Next Generation Campus
Mobile Applications

UC San Diego
Campus Apps

Welcome to the new Purdue App! Let me know if anything seems broken!

Special thanks to Evan Arnold for the new icon!

Email me your problems

This isn’t the official Purdue App, but then again, there isn’t an official Purdue App.
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
Torrey Pines Center

Next Arrivals

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

Map

Come On In Cafe
Shuttle Routes

Arriving in: 4 mins

Price Center

Arriving in: 4 mins

Warren Apartments
Weather

71° in San Diego
Mostly Cloudy

<table>
<thead>
<tr>
<th></th>
<th>FRI</th>
<th>SAT</th>
<th>SUN</th>
<th>MON</th>
<th>TUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Icon</td>
<td>☀️</td>
<td>☀️</td>
<td>☀️</td>
<td>☀️</td>
<td>☀️</td>
</tr>
<tr>
<td>Temp</td>
<td>75°</td>
<td>78°</td>
<td>77°</td>
<td>77°</td>
<td>82°</td>
</tr>
<tr>
<td>Temp</td>
<td>65°</td>
<td>65°</td>
<td>65°</td>
<td>61°</td>
<td>60°</td>
</tr>
</tbody>
</table>

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
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.xcworkspace 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
```

HelloUCCSC

Powered by React Native
Welcome to React Native!

To get started, edit index.ios.js

Press Command+R to reload,
Command+D or shake for dev menu
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
import React, { Component } from 'react';
import {
  AppRegistry,
  StyleSheet,
  Text,
  View,
  StatusBar
} from 'react-native';

class HelloUCCSC extends Component {
  render() {
    StatusBar.setBarStyle('light-content');

    return (
      <View style={styles.container}>
        <Text style={styles.welcome}>Welcome to UCCSC!</Text>
      </View>
    );
  }
}

const styles = StyleSheet.create({
  container: {
    flex: 1,
    justifyContent: 'center',
    alignItems: 'center',
    backgroundColor: '#5a9cf2',
  },
  welcome: {
  },
});
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
```
var nowucsandiego = React.createClass({
  realm: null,
  AppSettings: null,

  componentWillMount: function() {

    // Realm DB Setup
    this.realm = new Realm({schema: [AppSettings.DB_SCHEMA], schemaVersion: 2});
    this.AppSettings = this.realm.objects('AppSettings');

    if (this.AppSettings.length === 0) {
      this.realm.write(() => {
        this.realm.create('AppSettings', {id: 1});
      });
    }
  },

  render: function() {
    return 
    (<Navigator initialRoute={{id: 'Home', name: 'Home'}} renderScene={this.renderScene} />);
  },

  renderScene: function(route, navigator, index, navState) {
    switch (route.id) {
      case 'Home':
        return (<Home route={route} navigator={navigator} isSimulator={this.props.isSimulator} />);
      case 'SurfReport':
        return (<SurfReport route={route} navigator={navigator} />);
      default:
        return (<Home route={route} navigator={navigator} />);
    }
  }
});
```
Amazon Web Services

Simple Storage Service

Lambda

API Gateway
Amazon Web Services: S3

• News
• Events
• Surf

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

API Gateway

Shuttle Stop Service
Amazon Web Services

API Gateway

Shuttle Stop Service
Amazon Web Services

API Gateway

Caching

Shuttle Stop Service
Lambda: Past week 1.2s

706ms
Amazon Web Services

• Lessons learned with Lambda; Java vs Node.js stats
Amazon Web Services

Weather Lambda Function (Feb 2016)

<table>
<thead>
<tr>
<th>Language</th>
<th>Size</th>
<th>Cold Start Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java</td>
<td>29.8 MB</td>
<td>8 seconds</td>
</tr>
<tr>
<td>Node.js</td>
<td>751 bytes</td>
<td>4 seconds</td>
</tr>
</tbody>
</table>
event.options = {
    hostname: API_BASE_URL,
    port: 443,
    path: '/forecast/' + API_KEY + '/32.8829929,-117.2409542',
    method: 'GET'
};

var req = https.request(event.options, function(res) {
    var body = '';
    res.setEncoding('utf8');
    res.on('data', function(chunk) {
        body += chunk;
    });

    res.on('end', function() {
        // If we know it's JSON, parse it
        if (res.headers['content-type'] === 'application/json')
            body = JSON.parse(body);
        }
    context.succeed(JSON.parse(body));
});

req.on('error', context.fail);
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.
Create and edit ads right from your phone.
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

iOS App

SMS
Voice

APIs
Open Source

• https://github.com/UCSD/now-mobile
Q&A

Jeremy Wiles
Charles Bryant
Alex Wu

UC San Diego