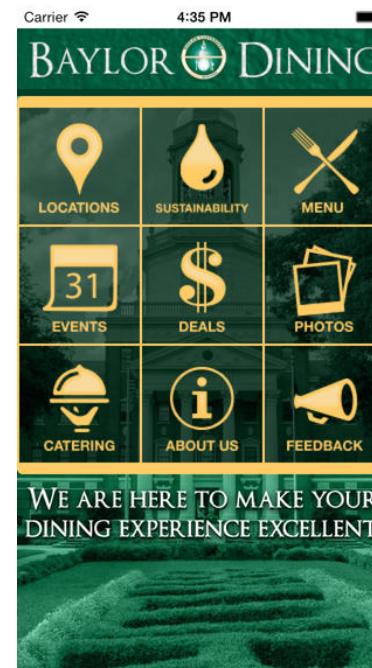
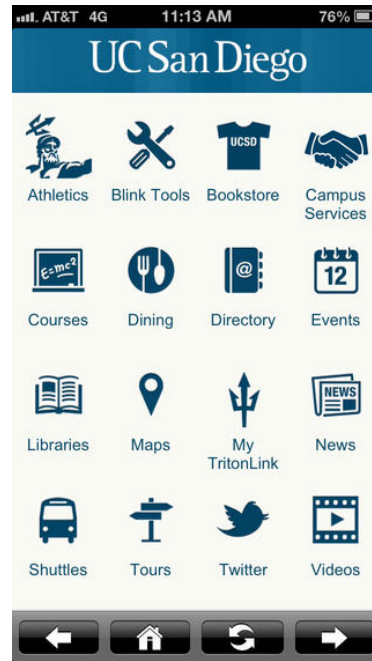
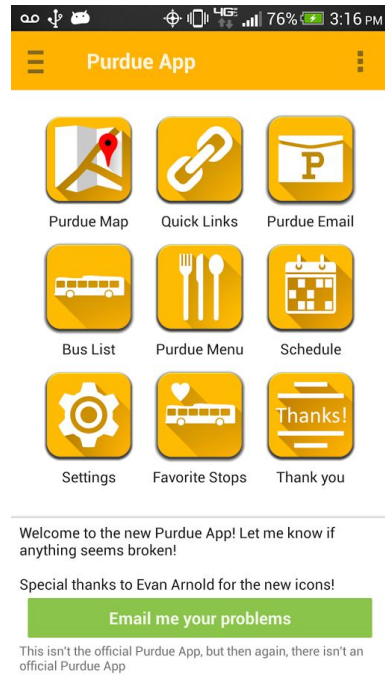
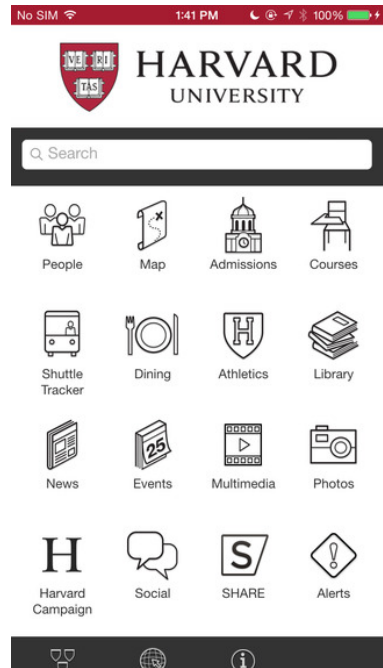


Next Generation Campus Mobile Applications

UC San Diego

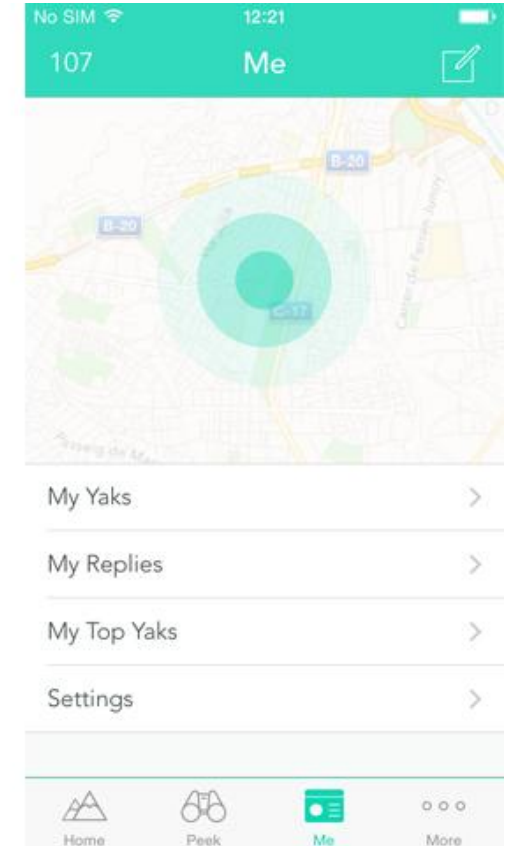
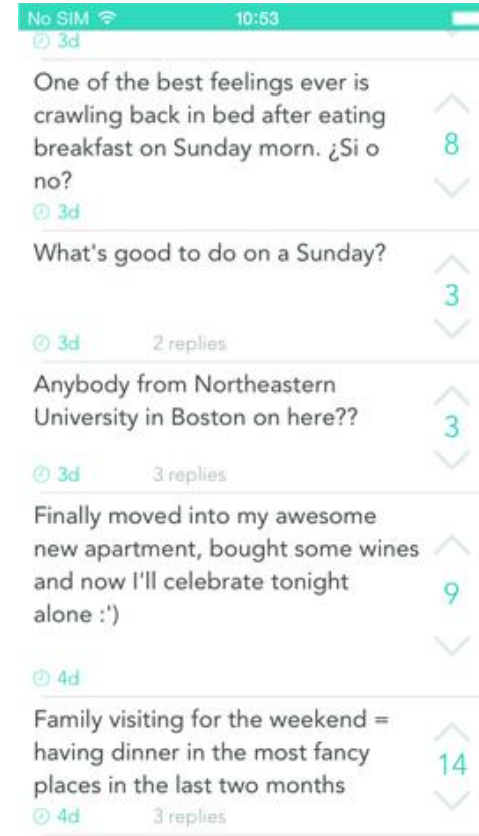
Campus Apps



Campus Apps

- Mass audience focused
- Static
- Informational
- User directed look-ups

Millennial Apps



Differences

- Personalized
- Conversational
- Up-to-the-minute information, active, actionable
- Peer assistance, digital assistance

User Experience Goals

- Better connect students with campus
- Better meet student expectations for applications

Technical Goals

- Leverage the capabilities of mobile
- Enable distributed development

Carrier

9:24 AM

now@ucsandiego



#WelcomeWeek



Shuttle Routes



@

Price Center

Arriving in: 4 mins



@




Warren Apartments

Arriving in: 4 mins



Torrey Pines Center 

Next Arrivals

-  Counter Campus Loop 5 mins
-  Sanford Consortium Shuttle 9 mins
-  Counter Campus Loop 23 mins

Map



Carrier

9:24 AM

now@ucsandiego



#WelcomeWeek



Shuttle Routes



@

Price Center

Arriving in: 4 mins




@

Warren Apartments

Arriving in: 4 mins

Weather

71° in San Diego 
Mostly Cloudy

FRI	SAT	SUN	MON	TUE
				
75°	78°	77°	77°	82°
65°	65°	65°	61°	60°

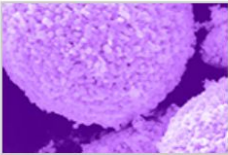
[Surf Report »](#)

News

UC San Diego Hires Top Robotics Expert to Lead Contextual Robotics Institute
[Jul 7](#)



Researchers Improve Performance of Cathode Material by Controlling Oxygen Activity
[Jul 7](#)



The University of California...



Jul 7

Show More News ▼

Student Events

Welcome Week 2016

Welcome Week, an annual tradition at UC San Diego, foste...

Sep 18, 8:00am



All-Campus Convocation

The 2016 New Student Welcome Convocation and Dinner is t...

Sep 19, 5:00pm - 7:00pm



All-Campus UnOlympics

Sep 21, 1:30pm - 3:30pm



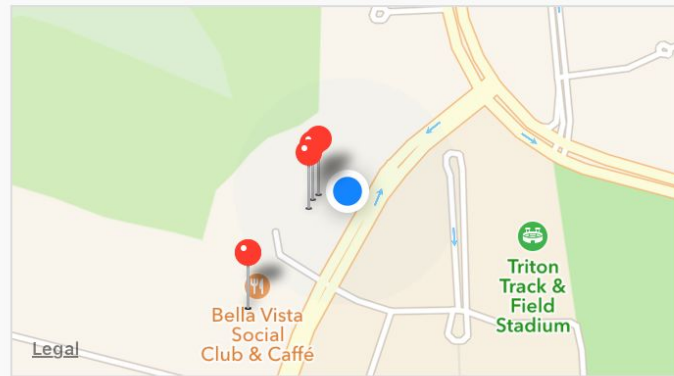
First Friday: The Triton

Sep 23, 11:00am - 11:55pm



Show More Events ▼

Nearby

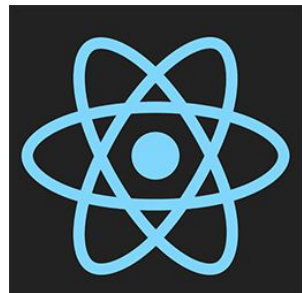
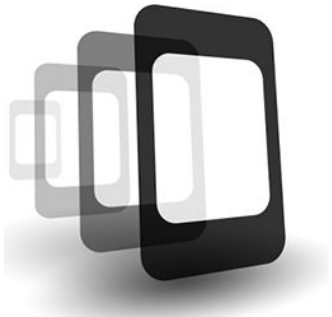


- 📍 Torrey Pines Center South
- 📍 ACT Help Desk
- 📍 Come On In! Cafe
- 📍 Sanford Consortium
- 📍 Sanford Consortium/Stem Cell Building

Where we're headed

- Personalization based on individual behavior modeling
- Push notification
- Conversational information feeds – a campus-wide chatbot
- Foundation of a whole host of cards
 - Dining info based on time, place and personal preference
 - Instant surveys to campus or segments
 - Student elections with real-time results

Choosing a Technology Platform



React Native Overview

- Launched with iOS support in March 2015 Android in October
- Supports all iOS 8.0+ and Android 4.1+ devices
- Open-source
- Leverages modern web development technologies
- Learn once, write anywhere

React Native Features (1/2)

- Develop in Real Time with NodeJS
- Native Components
- Styling with Flexbox
- Asynchronous Execution
- Standardized APIs

React Native Features (2/2)

- Touch Handling
- Extensibility
- NPM and RNPM
- Debugging & Performance
- Code Base Commonization



Development Process

- Leveraging Web Development Background
- Tools
 1. Xcode
 2. Android Studio
 3. Device Simulator
 4. Text Editor/IDE (Sublime)
 5. Chrome Debugger
- Version Control
- Backing & Support

Development Process Demo

- Initializing a new React Native project: HelloUCCSC

```
act181-153:React c3bryant$ react-native init HelloUCCSC
This will walk you through creating a new React Native project in /Users/c3bryant/Projects/iOS/Development/React/HelloUCCSC
Installing react-native package from npm...
Setting up new React Native app in /Users/c3bryant/Projects/iOS/Development/React/HelloUCCSC
HelloUCCSC@0.0.1 /Users/c3bryant/Projects/iOS/Development/React/HelloUCCSC
└─ react@15.2.0
```

To run your app on iOS:

```
cd /Users/c3bryant/Projects/iOS/Development/React/HelloUCCSC
react-native run-ios
```

- or -

Open /Users/c3bryant/Projects/iOS/Development/React/HelloUCCSC/ios/HelloUCCSC.xcodeproj in Xcode

Hit the Run button

To run your app on Android:

Have an Android emulator running (quickest way to get started), or a device connected

```
cd /Users/c3bryant/Projects/iOS/Development/React/HelloUCCSC
react-native run-android
```

```
act181-153:React c3bryant$ █
```

Name	Date Modified	Size
.DS_Store	11:11 AM	6
▼ android	11:02 AM	
build.gradle	11:02 AM	64...y
settings.gradle	11:02 AM	48...y
▶ app	11:02 AM	
▶ gradle	11:02 AM	
▶ keystores	11:02 AM	
gradlew	11:02 AM	5
gradle.properties	11:02 AM	88...y
gradlew.bat	11:02 AM	2
▼ ios	11:11 AM	
.DS_Store	11:11 AM	6
▼ HelloUCCSC	11:02 AM	
AppDelegate.h	11:02 AM	45...y
▶ Base.lproj	11:02 AM	
▶ Images.xcassets	11:02 AM	
AppDelegate.m	11:02 AM	1
main.m	11:02 AM	51...y
Info.plist	11:02 AM	2
▶ HelloUCCSCTests	11:02 AM	
HelloUCCSC.xcodeproj	11:02 AM	35
▶ node_modules	11:03 AM	
index.android.js	11:02 AM	1
index.ios.js	11:02 AM	1
package.json	11:03 AM	23...y
.buckconfig	11:02 AM	11...y
.flowconfig	11:02 AM	1
.gitignore	11:02 AM	42...y
.watchmanconfig	11:02 AM	2 by

iPhone 6s Plus | Indexing | Processing files

HelloUCCSC > HelloUCCSC > LaunchScreen.xib > LaunchScreen.xib (Base) > View

- ▼ HelloUCCSC
 - ▼ HelloUCCSC
 - main.jsbundle
 - AppDelegate.h
 - AppDelegate.m
 - Images.xcassets
 - Info.plist
 - LaunchScreen.xib
 - main.m
 - Libraries
 - HelloUCCSCTests
 - Products

HelloUCCSC

Powered by React Native

+ Filter

wAny hAny

```
c3bryant — React Packager — node ◀ launchPackager.command — 80x52
~/Projects/iOS/Development/React/HelloUCCSC/node_modules/react-native/packager ~

Running packager on port 8081.

Keep this packager running while developing on any JS projects. Feel
free to close this tab and run your own packager instance if you
prefer.

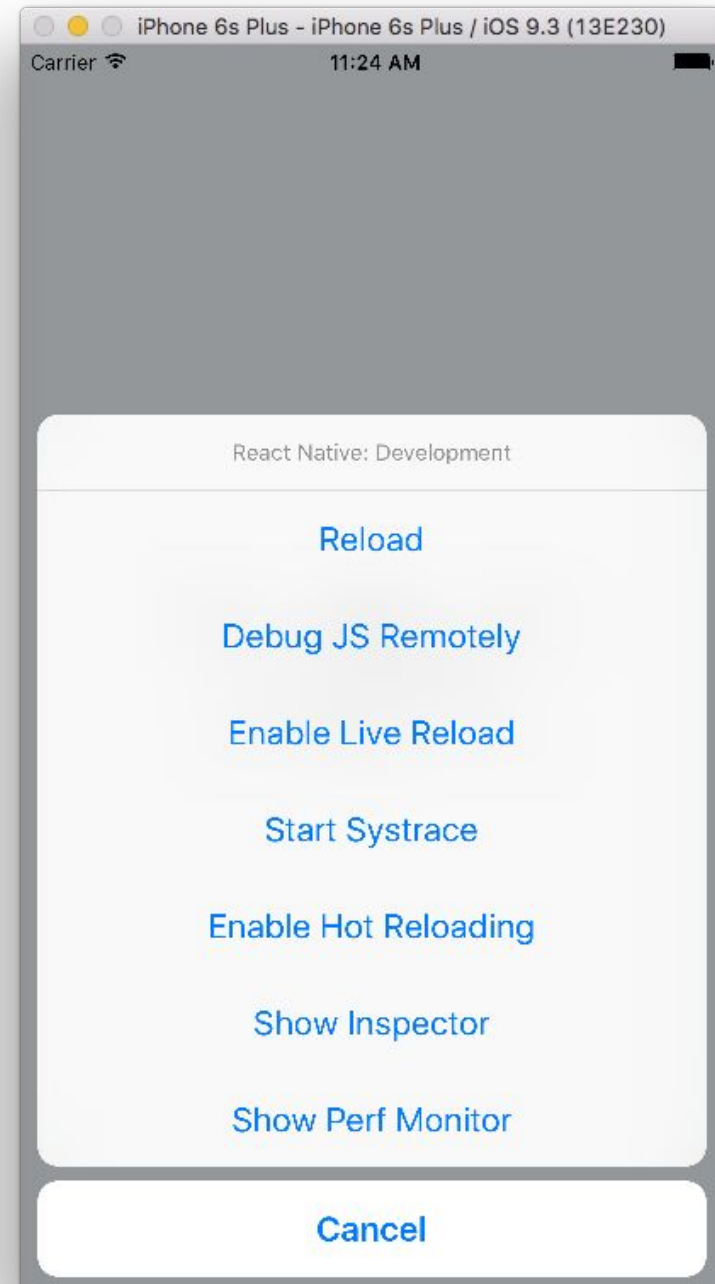
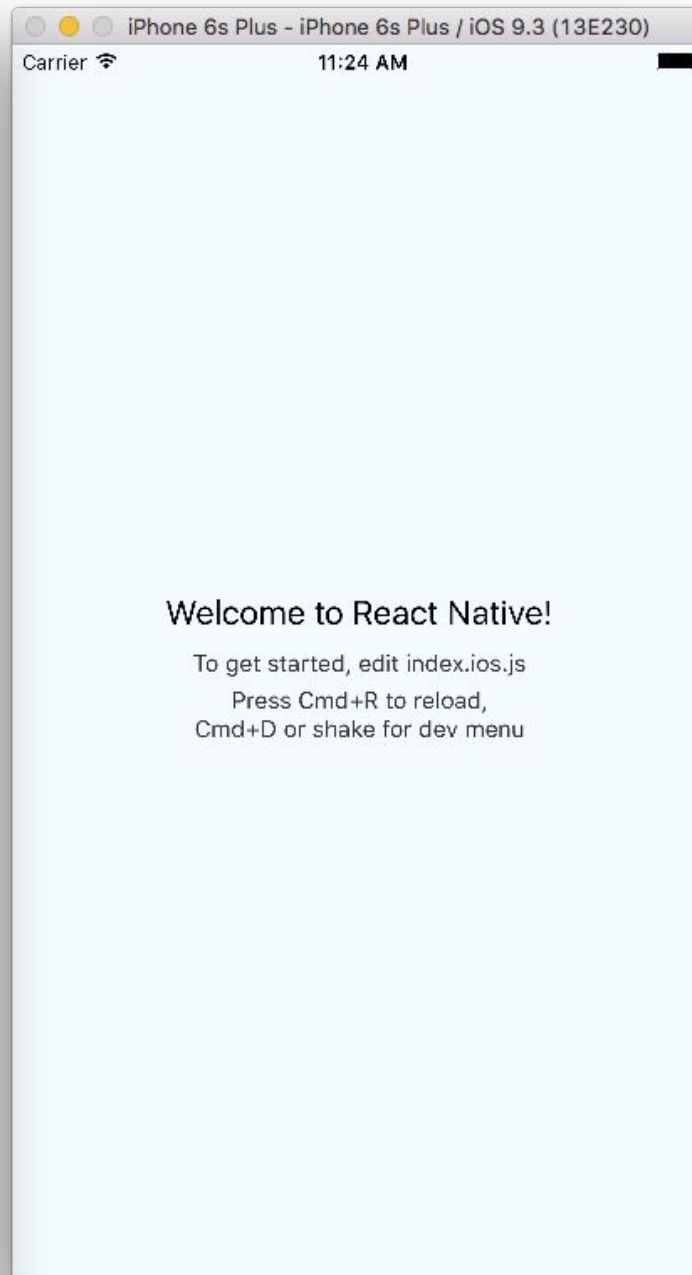
https://github.com/facebook/react-native

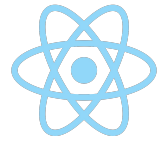
Looking for JS files in
/Users/c3bryant/Projects/iOS/Development/React/HelloUCCSC

[11:22:45 AM] <START> Building Dependency Graph
[11:22:45 AM] <START> Crawling File System
[Hot Module Replacement] Server listening on /hot

React packager ready.

[11:22:49 AM] <END> Crawling File System (3877ms)
[11:22:49 AM] <START> Building in-memory fs for JavaScript
[11:22:49 AM] <END> Building in-memory fs for JavaScript (251ms)
[11:22:49 AM] <START> Building in-memory fs for Assets
[11:22:49 AM] <END> Building in-memory fs for Assets (143ms)
[11:22:49 AM] <START> Building Haste Map
[11:22:49 AM] <START> Building (deprecated) Asset Map
[11:22:49 AM] <END> Building (deprecated) Asset Map (94ms)
[11:22:52 AM] <END> Building Haste Map (2863ms)
[11:22:52 AM] <END> Building Dependency Graph (7166ms)
[11:22:54 AM] <START> request:/index.ios.bundle?platform=ios&dev=true&minify=fal
se
[11:22:54 AM] <START> find dependencies
transformed 614/614 (100%)
[11:23:17 AM] <END> find dependencies (23150ms)
[11:23:22 AM] <END> request:/index.ios.bundle?platform=ios&dev=true&minify=fal
se (28025ms)
[11:24:07 AM] <START> request:/index.ios.bundle?platform=ios&dev=true&minify=fal
se
[11:24:07 AM] <END> request:/index.ios.bundle?platform=ios&dev=true&minify=fal
se (125ms)
[11:24:11 AM] <START> request:/index.ios.bundle?platform=ios&dev=true&minify=fal
se
[11:24:11 AM] <END> request:/index.ios.bundle?platform=ios&dev=true&minify=fal
se (96ms)
[11:24:12 AM] <START> request:/index.ios.bundle?platform=ios&dev=true&minify=fal
se
[11:24:12 AM] <END> request:/index.ios.bundle?platform=ios&dev=true&minify=fal
se (113ms)
```



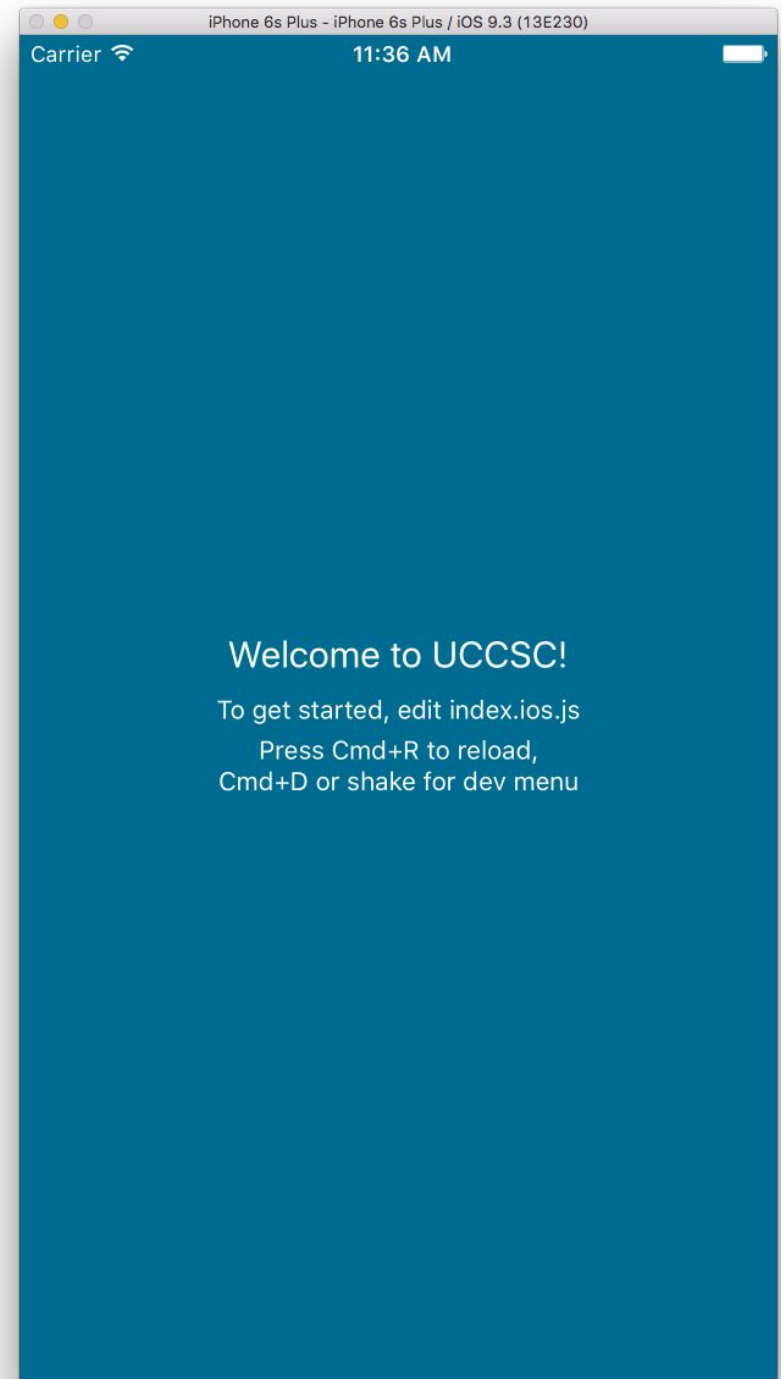


React Native Common Questions

- Facebook has a full-time staff of 30 people working on React Native, and over 1000 contributing developers since launch
- The goal of React Native is not to just solve the cross platform problem, but to be a better developer environment than the way you build iOS and Android apps natively today
- Facebook is currently using it for apps in production (Ads manager and Groups app). Over 500 iOS and 200 android apps live
- There is no WebView, it is JavaScript running in a virtual machine and controlling a native UI. At the core of React Native is a bridge to Objective-C or Java that lets native code call JavaScript and vice versa.
- React Native releases a new version every two weeks. So far each version upgrade has been packed with new native features and overall improvements. We are currently running version .29, and started on version .13 last December

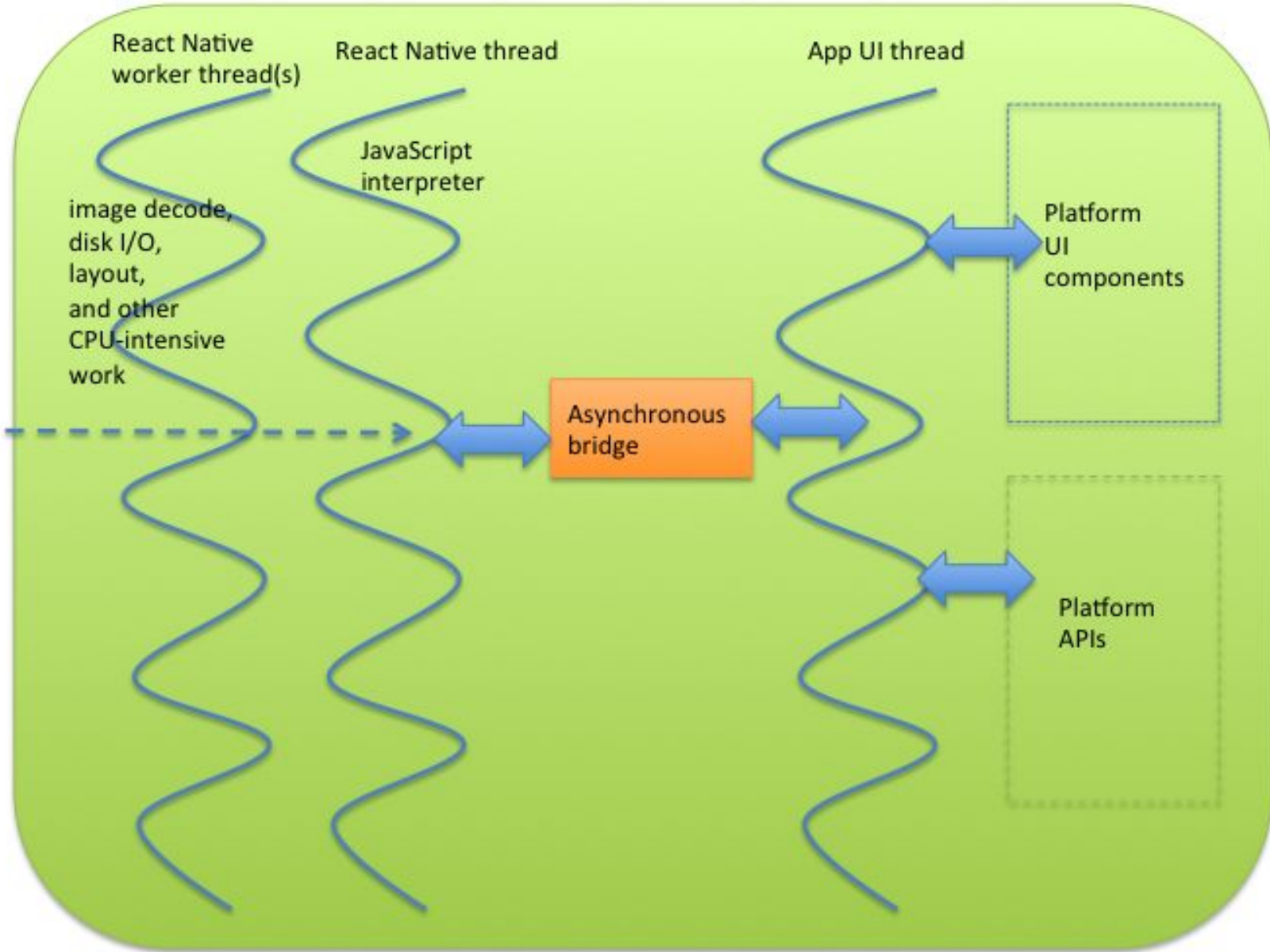
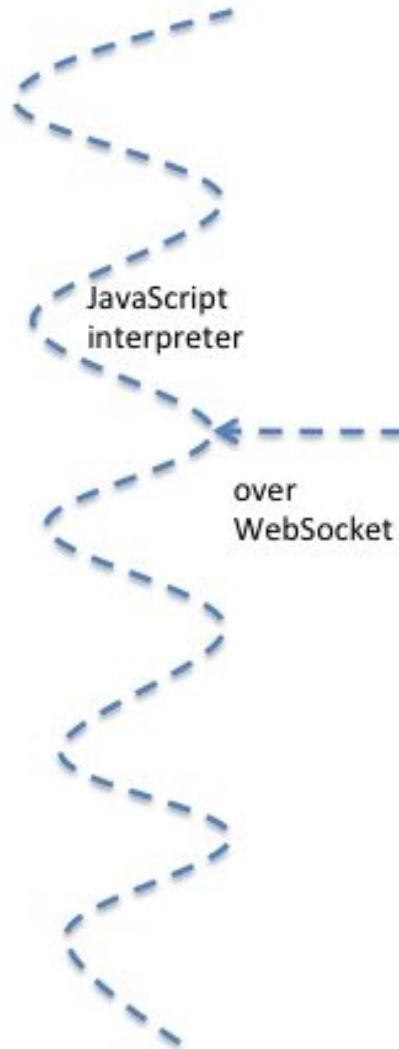

```
index.ios.js UNREGISTERED
index.ios.js x
1 /**
2  * Sample React Native App
3  * https://github.com/facebook/react-native
4  * @flow
5  */
6
7  import React, { Component } from 'react';
8  import {
9    AppRegistry,
10   StyleSheet,
11   Text,
12   View,
13   StatusBar
14 } from 'react-native';
15
16 class HelloUCCSC extends Component {
17   render() {
18
19     StatusBar.setBarStyle('light-content');
20
21     return (
22       <View style={styles.container}>
23         <Text style={styles.welcome}>
24           Welcome to UCCSC!
25         </Text>
26         <Text style={styles.instructions}>
27           To get started, edit index.ios.js
28         </Text>
29         <Text style={styles.instructions}>
30           Press Cmd+R to reload,{'\n'}
31           Cmd+D or shake for dev menu
32         </Text>
33       </View>
34     );
35   }
36 }
37
38 const styles = StyleSheet.create({
39   container: {
40     flex: 1,
41     justifyContent: 'center',
42     alignItems: 'center',
43     backgroundColor: '#006C92',
44   },
45   welcome: {
```

Line 19, Column 44 Spaces: 2 JavaScript



Running iOS App

Running in
Chrome for remote
debugging



Common Code

- Folders: app, ios, android
- App: 13 common JavaScript files
- iOS: AppDelegate.m, index.ios.js
- Android: AndroidManifest.xml, index.android.js

Android Build

- Edited index.android.js ~45 lines of code
- Added ACCESS_FINE_LOCATION permission to AndroidManifest.xml
- Some image path updates
- Run in emulator

```
14 var nowucsandiego = React.createClass({
15   realm: null,
16   AppSettings: null,
17
18   componentWillMount: function() {
19
20     // Realm DB Setup
21     this.realm = new Realm({schema: [AppSettings.DB_SCHEMA], schemaVersion: 2});
22     this.AppSettings = this.realm.objects('AppSettings');
23
24     if (this.AppSettings.length === 0) {
25       this.realm.write(() => {
26         this.realm.create('AppSettings', { id: 1 });
27       });
28     }
29   },
30
31   render: function() {
32     return (
33       <Navigator initialRoute={{id: 'Home', name: 'Home'}} renderScene={this.renderScene} />
34     );
35   },
36
37   renderScene: function(route, navigator, index, navState) {
38
39     switch (route.id) {
40       case 'Home':           return <Home route={route} navigator={navigator} isSimulator={this.props.isSimulator} />;
41       case 'SurfReport':     return <SurfReport route={route} navigator={navigator} />;
42       default:               return <Home route={route} navigator={navigator} />;
43     }
44   },
```

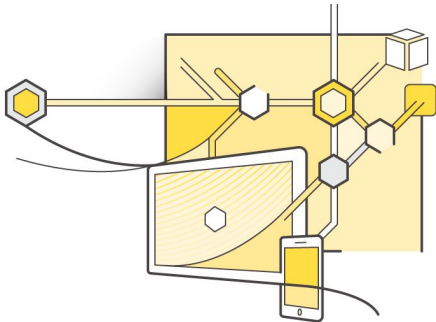
Amazon Web Services



Simple Storage Service



Lambda



API Gateway

Amazon Web Services: S3

- News
- Events
- Surf

```
{  
  "date": "Mon, 6 Jun 2016 05:55:00 PDT",  
  "link": "http://www.surflife.com/rss/rssredirect.c  
  "description": "A slow go, Bird with the report for  
  "title": "TORREY PINES STATE BEACH : 1-2 ft - knee  
}, ....
```



Amazon Web Services: Lambda

- Weather
- Shuttle Stops
- .. 8 functions



“Run code without thinking about servers”

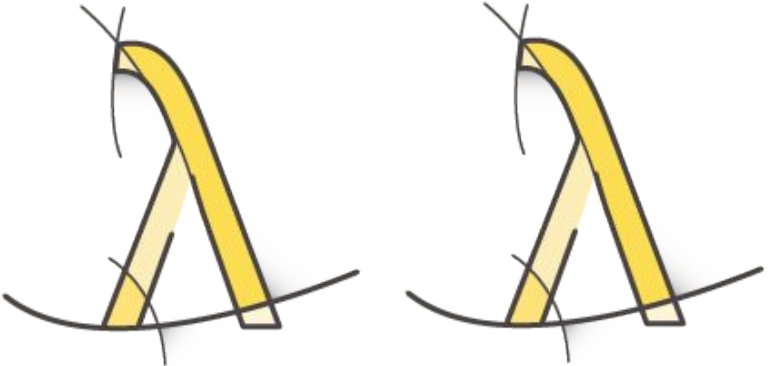
Amazon Web Services: Lambda

- No charge when code is not running
- Node.js, Python, Java
- Timeout setting from 1 second to 5 minutes
- Stateless
- Event Driven
 - API Gateway
 - AWS IoT
 - CloudWatch Events – Schedule
 - CloudWatch Logs
 - DynamoDB
 - Kinesis
 - S3
 - SNS

Amazon Web Services: Lambda



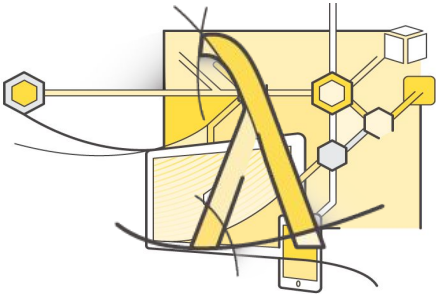
Amazon Web Services: Lambda



Amazon Web Services: Lambda

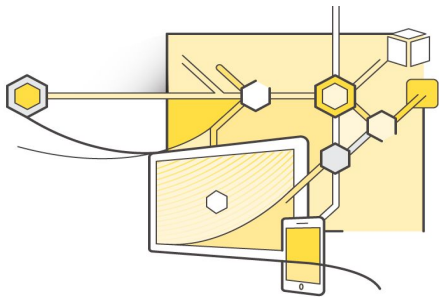
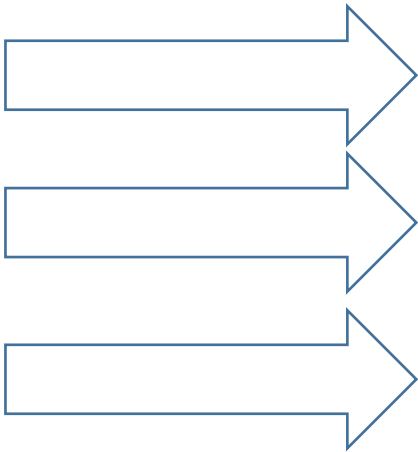


Amazon Web Services

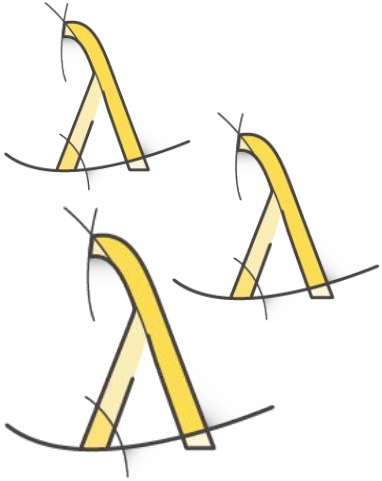
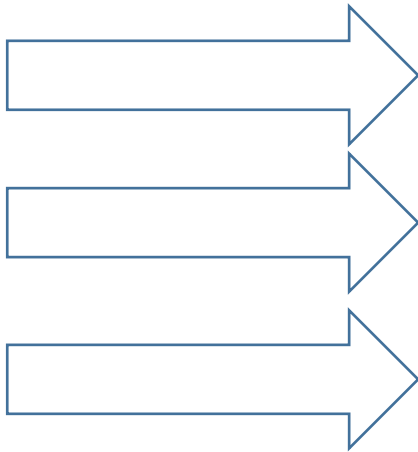


~~Shuttle Store Service~~
~~API Gateway~~

Amazon Web Services

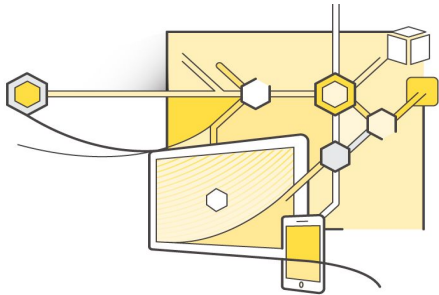
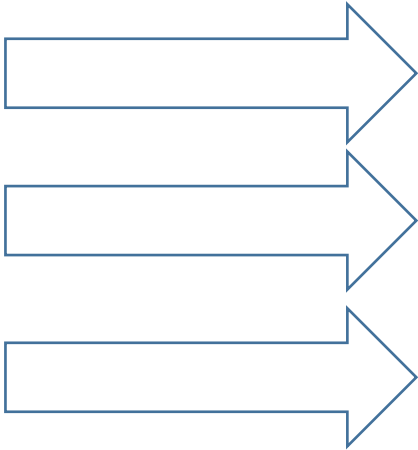


API Gateway



Shuttle Stop Service

Amazon Web Services

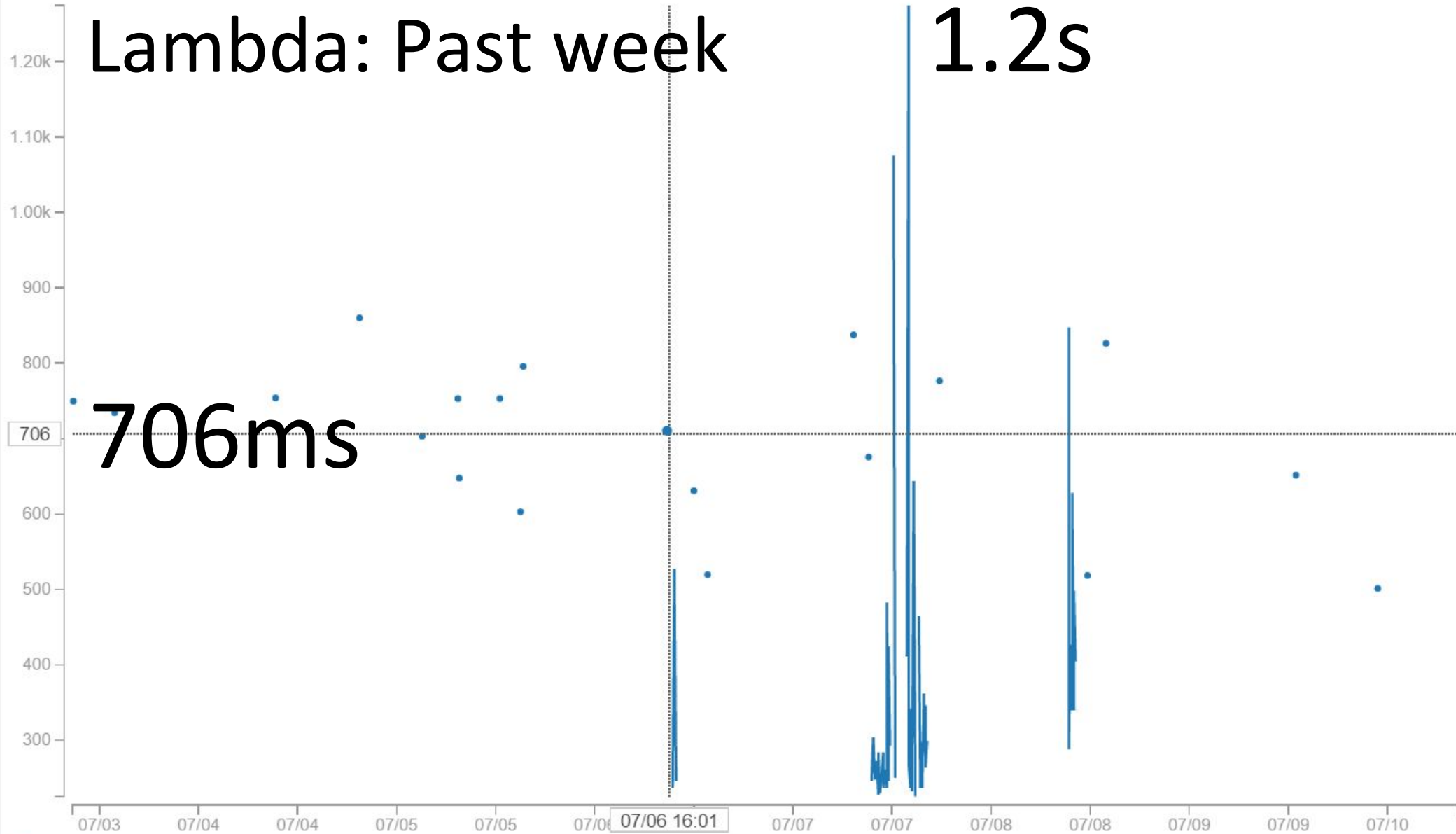


API Gateway



Shuttle Stop Service

Caching



Amazon Web Services

- Lessons learned with Lambda; Java vs Node.js stats

Amazon Web Services

Weather Lambda Function (Feb 2016)

Java	29.8 MB	8 seconds cold start
Node.js	751 bytes	4 seconds cold start

Node.js

ReactNative
AWS

```
14     event.options = {
15         hostname: API_BASE_URL,
16         port: 443,
17         path: '/forecast/' + API_KEY + '/32.8829929,-117.240954',
18         method: 'GET'
19     };
20     event.data = {};
21
22     var req = https.request(event.options, function(res) {
23         var body = '';
24         res.setEncoding('utf8');
25         res.on('data', function(chunk) {
26             body += chunk;
27         });
28         res.on('end', function() {
29             // If we know it's JSON, parse it
30             if (res.headers['content-type'] === 'application/json')
31                 body = JSON.parse(body);
32         }
33         context.succeed(JSON.parse(body));
34     });
35 });
36 req.on('error', context.fail);
37 req.end();
```

Tools

- ReactNative
- iOS
- Android
- (Windows)

- Mac
- Windows

- AWS

Timeline

- iOS took 6 months to production
- Android alpha took less than a day to run on an emulator and device

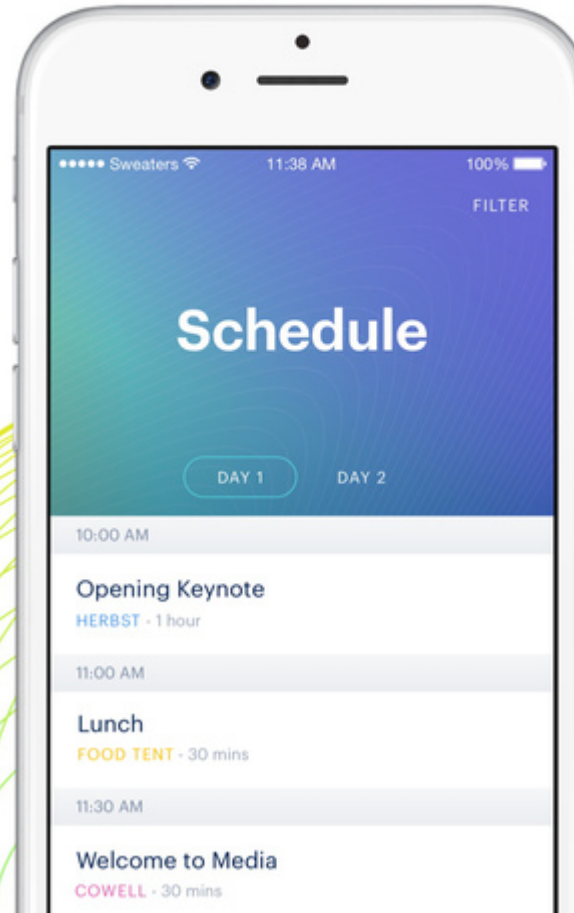
... and they are both native apps

Who's Using ReactNative

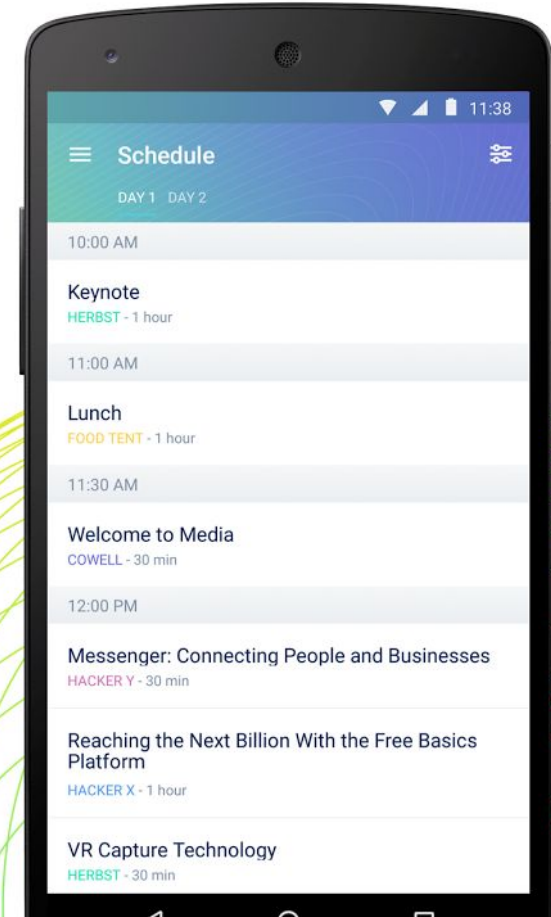
- Facebook
 - Events Dashboard for iOS
 - Ads Manager
 - Facebook Groups (hybrid)

F8 App

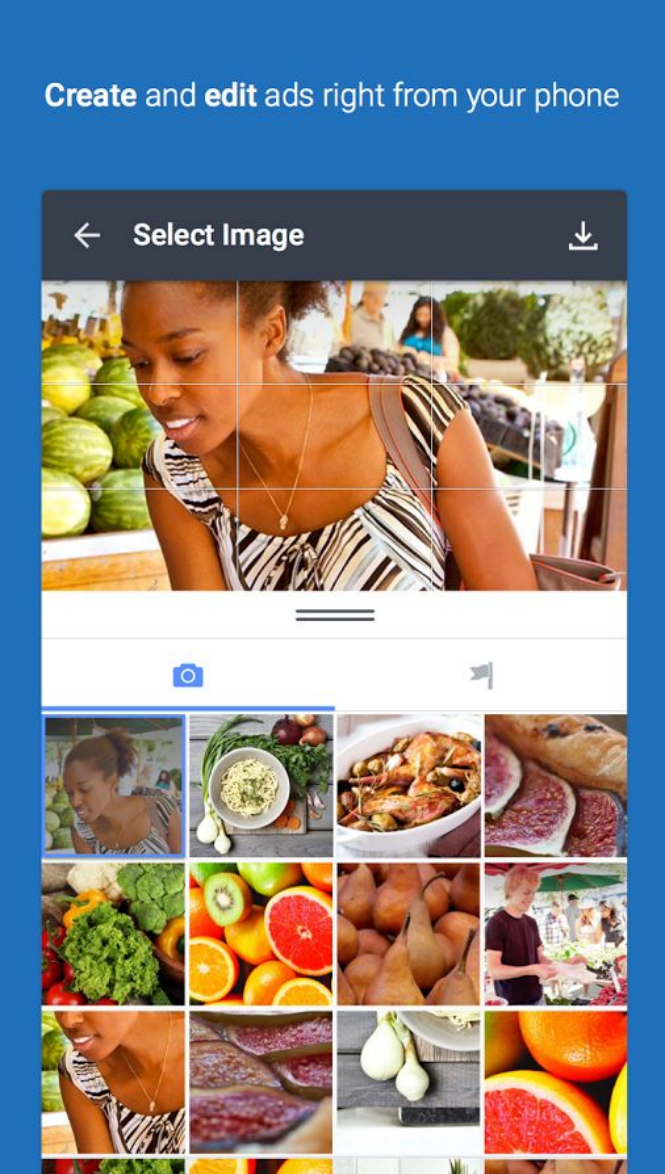
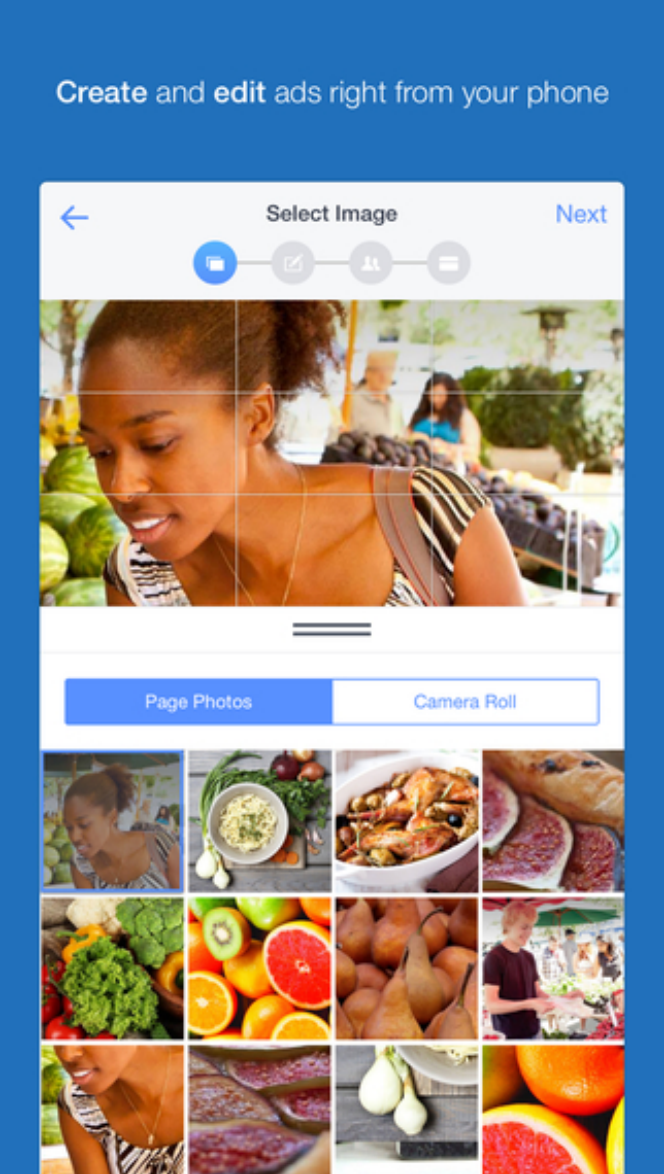
Explore the 2-day
schedule.



Explore the 2-day
schedule.



Ads Manager



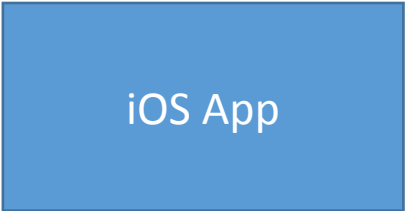
Who's Using ReactNative

- Tencent QQ messaging app
- April 2016, Microsoft announced support for Universal Windows Platform (UWP) ; 10 releases since June 2016
- <https://github.com/ReactWindows/react-native-windows>
- <https://facebook.github.io/react-native/showcase.html>

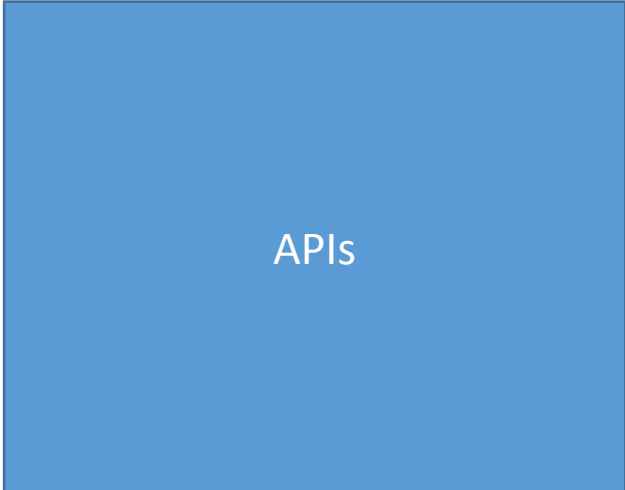
What's Next

- Continue to collaborate with campus groups
- More data and features
- Chatbot
- Push notification
- Personalized Analytics
- Pushing data (vs pulling data)
- CodePush integration
- SSO integration

What's Next



SMS
Voice



Open Source

- <https://github.com/UCSD/now-mobile>

Q&A

Jeremy Wiles

Charles Bryant

Alex Wu

UC San Diego