOS, and web apps on real devices in the cloud

Demo: test on real devices

AWS Device Farm

AWS Device Farm enables you to improve the quality of your Android, iOS, and Fire OS apps by quickly and securely testing them on 100s of real smartphones, tablets, and other devices in the AWS cloud.

Run a test. Your first 1000 minutes are free.

devicefarm-testing

Create project



Test often

Test your app on a device fleet comprised of hundreds of unique devices that scale with customer demand, ensuring fast and secure app testing. Test execution can be automated, allowing you to execute the same test cases on multiple devices in parallel, or manual, allowing you to swipe, gesture, and interact with a device through your web browser.



Find issues quickly

View comprehensive, actionable reports as tests complete on each device. In addition to containing test results, detailed logs, screenshots, video, and performance data, reports identify and group identical errors across multiple devices, allowing you to quickly and efficiently analyze data from potentially hundreds of tests.



Control how you test

Run your own tests written in a number of popular, open-source test frameworks or run our built-in compatibility test suite to fuzz-test and crawl your app with no scripting necessary. You can also execute manual tests and reproduce customer issues via remote access. Fine-tune your test environment by configuring location, language, device data, and installing prerequisite apps to simulate real-world conditions.

Create a new run

- 1 Choose application
- 2 Configure
- 3 Select devices
- 4 Specify device state
- 5 Review and start run

Choose your application



Upload Or drop your file here

Run name

Cancel

Next step

Create a new run

- 1 Choose application
- 2 Configure
- 3 Select devices
- 4 Specify device state
- 5 Review and start run

Choose your application



app-debug.apk

Package com.mtranslate
Activity com.mtranslate.MainActivity
Minimum SDK 16
Native Code armeabi-v7a,x86
Screens small,normal,large,xlarge
Target SDK 22
Version Code 1
Version Name 1.0

Run name

app-debug.apk

Cancel

Next step

Automated tests

Remote access

Project settings

Automated runs allow you to execute built-in tests or your own scripts on one or more devices in parallel, generating a comprehensive report that includes high-level results, logs, screenshots, and performance data.

Create a new run

Run	Test results	Test Type	Created	Total minutes
app-debug.apk		Built-In: Explorer	2018-11-20T17:27:0800	

app-debug.apk

Scheduled at: Nov 20, 2018 5:27:56 PM

0:18

minutes

Stop run

Devices Screenshots Parsing result

Devices

Device	OS	Test results	Total minutes
✓ Google Pixel	7.1.2	0:3	00:03:00
✓ Google Pixel 2	8.0.0	0:3	00:02:39
✓ Samsung Galaxy S6 (T-Mobile)	6.0.1	0:3	00:02:47
✓ Samsung Galaxy S6 (Unlocked)	8.0.0	0:3	00:02:36
✓ Samsung Galaxy Tab 4 10.1" (WiFi)	4.4.2	0:3	00:03:31

Screenshots

Screenshots

Google Pixel 7.1.2

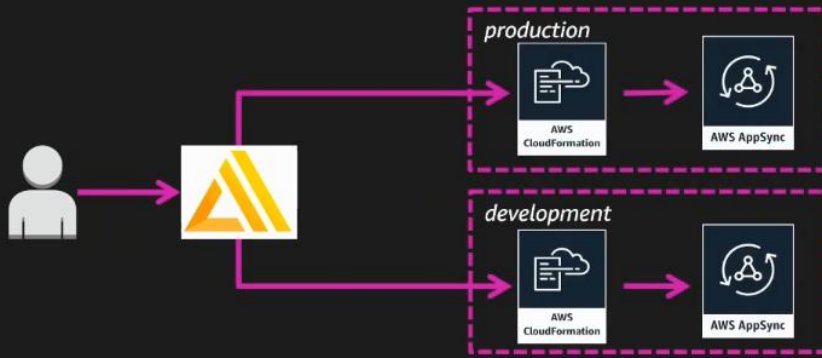


Deploy

Backend

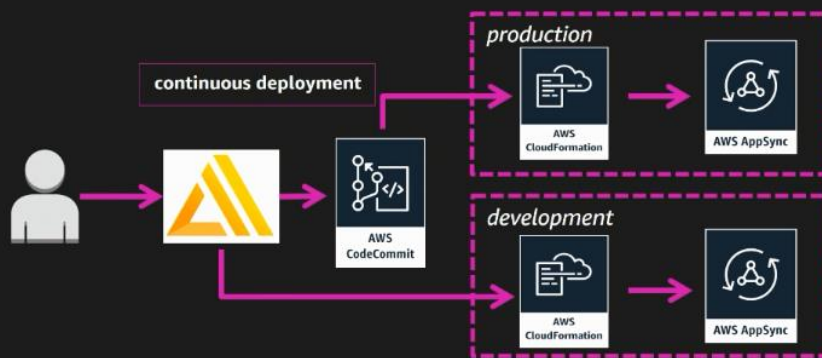


Backend



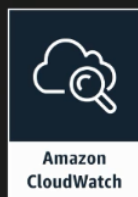
It is best to create 2 different stacks

Backend



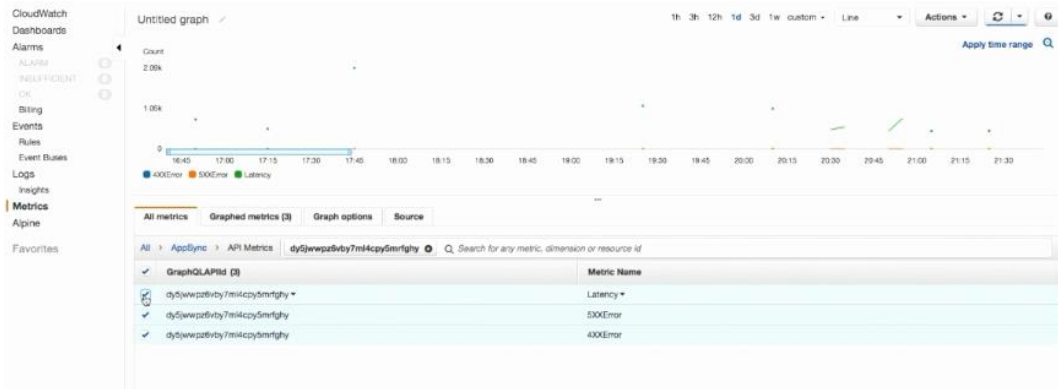
Operate

How does my app perform?



Monitor resources and applications

You can collect all the metrics from CloudWatch

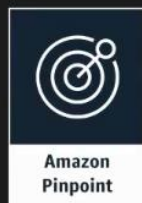


How is my app used?

How is my app used?

- Number of users
- Unfulfilled requests
- Most popular breed
- Time in app

How is my app used?



Engage users via email, push, SMS & analytics

Demo: Track analytics

```
translationCFN.yaml // WARNING: DO NOT EDIT. This file is automatically generated by AWS Amplify. It will be overwritten.
1 // WARNING: DO NOT EDIT. This file is automatically generated by AWS Amplify. It will be overwritten.
2
3 const awsmobile = {
4   // appsync-lambda-ai — node — /usr/local/bin/amplify push — 113x26
5   f45c89b36c51:appsync-lambda-ai lisashon$ amplify add analytics
6   Using service: Pinpoint, provided by: awscloudformation — host-2.amazonaws.com/graphql",
7   ? Provide your pinpoint resource name: appsynclambdaai
8   Adding analytics would add the Auth category to the project if not already added.
9   ? Apps need authorization to send analytics events. Do you want to allow guests and unauthenticated users to send
10  analytics events? (we recommend you allow this when getting started) true
11  Successfully added auth resource locally.
12  Successfully added resource appsynclambdaai locally
13
14  ex Some next steps:
15  "amplify push" builds all of your local backend resources and provisions them in the cloud
16  "amplify publish" builds all your local backend and front-end resources (if you have hosting category added) and
17  provisions them in the cloud
18
19  f45c89b36c51:appsync-lambda-ai lisashon$ amplify push
20  | Category | Resource name | Operation | Provider plugin |
21  |-----|-----|-----|-----|
22  | Auth | cognito31e14723 | Create | awscloudformation |
23  | Analytics | appsynclambdaai | Create | awscloudformation |
24  ? Are you sure you want to continue? true
25  Updating resources in the cloud. This may take a few minutes...
```

```
translationCFN.yaml // WARNING: DO NOT EDIT. This file is automatically generated by AWS Amplify. It will be overwritten.
1 // WARNING: DO NOT EDIT. This file is automatically generated by AWS Amplify. It will be overwritten.
2
3 const awsmobile = {
4   // appsync-lambda-ai — node — /usr/local/bin/amplify push — 113x26
5   | Auth | cognito31e14723 | Create | awscloudformation |
6   | Analytics | appsynclambdaai | Create | awscloudformation |
7   ? Are you sure you want to continue? true
8   Updating resources in the cloud. This may take a few minutes...
9   UPDATE_IN_PROGRESS appsynclambdaai-20181119212348 AWS::CloudFormation::Stack Mon Nov 19 2018 21:24:57 GMT-0800 (P
10  ST) User Initiated
11  CREATE_IN_PROGRESS authcognito31e14723 AWS::CloudFormation::Stack Mon Nov 19 2018 21:25:02 GMT-0800 (P
12  ST)
13  ex CREATE_IN_PROGRESS analyticsappsynclambdaai AWS::CloudFormation::Stack Mon Nov 19 2018 21:25:02 GMT-0800 (P
14  ST)
15  CREATE_IN_PROGRESS authcognito31e14723 AWS::CloudFormation::Stack Mon Nov 19 2018 21:25:03 GMT-0800 (P
16  ST) Resource creation Initiated
17  CREATE_IN_PROGRESS analyticsappsynclambdaai AWS::CloudFormation::Stack Mon Nov 19 2018 21:25:04 GMT-0800 (P
18  ST) Resource creation Initiated
19  Updating resources in the cloud. This may take a few minutes...
20
21  CREATE_IN_PROGRESS appsynclambdaai-20181119212348-authcognito31e14723-1JFJ79M1E8JKP AWS::CloudFormation::Sta
22  ck Mon Nov 19 2018 21:25:03 GMT-0800 (PST) User Initiated
23  CREATE_IN_PROGRESS appsynclambdaai-20181119212348-analyticsappsynclambdaai-1J5PTNGVXVSG0 AWS::CloudFormation::Sta
24  ck Mon Nov 19 2018 21:25:04 GMT-0800 (PST) User Initiated
25  CREATE_IN_PROGRESS IdentityPool AWS::Cognito::IdentityPo
26  ol Mon Nov 19 2018 21:25:07 GMT-0800 (PST)
27  CREATE_IN_PROGRESS LambdaExecutionRole AWS::IAM::Role
28  Mon Nov 19 2018 21:25:07 GMT-0800 (PST)
29  Updating resources in the cloud. This may take a few minutes...
```

Improve

Evaluate needs

- Improve retention
- Improve acquisition
- Improve stability

Demo: add language

```
JS App.js x JS codes.js JS aws-exports.js
1 import React, { Component } from 'react';
2 import {
3   StyleSheet,
4   View,
5   TextInput
6 } from 'react-native';
7
8 import { ButtonGroup, Button } from 'react-native-elements'
9 import { API, graphqlOperation } from 'aws-amplify'
10 var Sound = require('react-native-sound')
11 Sound.setCategory('Playback')
12
13 import codes from './codes'
14 import query from './query'
15
16 const buttons = [
17   'French',
18   'Portuguese',
19   'Spanish',
20   'German'
21 ]
22
23 export default class App extends Component {
24   state = {
25     index: 0,
26     codes,
27     sentence: '',
28     translatedText: '',
29     mp3Url: '',
30     loading: false
31   }
32 }
```

```
JS App.js JS codes.js JS aws-exports.js
1 const codes = [
2   { name: 'French', code: 'fr' },
3   { name: 'Portuguese', code: 'pt' },
4   { name: 'Spanish', code: 'es' },
5   { name: 'German', code: 'de' }
6 ]
7
8 export default codes
```

```
JS App.js JS codes.js JS aws-exports.js
1 const codes = [
2   { name: 'French', code: 'fr' },
3   { name: 'Portuguese', code: 'pt' },
4   { name: 'Spanish', code: 'es' },
5   { name: 'German', code: 'de' }
6 ]
7
8 export default codes
```

appsinc-lambda-ai — xcodebuild - node ~/nvm/versions/node/v8.11.3/bin/react-native run-ios — 80x24

f45c89b36c51:appsinc-lambda-ai lisashon\$ react-native run-ios

Scanning folders for symlinks in /Users/lisashon/reinvent/appsinc-lambda-ai/node_modules (15ms)

Found Xcode project RNTranslate.xcodeproj

Building using "xcodebuild -project RNTranslate.xcodeproj -configuration Debug -scheme RNTranslate -destination id=9568933E-A8FA-459E-B86E-4F5C861280E8 -derivedDataPath build"

User defaults from command line:

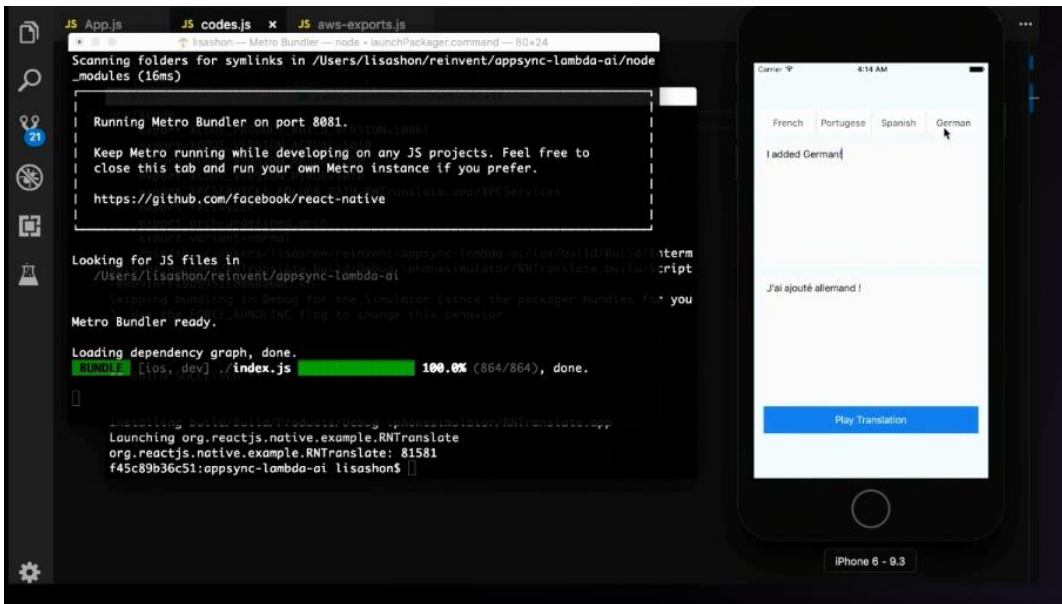
IDEDerivedDataPathOverride = /Users/lisashon/reinvent/appsinc-lambda-ai/ios/build

4:14 AM

Calendar Photos Maps Wallet

Reminders News Health Settings

Search



Resources

Sample app on Github:

<https://github.com/dabit3/appsync-lambda-ai>

Goodreads:

<https://www.goodreads.com>

<https://www.goodreads.com/jobs> (we're hiring!)

Thank you!

Lisa Shon
Tomas Batalla

re:Invent

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