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.
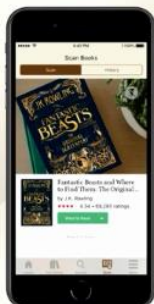
We have a lot of content

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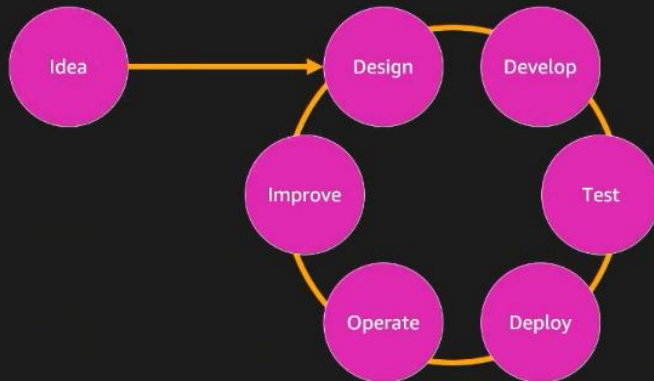
- 80 million users
- 2.3 billion books shelved
- 83 million text reviews
- With all this content, how can we help our users' discover the next great book for them?

Product Lifecycle

goodreads

Idea → Design → Develop → Test → Deploy → Operate → Improve (cycle diagram)

Idea

goodreads

> Great, but... ★★★★★   ← Reply
> by   – May 30, 2018
>
> 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

> Aug 26, 2017 at 2:58 AM
> ★★
> 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

goodreads

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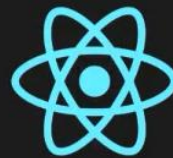 - How are you going to fetch the data?
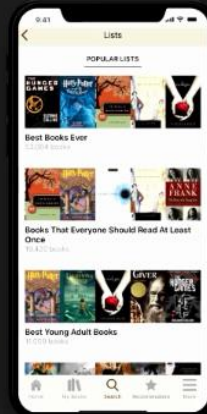
Why cross-platform?

goodreads

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

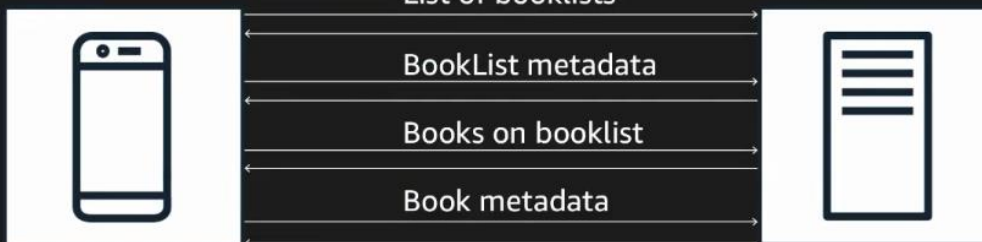# Why not cross-platform?

goodreads

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

Getting the data

goodreads

List of booklists

BookList metadata

Books on booklist

Book metadata

Solving our data fetching problem

goodreads

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

But it's a service

goodreads

We don't want to run ops

AWS AppSync

Design

goodreads

AWS AppSync

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

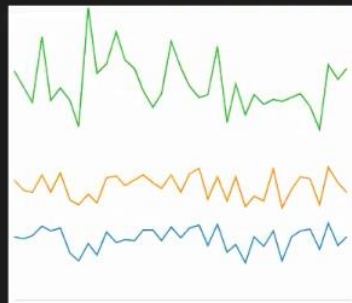## Operational Metrics

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

Business metrics

- Shelvings
- Users
- Page views

Want to Read

Improve

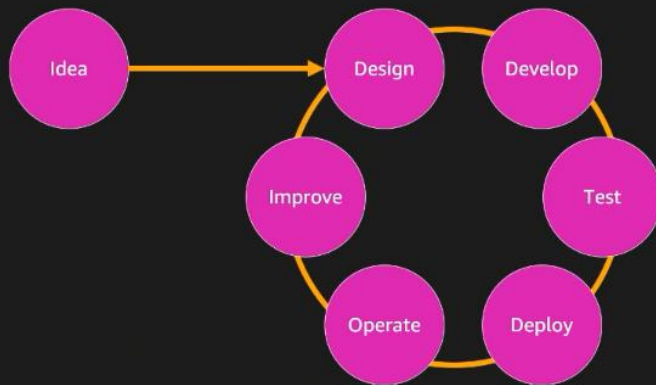- How are customers responding?
- What do the metrics say?

Building on the feature

Back to Design

Idea → Design → Develop → Test → Deploy → Operate → Improve

Idea

What problem am I solving?

Design

What does my app look like?

What does my app look like?

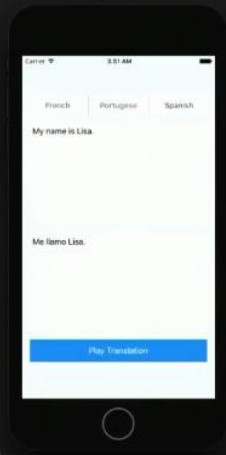# Which platforms to support?

Platforms
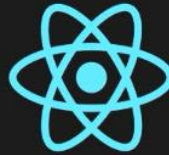
What is the MVP for my app?

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

Develop

Domain objects

Input

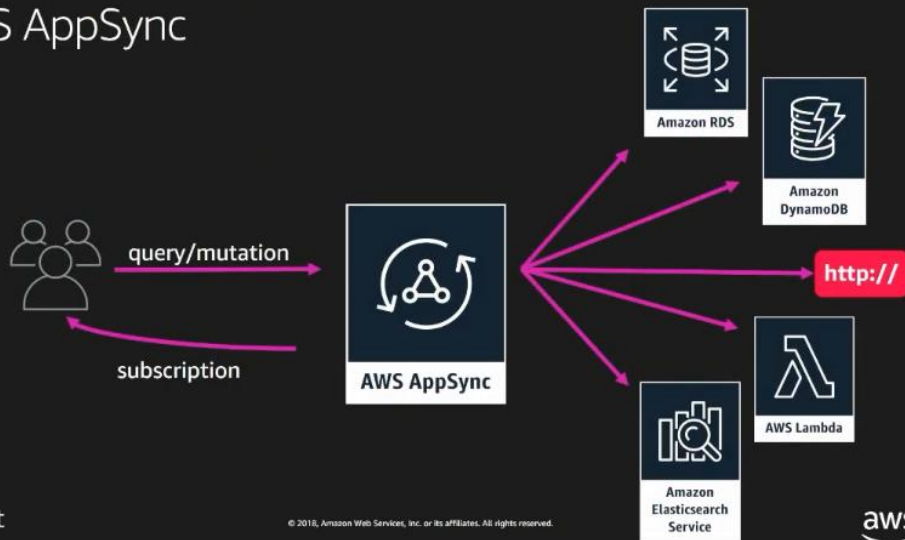- `sentence: String`
- `language: String`

Output

- `sentence: String`
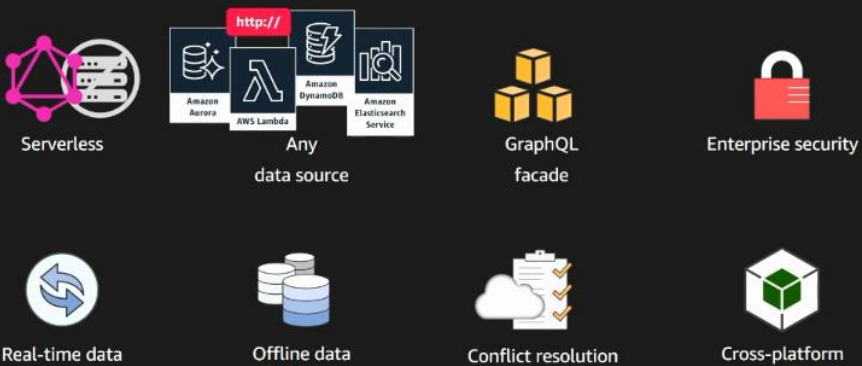

GraphQL

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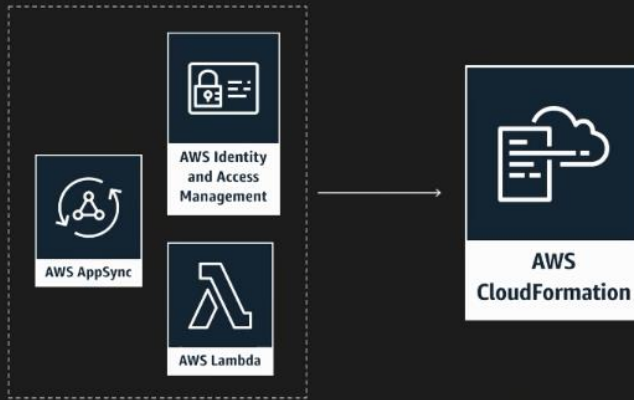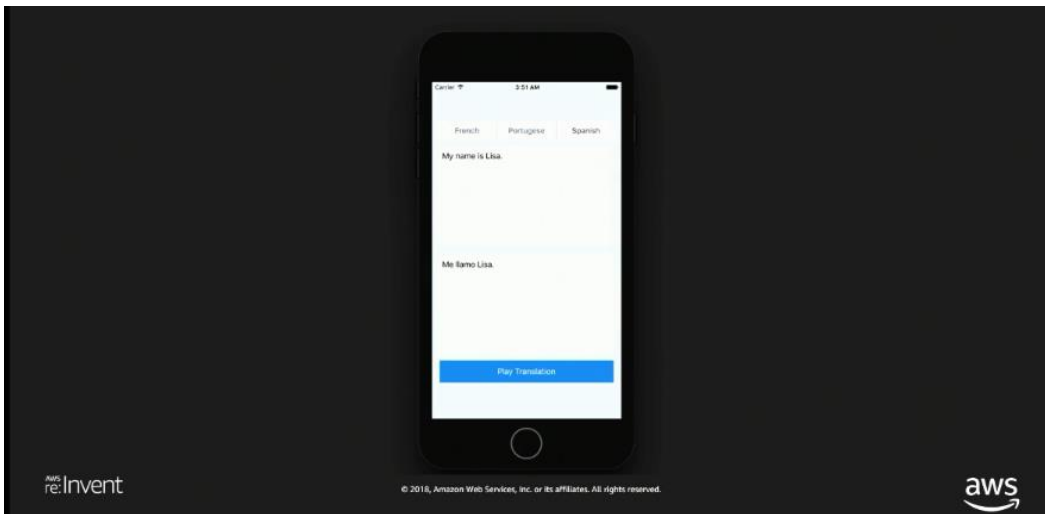- Efficient
- Extensible

AWS AppSync

AWS AppSync

AWS Amplify

Demo: Build the app & backend

Resources in the Cloud


```js
const AWS = require('aws-sdk')
AWS.config.update({region: 'us-west-2'})
const uuidV4 = require('uuid/v4')
const translate = new AWS.Translate();
const polly = new AWS.Polly();
const s3 = new AWS.S3({
    params: {
        Bucket: 'reinvent-sample-lisa',
    }
})
const voices = {
    'es': 'Penelope',
    'pt': 'Vitoria',
    'de': 'Vicki',
    'en': 'Joanna',
    'fr': 'Celine'
}

exports.handler = (event, context, callback) => {
    // prepare translate params
```

```js
    View,
    TextInput
} from 'react-native';

import { ButtonGroup, Button } from 'react-native-elements'
import { API, graphqlOperation } from 'aws-amplify'

var Sound = require('react-native-sound');
Sound.setCategory('Playback')

import codes from './codes'
import query from './query'

const buttons = [
    'French',
    'Portugese',
    'Spanish',
    'German'
]
```



```yaml
AWSTemplateFormatVersion: 2010-09-09
Parameters:
  LambdaFunctionName:
    Default: appsync-lambda-example
    Description: Name of the AWS Lambda Function.
    Type: String
    MinLength: 1
  GraphQLApiName:
    Default: appsync-api
    Description: Name of the AppSync GraphQL Api
    Type: String
    MinLength: 1
Resources:
  LambdaExecutionRole:
    Type: 'AWS::IAM::Role'
    Properties:
      AssumeRolePolicyDocument:
        Version: 2012-10-17
        Statement:
          - Effect: Allow
            Principal:
              Service:
                - lambda.amazonaws.com
            Action:
              - 'sts:AssumeRole'
      Path: /
      ManagedPolicyArns:
        - 'arn:aws:iam::aws:policy/TranslateReadOnly'
        - 'arn:aws:iam::aws:policy/AmazonPollyFullAccess'
        - 'arn:aws:iam::aws:policy/AmazonS3FullAccess'
        - 'arn:aws:iam::aws:policy/AWSLambdaFullAccess'
      Policies:
        - PolicyName: LambdaExecutionRoleLogAccess
```

Update reinvent-translation stack

Select Template
Select Template
Specify Details
Options
Review

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
      Choose File   translationCFN.yaml

    ○ Specify an Amazon S3 template URL

Cancel   **Next**

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.

Cancel   Previous   **Next**

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.

Cancel   Previous   **Update**

---

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

```
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': 'Celine'
```

Test

Test

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

Real-device testing

AWS Device Farm

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

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

app-debug.apk

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

✔ 16
PASSED

Stop run

Devices   Screenshots   Parsing result

Devices

Device		OS	Test results	Total minutes
✔	Google Pixel	7.1.2	✔ 3	00:03:00
✔	Google Pixel 2	8.0.0	✔ 3	00:02:59
✔	Samsung Galaxy S6 (T-Mobile)	6.0.1	✔ 3	00:02:47
✔	Samsung Galaxy S9 (Unlocked)	8.0.0	✔ 3	00:02:36
✔	Samsung Galaxy Tab 4 10.1" (WiFi)	4.4.2	✔ 3	00:03:31

Screenshots

Screenshots

Google Pixel 7.1.2

| French | Portugese | Spanish |

Text to translate

Play Translation

Deploy
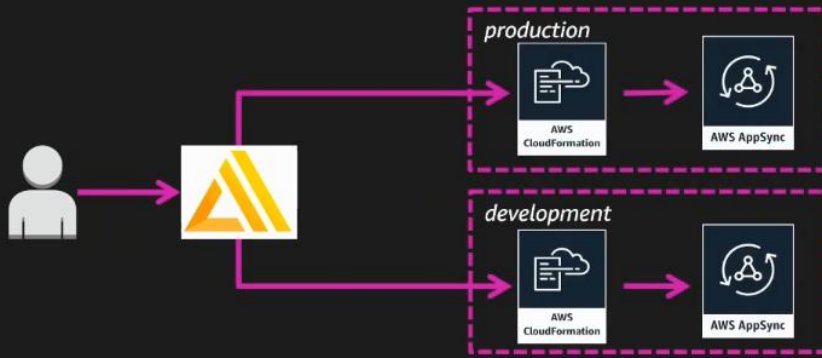
Backend

It is best to create 2 different stacks
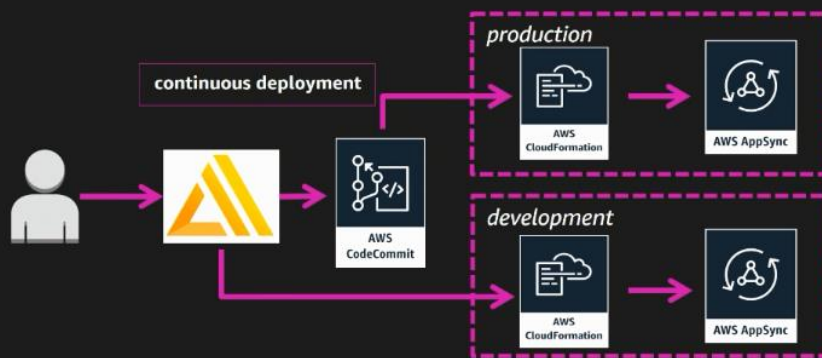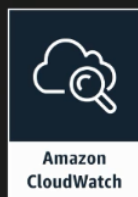
You can collect all the metrics from CloudWatch
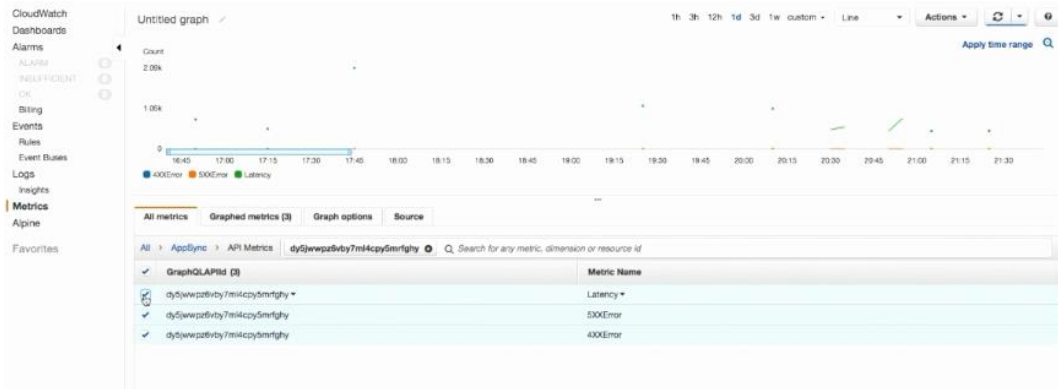
How is my app used?

How is my app used?

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

How is my app used?

Amazon Pinpoint
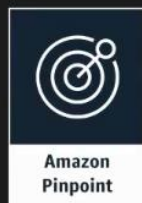
Engage users via email, push, SMS & analytics

Demo: Track analytics

Improve

Evaluate needs

- Improve retention
- Improve acquisition
- Improve stability

Demo: add language

```javascript
import React, { Component } from 'react';
import {
  StyleSheet,
  View,
  TextInput
} from 'react-native';

import { ButtonGroup, Button } from 'react-native-elements'
import { API, graphqlOperation } from 'aws-amplify'
var Sound = require('react-native-sound')
Sound.setCategory('Playback')

import codes from './codes'
import query from './query'

const buttons = [
  'French',
  'Portugese',
  'Spanish',
  'German'
]

export default class App extends Component {
  state = {
    index: 0,
    codes,
    sentence: '',
    translatedText: '',
    mp3Url: '',
    loading: false
  }
```

```javascript
const codes = [
  { name: 'French', code: 'fr' },
  { name: 'Portuguese', code: 'pt' },
  { name: 'Spanish', code: 'es' },
  { name: 'German', code: 'de' }
]

export default codes
```

```
appsync-lambda-ai — xcodebuild • node ~/.nvm/versions/node/v8.11.3/bin/react-native run-ios — 80×24
f45c89b36c51:appsync-lambda-ai lisashon$ react-native run-ios
Scanning folders for symlinks in /Users/lisashon/reinvent/appsync-lambda-ai/node
_modules (15ms)
Found Xcode project RNTranslate.xcodeproj
Building using "xcodebuild -project RNTranslate.xcodeproj -configuration Debug -
scheme RNTranslate -destination id=956B933E-ABFA-459E-BB6E-4F5C8612B0EB -derived
DataPath build"
User defaults from command line:

    IDEDerivedDataPathOverride = /Users/lisashon/reinvent/appsync-lambda-ai/ios/
build
```
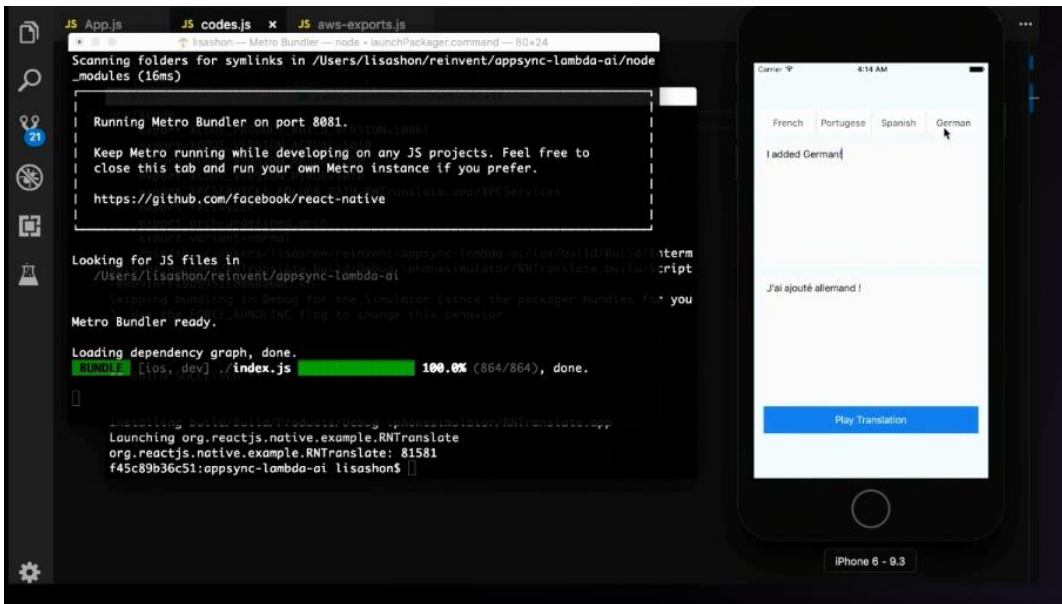
Resources

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