



Esri International Developer Summit
Palm Springs, CA

Building Native Apps with ArcGIS API for JavaScript Using PhoneGap and jQuery

Andy Gup, Lloyd Heberlie

Agenda

- **Getting to know PhoneGap**
- jQuery overview
- jQuery and ArcGIS API for JavaScript
- Putting it all together
- Additional information

Technical workshops at Dev Summit

- **Web**

- **Building Mobile Web Apps with the ArcGIS API for JavaScript**

- **Hybrid**

- **You are here!**

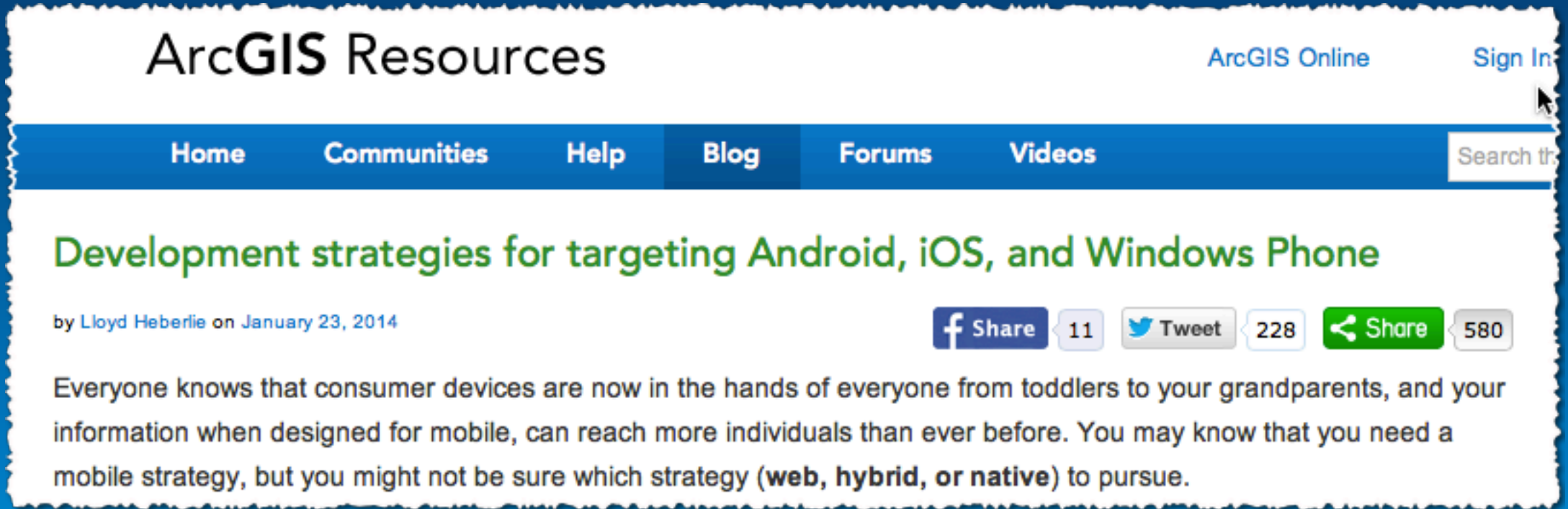
- **Native**

- **Building iOS Apps with ArcGIS Runtime SDK**
- **Building Android Apps with ArcGIS Runtime SDK**
- **Building Windows Store and Windows Phone Apps with ArcGIS Runtime SDK**

Application comparison

	Web	Hybrid	Native
Development Cost	Reasonable	Reasonable	Expensive
Development Time	Short	Short	Long
App Portability	High	High	None
Performance	Fast	Native speed if needed	Very Fast
Native Functionality	No	All	All
App Store Distribution	No	Yes	Yes
Extensible	No	Yes	Yes

Further reading



The screenshot shows the ArcGIS Resources website. At the top left is the logo "ArcGIS Resources". To the right are links for "ArcGIS Online" and "Sign In". Below this is a navigation bar with links for "Home", "Communities", "Help", "Blog" (which is highlighted), "Forums", and "Videos". A search box is located on the right side of the navigation bar. The main content area features a blog post titled "Development strategies for targeting Android, iOS, and Windows Phone" in green text. Below the title, it says "by Lloyd Heberlie on January 23, 2014". There are three social sharing buttons: a Facebook "Share" button with 11 shares, a "Tweet" button with 228 shares, and a green "Share" button with 580 shares. The first part of the article text is visible, starting with "Everyone knows that consumer devices are now in the hands of everyone from toddlers to your grandparents, and your information when designed for mobile, can reach more individuals than ever before. You may know that you need a mobile strategy, but you might not be sure which strategy (**web, hybrid, or native**) to pursue."

<http://esriurl.com/7478>

App

Lloyd Heberlie

Demonstration

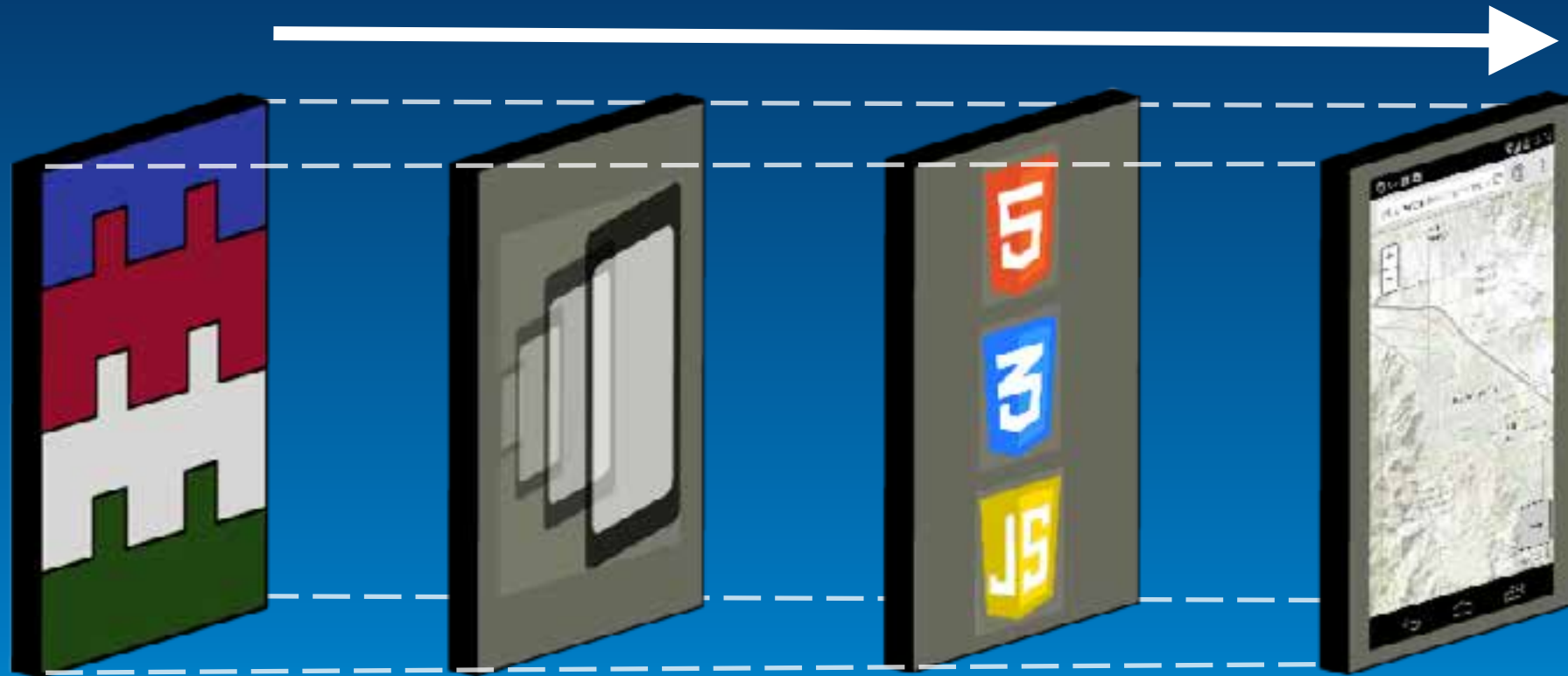
What is PhoneGap?

- Application container technology
- Core engine is 100% open source
- Web view container, plus JS API
- HTML5, CSS3, JS = Native App



PhoneGap

PhoneGap architecture



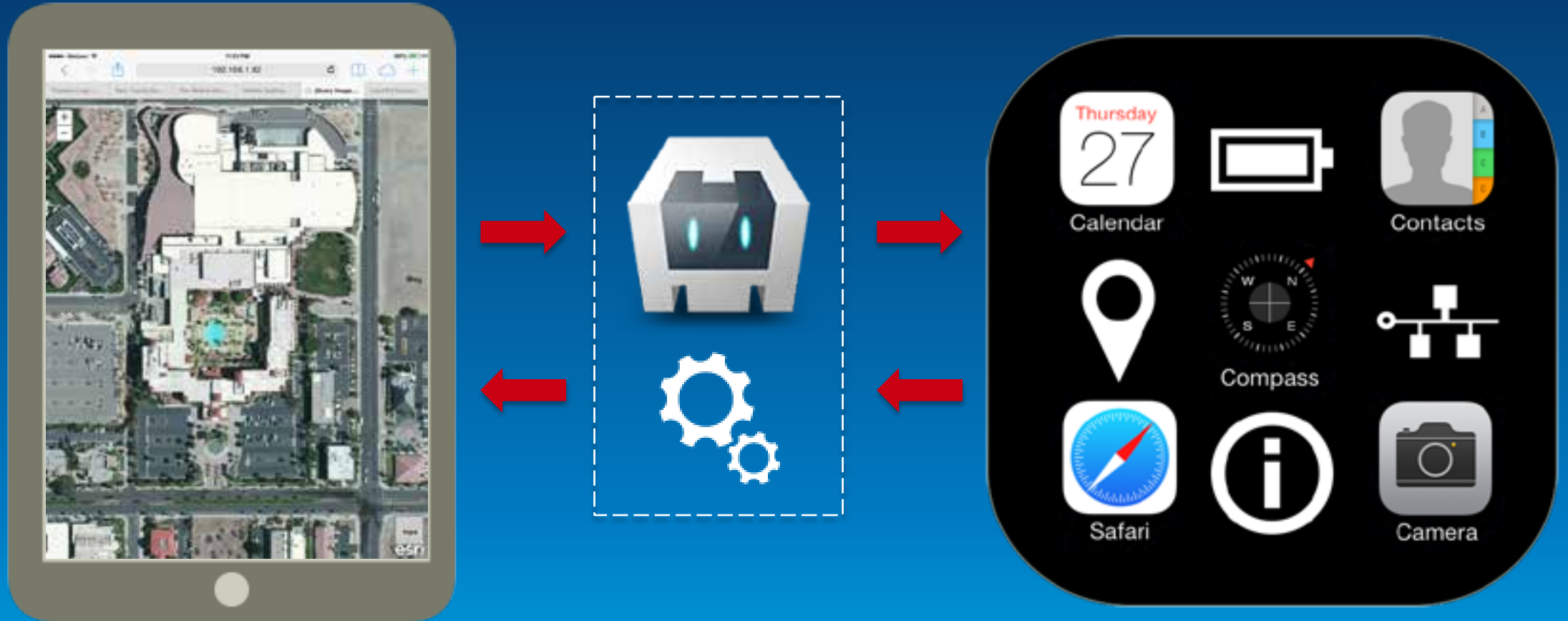
**PhoneGap
Plugins**

PhoneGap

**Application
Code**

**Native
App**

PhoneGap Plugins



PhoneGap Plugin options

Adobe PhoneGap Build

Home Plugins Docs Blog FAQ Support Sign in Register

Plugins

Third Party Plugins **PhoneGap Plugins** Your Plugins Submit Plugin

Feedback

Battery	org.apache.cordova.battery-status
Camera	org.apache.cordova.camera
Capture	org.apache.cordova.media-capture
Console	org.apache.cordova.console

Adobe PhoneGap Build

Home Plugins Docs Blog FAQ Support Sign in Register

Plugins

Third Party Plugins PhoneGap Plugins Your Plugins Submit Plugin

Feedback

BarcodeScanner	com.phonegap.plugins.barcodescanner
PushPlugin	
Facebook	
GAPPlugin	

Plugin ID com.phonegap.plugins.barcodescanner

Version 1.1.0

Platform(s) Android, iOS

PhoneGap Version(s) 3.0.0, 3.1.0, 3.2.0, 3.3.0

License MIT

Submitter ryan.willoughby@adobe.com

Repository <http://github.com/phonegap-build/BarcodeScanner.git>

Tag / Branch 1.1.0

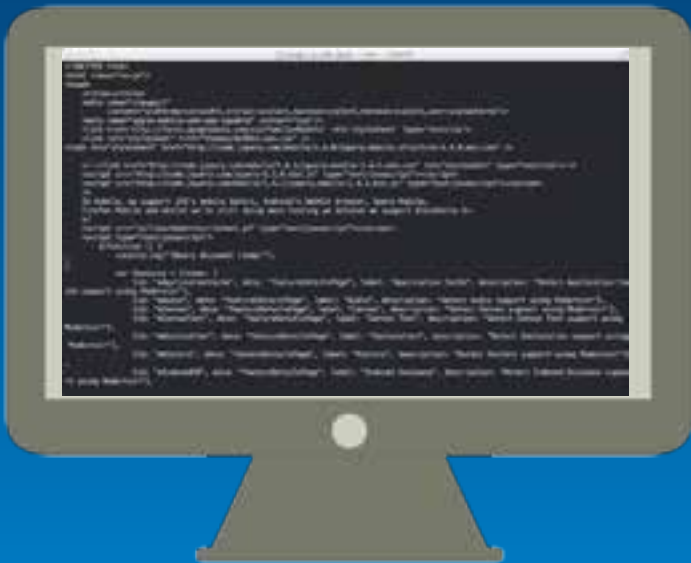
Setup a developer machine



web server



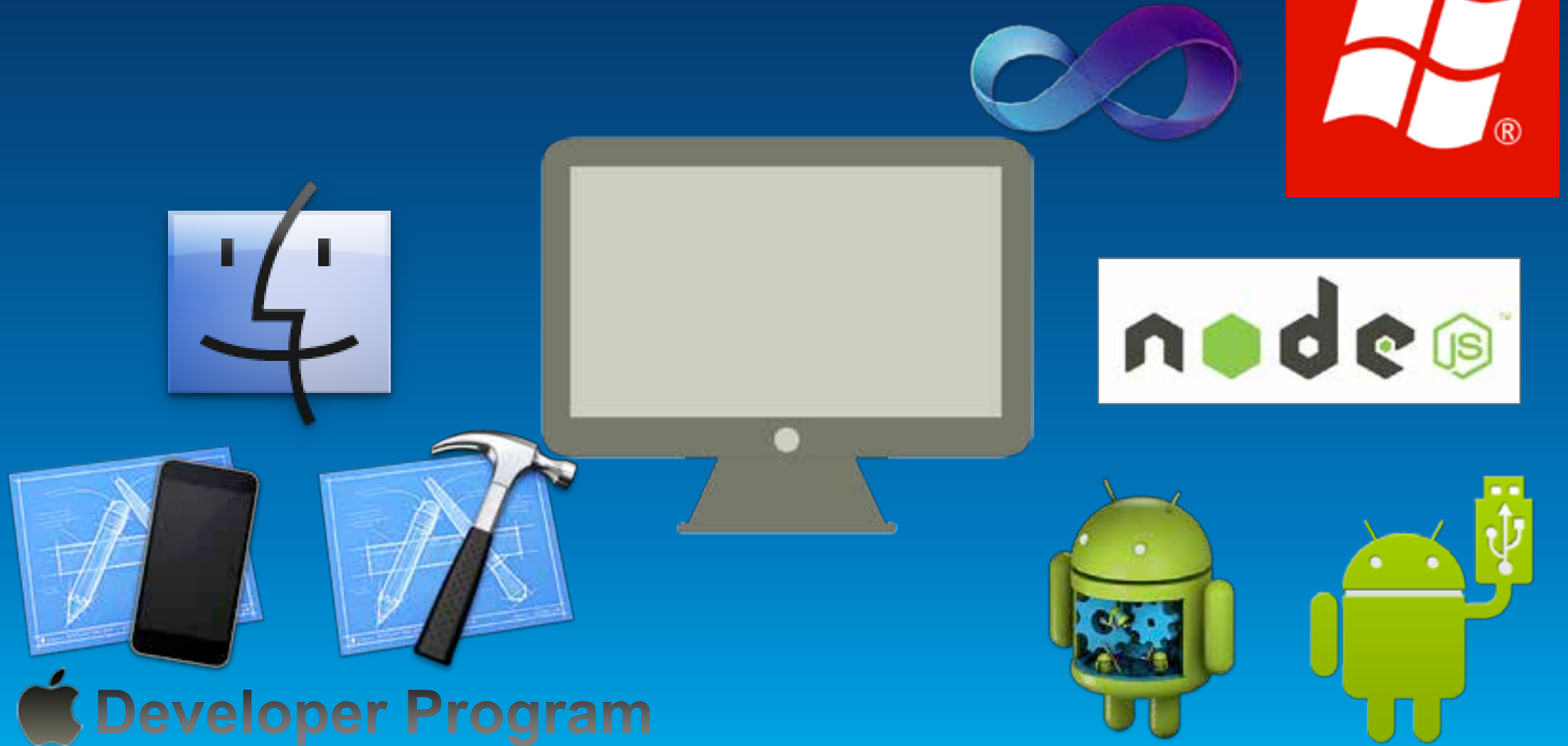
Source Control



Code quality and verification



Preparing for PhoneGap



Installing PhoneGap and Apache Cordova

```
lheberlie — bash — 55x5
Last login: Thu Feb 27 17:18:10 on ttys000
heb:~ lheberlie$ npm install -g cordova
```

```
lheberlie — bash — 55x5
Last login: Thu Feb 27 17:18:10 on ttys000
heb:~ lheberlie$ npm install -g phonegap
```



Check versions of PhoneGap and Apache Cordova

```
lheberlie — bash — 55x6
Last login: Thu Feb 27 17:18:10 on ttys000
heb:~ lheberlie$ cordova -v
3.4.0-0.1.0
heb:~ lheberlie$ phonegap -v
3.3.0-0.19.4
heb:~ lheberlie$
```

```
lheberlie — bash — 55x5
heb:~ lheberlie$ npm info phonegap version
3.3.0-0.19.6

heb:~ lheberlie$ npm info cordova version
3.4.0-0.1.0
```



Updating PhoneGap and Apache Cordova

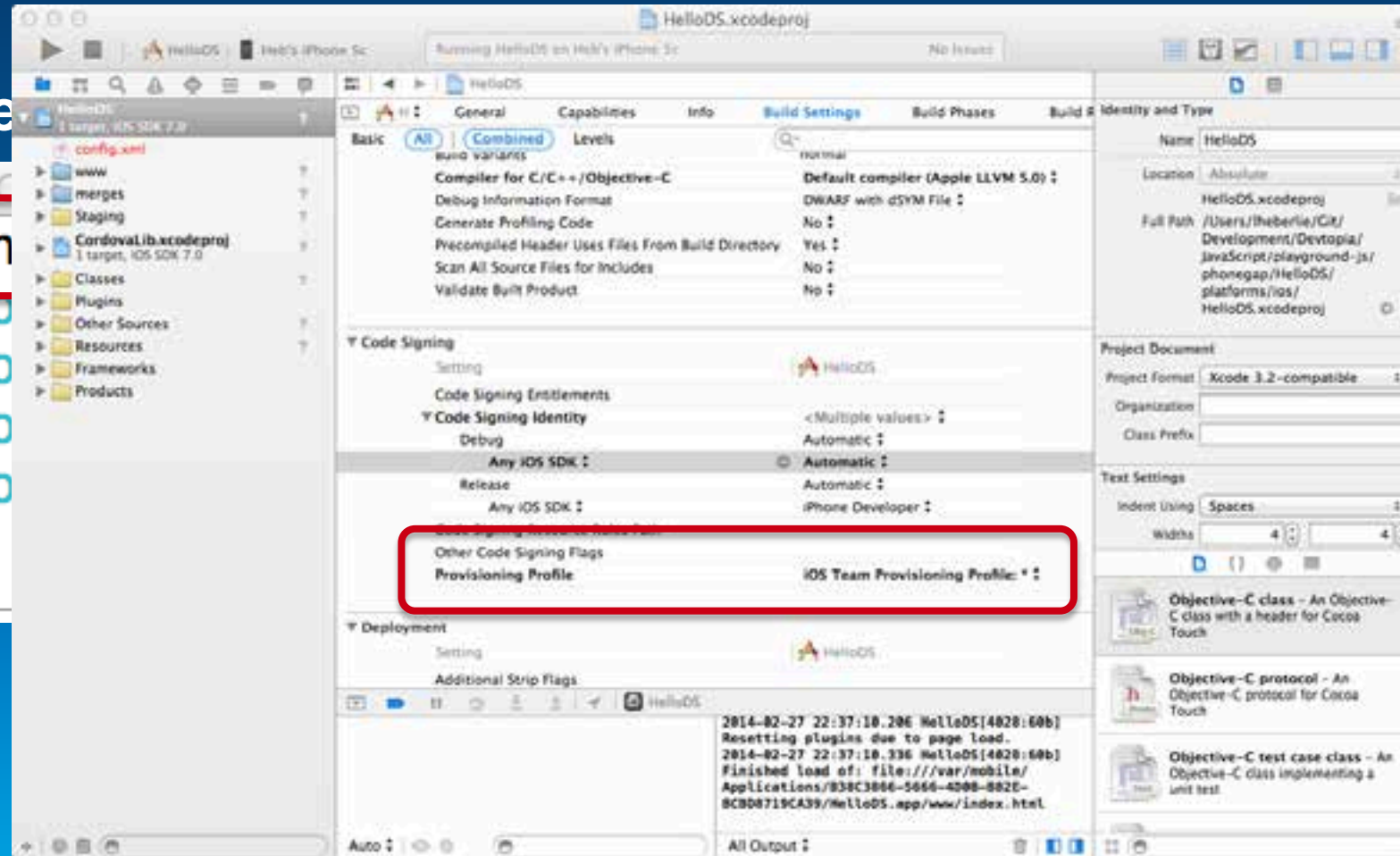
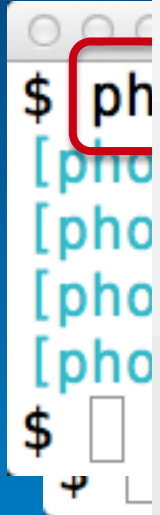
```
lheberlie — bash — 55x5  
heb:~ lheberlie$ sudo npm update -g cordova
```

```
lheberlie — bash — 55x5  
heb:~ lheberlie$ sudo npm update -g phonegap
```

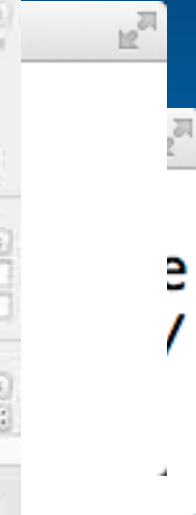


Creating your first PhoneGap CLI project

phone



App"



Demonstration

Hello PhoneGap

Lloyd Heberlie

PhoneGap Apps



Wikipedia



Netflix

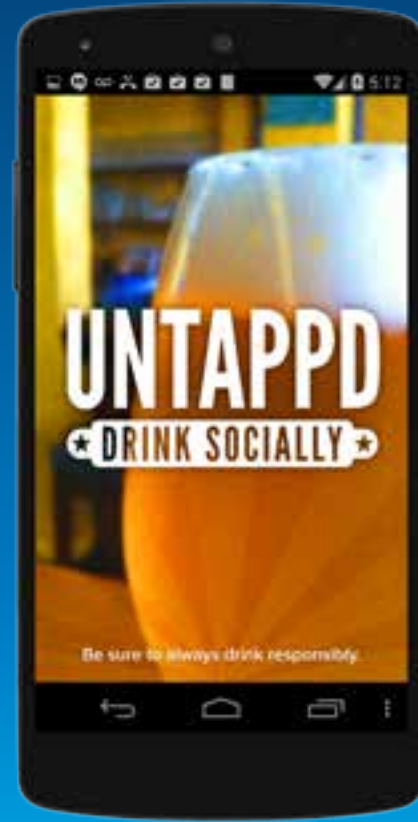


Southwest

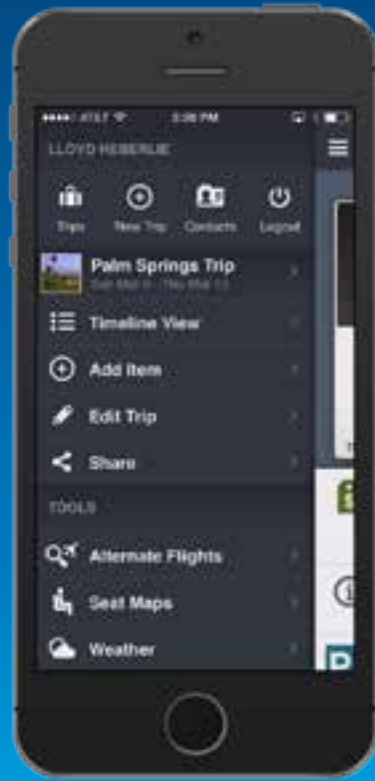
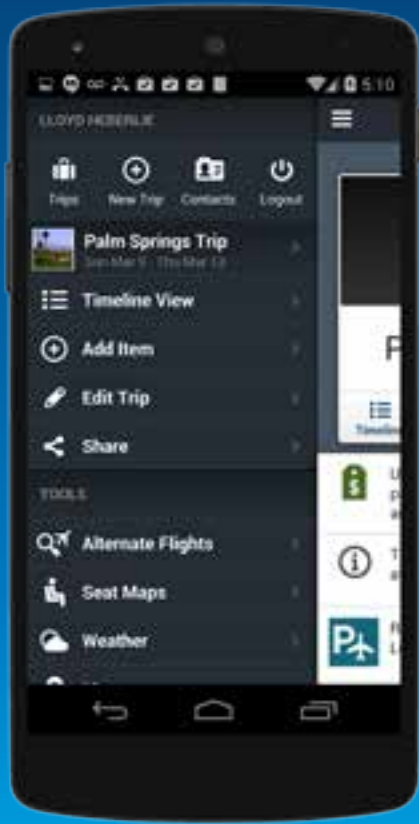


LinkedIn

Featured Apps



Featured Apps: Tripcase, Untappd





jQuery overview

Lloyd Heberlie



data-attributes

Listview

OL or UL with `data-role="listview"`

data-autodividers	true false
data-count-theme	swatch letter (a-z)
data-divider-theme	swatch letter (a-z)
data-filter	true false
data-filter-placeholder	string
data-filter-theme	swatch letter (a-z)
data-header-theme	swatch letter (a-z)
data-icon	home delete plus forward back ale
data-inset	true false

```
206 <div id="page-main" data-role="page">
207   <div data-role="header" data-position="fixed">
208     <h1>Feature Detection</h1>
209   </div>
210   <div data-role="content">
211     <ul id="featureDetectionListView" data-role="listview">
212       <!-- This content is auto generated -->
213     </ul>
214   </div>
215 </div>
```

Selections and filtering

```
7 <script type="text/javascript">
8   $("document").ready(function() {
9     $("p:last").css("border", "3px solid red");
10
11    $(".a").css("border", "3px solid green");
12
13    $("#list1").css("border", "3px solid yellow");
14
15    $("p.b").css("border", "3px solid orange");
16  });
17 </script>
```

```
24 <body>
25   <ul id="list1">
26     <li class="a">item 1</li>
27     <li class="a">item 2</li>
28     <li class="b">item 3</li>
29     <li class="b">item 4</li>
30
31   </ul>
32
33   <p class="a">This is paragraph 1</p>
34
35   <p>This is paragraph 2</p>
36
37   <p class="b">This is paragraph 3</p>
38
39   <p>This is paragraph 4</p>
40
41 </body>
```


Events

```
77 $("#featureDetectionListView li").on("click", function (evt) {  
78     var featureTest = evt.currentTarget.id;  
79     console.log("clicked it", featureTest);  
}
```

```
▼ <ul id="featureDetectionListView" data-role="listview"  
listview">  
    <!-- This content is auto generated -->  
    ▶ <li id="mApplicationCache" class="ui-first-child">...</li>  
    ▶ <li id="mAudio">...</li>  
    ▶ <li id="mCanvas">...</li>  
    ▶ <li id="mCanvasText">...</li>  
    ▼ <li id="mGeolocation">  
        ▼ <a href="#page-feature-details" class="ui-btn ui-bt  
right ui-icon-carat-r">  
            <h3>Geolocation</h3>  
            <p>Detect Geolocation support using Modernizr</p>  
            ::after  
        </a>  
    </li>
```

Dynamic content

```
53     $.each(featuresArr, function (key, val) {
54         featureDetectionDict[val.id] = val;
55         var pageData = val;
56         var end = featuresArr.length - 1;
57         var htmlString = "";
58         switch (key) {
59             case 0:
60                 htmlString = "<li id='" + pageData.id + "' c";
61                 break;
62             case end:
63                 htmlString = "<li id='" + pageData.id + "'";
64                 break;
65             default:
66                 htmlString = "<li id='" + pageData.id + "' >";
67         }
68         featureItemsArr.push($(htmlString));
69     });
70     $("#featureDetectionListView").append(featureItemsArr);
```

jQuery Mobile page lifecycle

ne custom setup before jQueryMo

```
$("#pageMain) "pagebeforecreate"  
$("#pageMain) "pagecreate" event  
$("#pageMain) "pageinit" event  
$("#pageMain) "pagebeforeshow" e  
$("#pageMain) "pageshow" event
```

```
("#pageSettings) "pagebeforecreate"  
("#pageSettings) "pagecreate" event  
("#pageSettings) "pageinit" event
```

```
("#pageMain) "pagebeforehide" event
```

```
("#pageSettings) "pagebeforeshow" e
```

```
("#pageMain) "pagehide" event
```

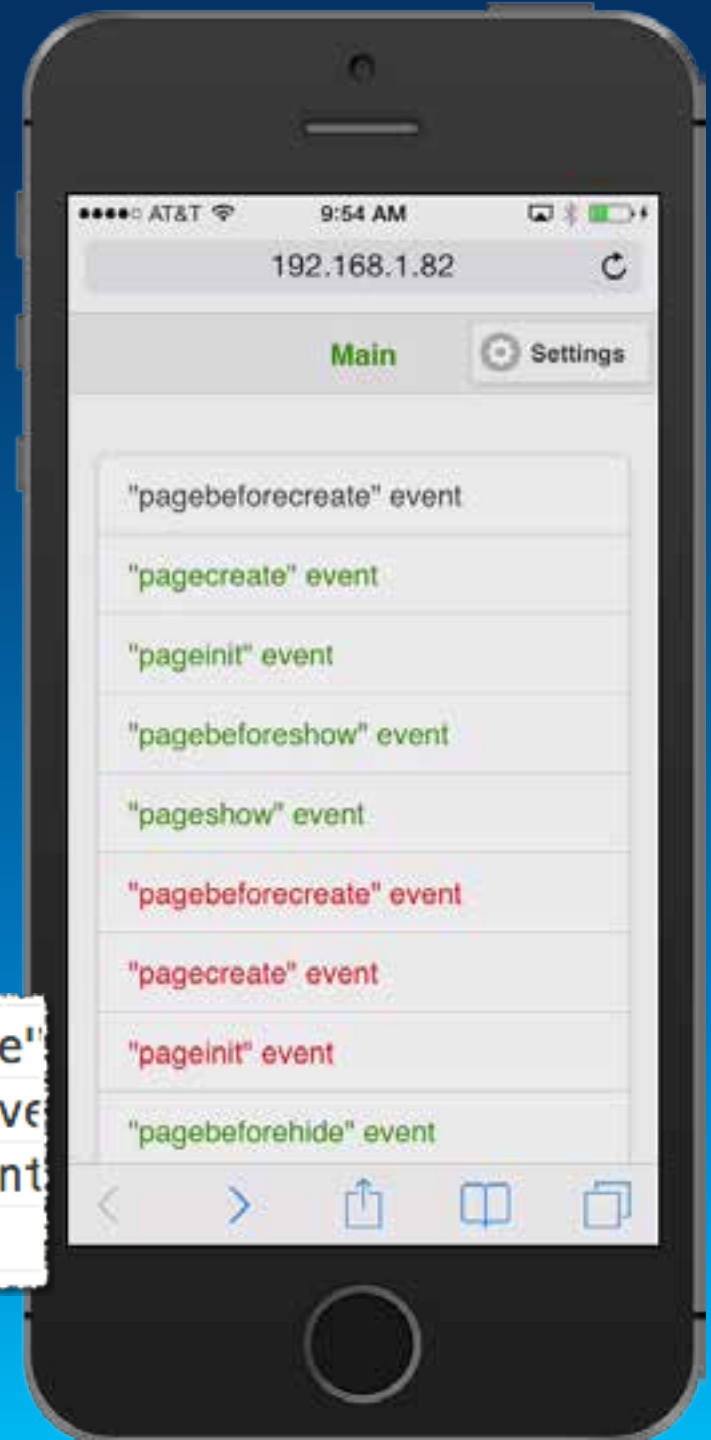
```
("#pageSettings) "pageshow" event
```

```
ings) "pagebeforehide"
```

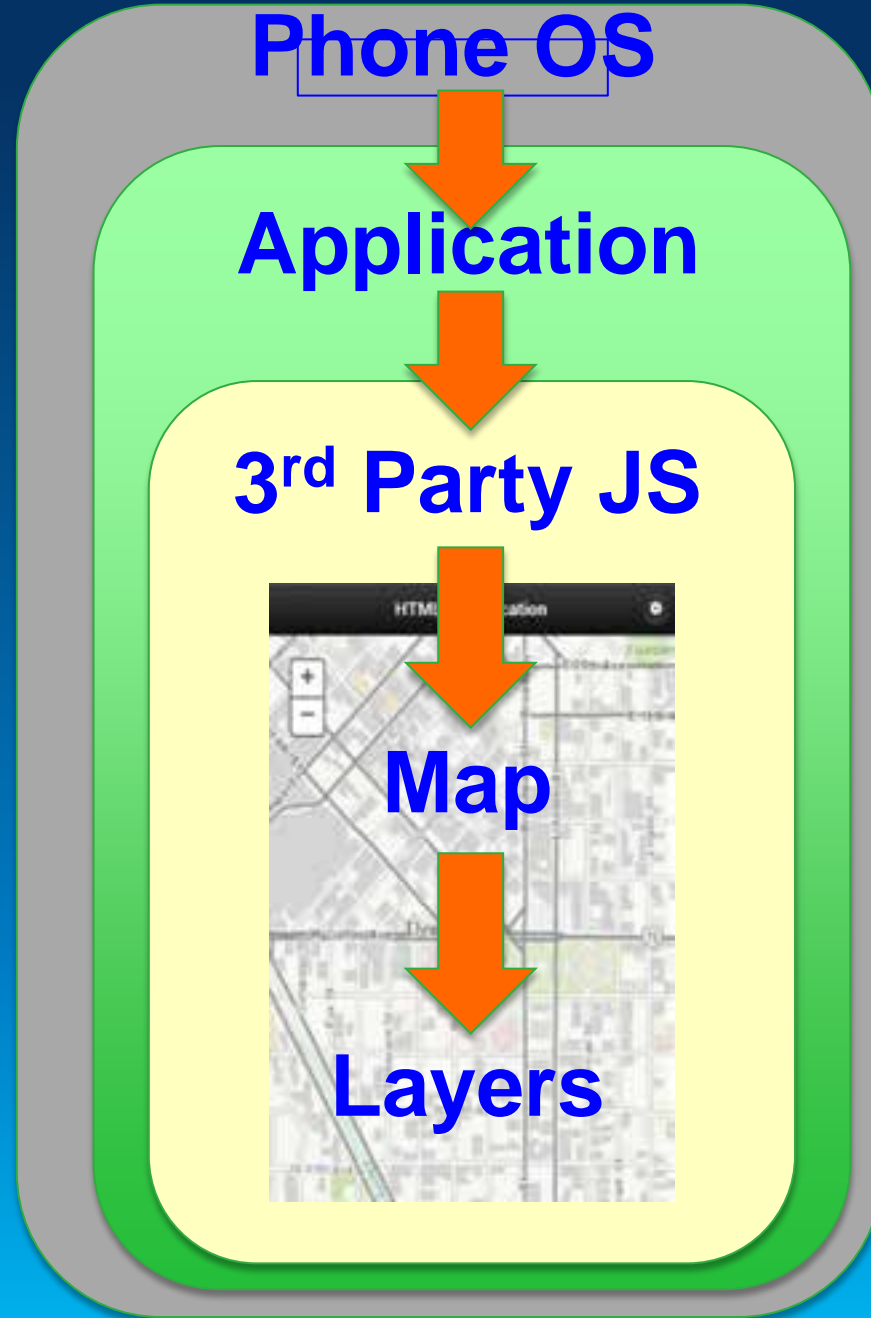
```
) "pagebeforeshow" eve
```

```
ings) "pagehide" event
```

```
) "pageshow" event
```



LifeCycle





jQuery and ArcGIS API for JavaScript

Andy Gup

Jquery Mobile + ArcGIS

Single page map app

Multiple page map app

Testing use cases

<https://github.com/Esri/jquery-mobile-map-js>

Single Page view

Page Structure

Apply CSS, roles and themes

Single Page Map - HTML

```
<div data-role="page" id="home">
//Header
  <div data-theme="a" data-role="header"
    data-position="fixed">
    <h3>HTML5 Geolocation</h3>
  </div>
//Map
  <div data-role="content">
    <div id="mapDiv"></div>
  </div>
</div>
```


Single Page Map - HTML

```
<div data-role="page" id="home">  
  //Header  
  <div data-theme="a" data-role="header"  
    data-position="fixed">  
    <h3>HTML5 Geolocation</h3>  
  </div>  
  
  //Map  
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    <div id="mapDiv"></div>  
  </div>  
</div>
```

Single Page Map - HTML

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<div data-role="page" id="home">
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    data-position="fixed">
    <h3>HTML5 Geolocation</h3>
  </div>
  //Map
  <div data-role="content">
    <div id="mapDiv"></div>
  </div>
</div>
```

Single Page Map - CSS

```
html, body, div[data-role = "page"] {
    height: 100%;
    width: 100%;
    margin: 0px;
    padding: 0px;
    overflow: hidden !important;
}
.ui-header {
    margin: 0px !important;
    padding: 0px !important;
    float: left;
}
.ui-content {
    height: 100%;
    width: 100%;
    margin: 0px;
    padding: 0px;
}
#mapDiv {
    position: absolute;
    background-color: #EEEEDD;
    height: 100%;
    width: 100%;
    padding: 0px;
    z-index: 0;
    left: 0px;
}
```

Demonstration

Single page app

Andy Gup

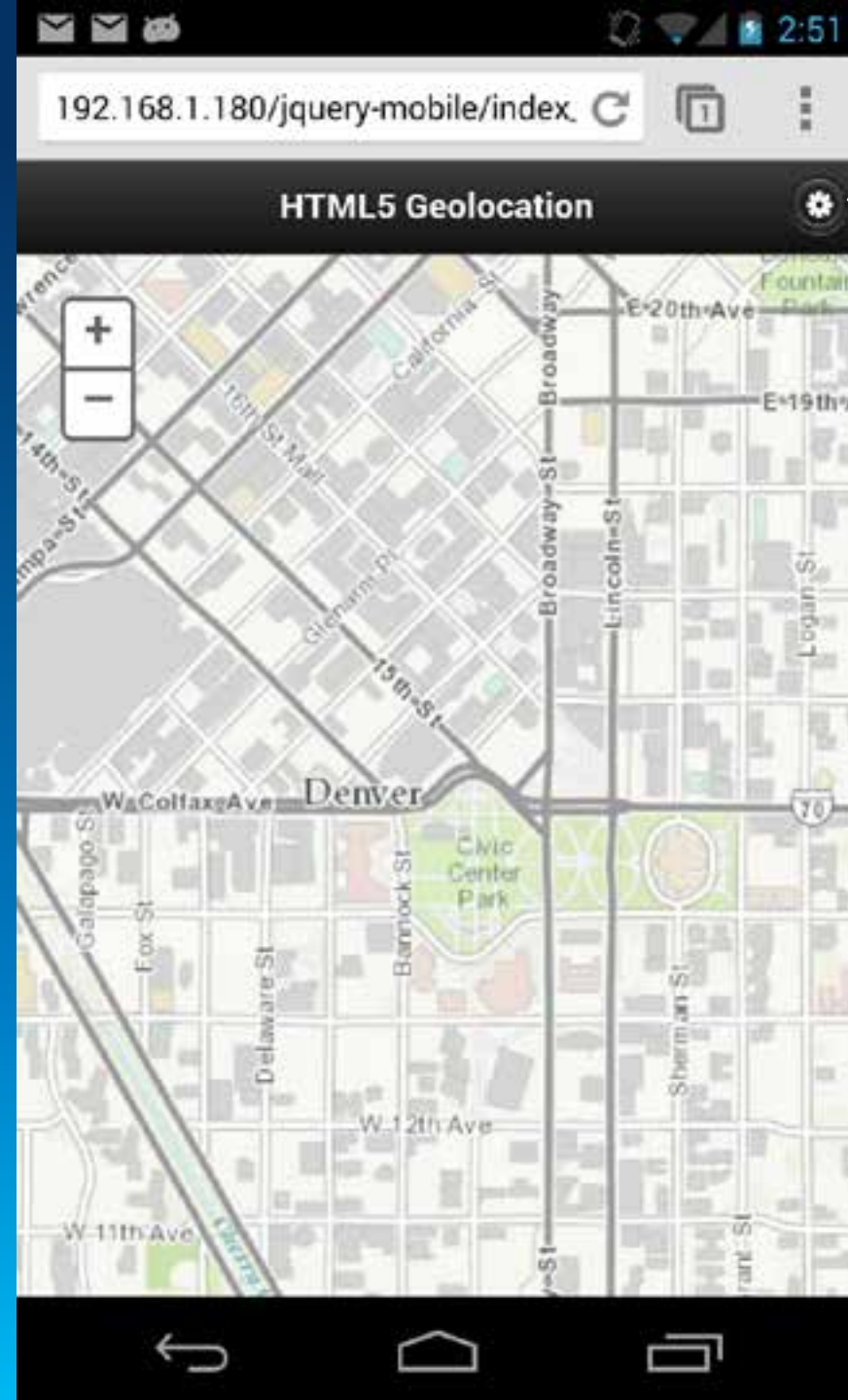
Multi Page View

Set up additional pages

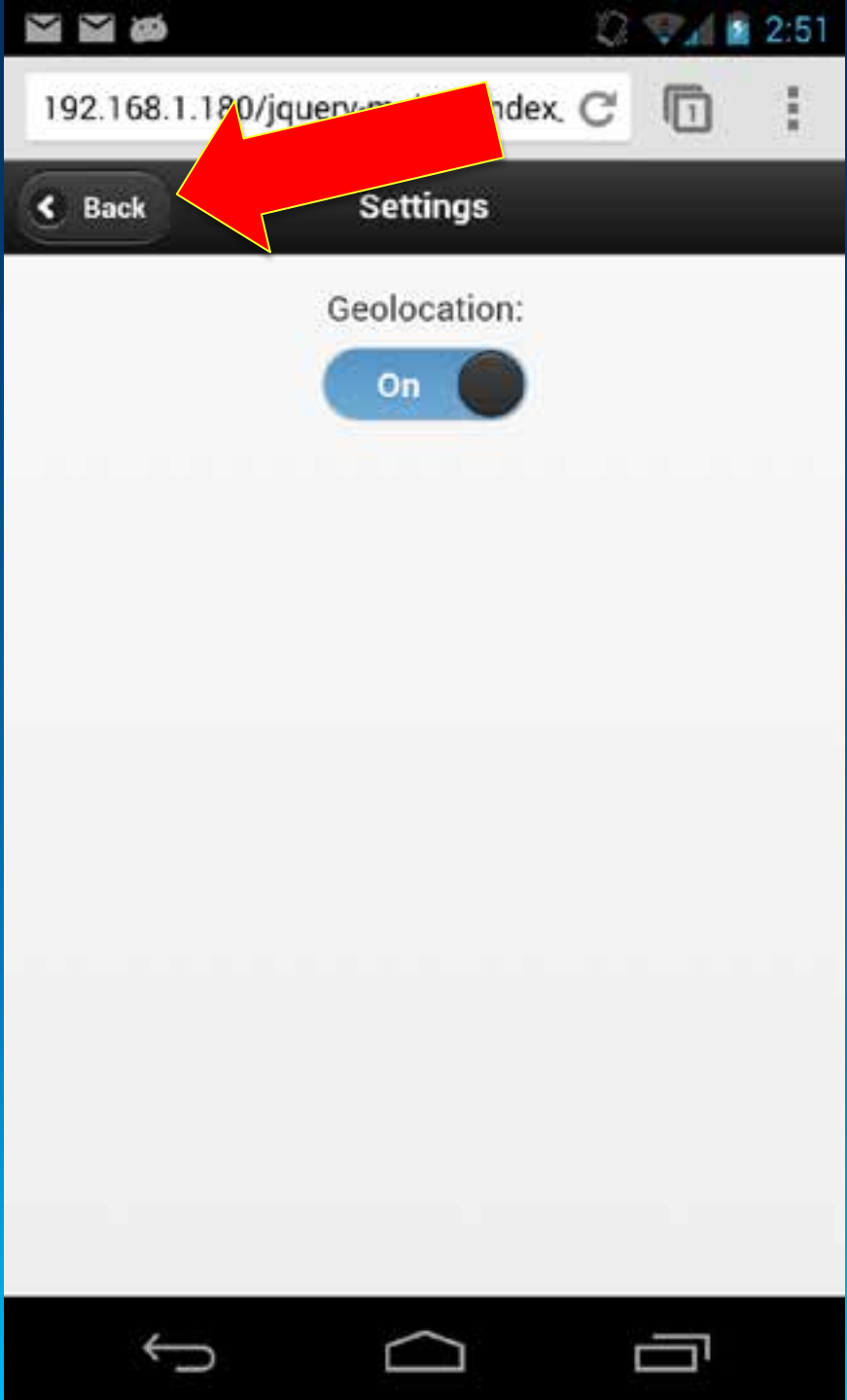
Set up page navigation

Additional CSS

Multi Page View



Multi Page View



Multi Page app – Page 2 HTML

```
<div data-role="page" id="settings" data-icon="home">
//Our Header
<div data-theme="a" data-role="header"
  data-position="fixed">
  <h1>Settings</h1>
</div>

//Page Content
<div data-role="content">
  <div class="settings" style="margin-top: 15px;">
    <div>Geolocation:</div>
    <select name="slider" id="slider-geo-on-off"
      data-role="slider" data-theme="a">
      <option value="off">Off</option>
      <option value="on" selected>On</option>
    </select>
  </div>
</div>
</div>
```


Multi Page app – Page 2 HTML

```
<div data-role="page" id="settings" data-icon="home">
//Our Header
<div data-theme="a" data-role="header"
  data-position="fixed">
  <h1>Settings</h1>
</div>

//Page Content
<div data-role="content">
  <div class="settings" style="margin-top: 15px;">
    <div>Geolocation:</div>
    <select name="slider" id="slider-geo-on-off"
      data-role="slider" data-theme="a">
      <option value="off">Off</option>
      <option value="on" selected>On</option>
    </select>
  </div>
</div>
</div>
```

Multi Page app – Page 2 HTML

```
<div data-role="page" id="settings" data-icon="home">
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<div data-role="content">
  <div class="settings" style="margin-top: 15px;">
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    <select name="slider" id="slider-geo-on-off"
      data-role="slider" data-theme="a">
      <option value="off">Off</option>
      <option value="on" selected>On</option>
    </select>
  </div>
</div>
</div>
```

Multi Page app – Page 2 HTML

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<div data-role="page" id="settings" data-icon="home">
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  <div class="settings" style="margin-top: 15px;">
    <div>Geolocation:</div>
    <select name="slider" id="slider-geo-on-off"
      data-role="slider" data-theme="a">
      <option value="off">Off</option>
      <option value="on" selected>On</option>
    </select>
  </div>
</div>
</div>
```

Multi Page app – Page 2 CSS

```
<style type="text/css">
  /* Class for aligning buttons */
  .settings{
    margin-left: auto;
    margin-right: auto;
    text-align: center;
    width: 100%;
  }
</style>
```

Multi-page map app



Page Transitions & Orientation Change

- **Page and Orientation life cycle**
- **Map destruction and resizing**

Page Transitions

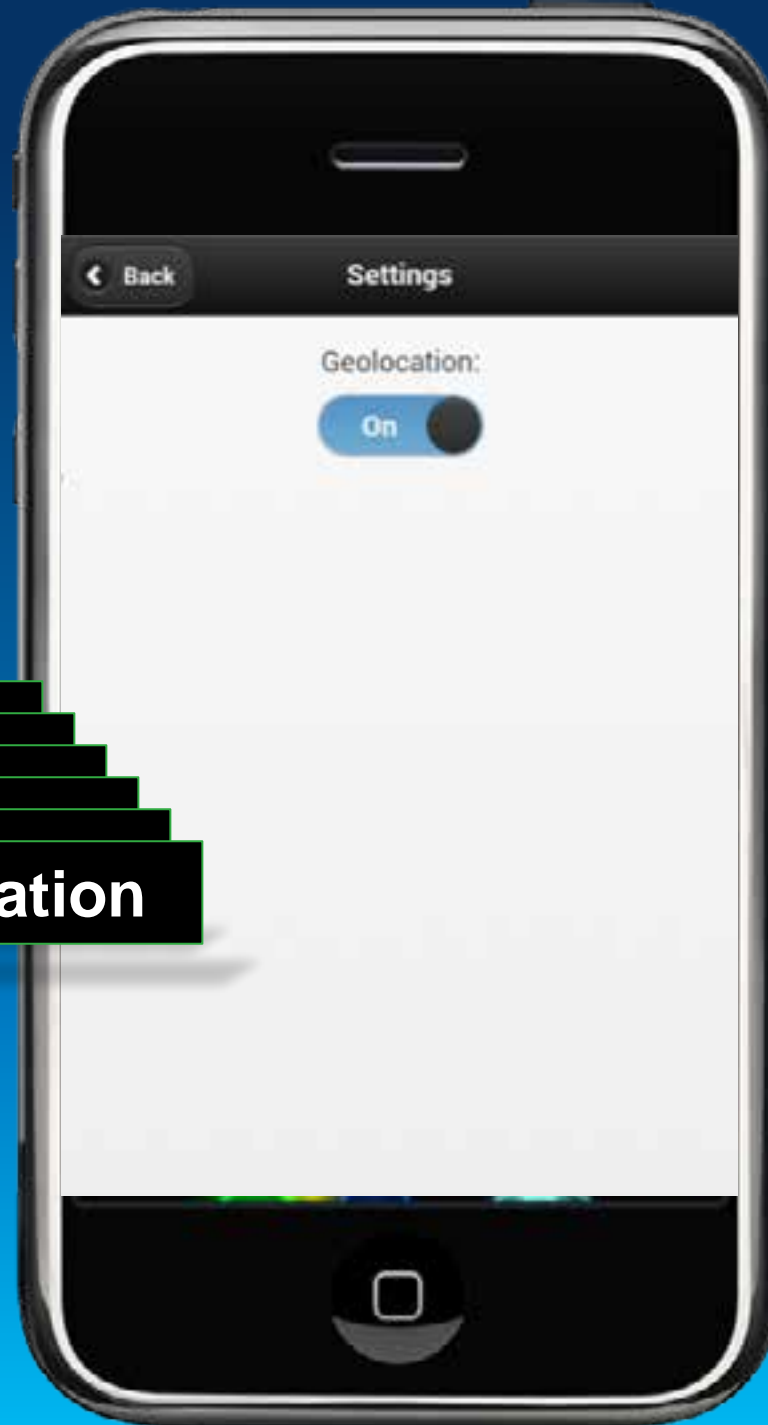
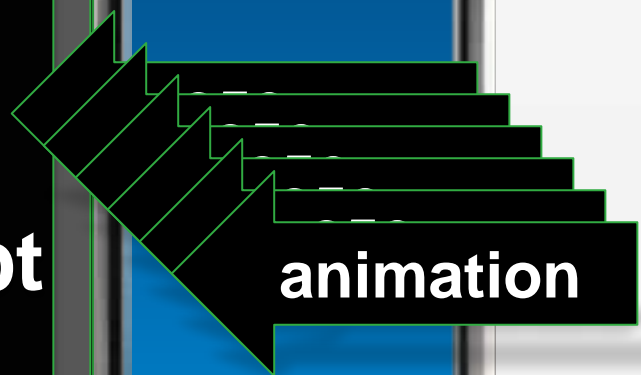
Page 1



Page 2



~250 ms



Events: leaving page

pagebeforechange

pagechange

pagechangefailed

<http://api.jquerymobile.com/category/events/>

Events: entering page

pagebeforeshow

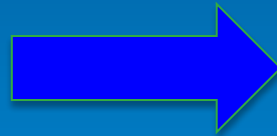
pageshow

pagechangefailed

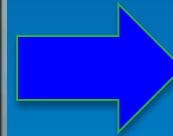
<http://api.jquerymobile.com/category/events/>

Page Transitions & Orientation Change

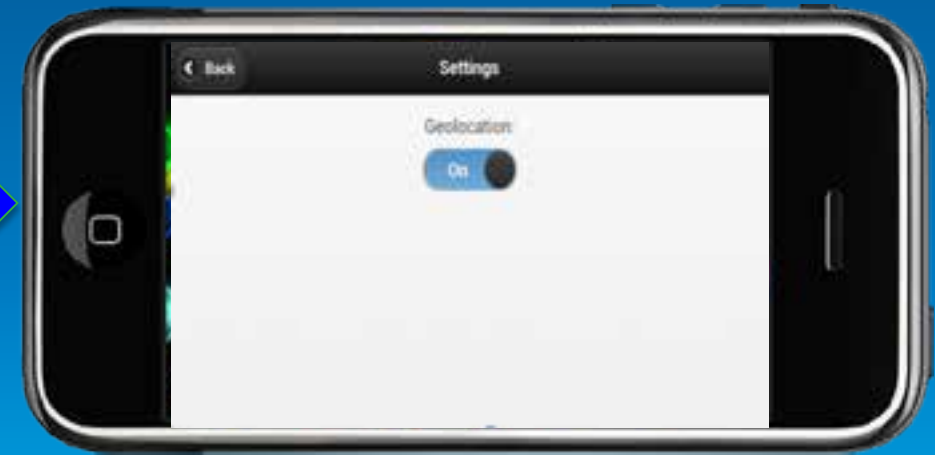
Page 1



Page 2

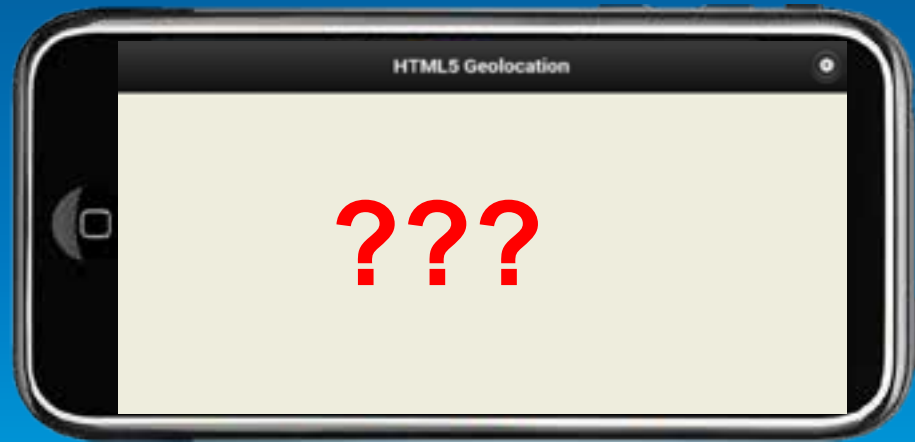


Page 2

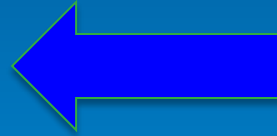


Page Transitions & Orientation Change

Page 1



Page 2





× Elements Resources Network Sources Timeline Profiles Audits Console

❌ XMLHttpRequest cannot load http://services.arcgisonline.com/ArcGIS/rest/info?f=json. Origin <http://services.arcgisonline.com/ArcGIS/rest/info?f=json> is not allowed by CORS policy. Resource interpreted as Script but transferred with MIME type text/plain: "http://services.arcgisonline.com/ArcGIS/rest/info?f=json&callback=dojo.io.script1.isonp dojoIoScript1, isonpCallback".

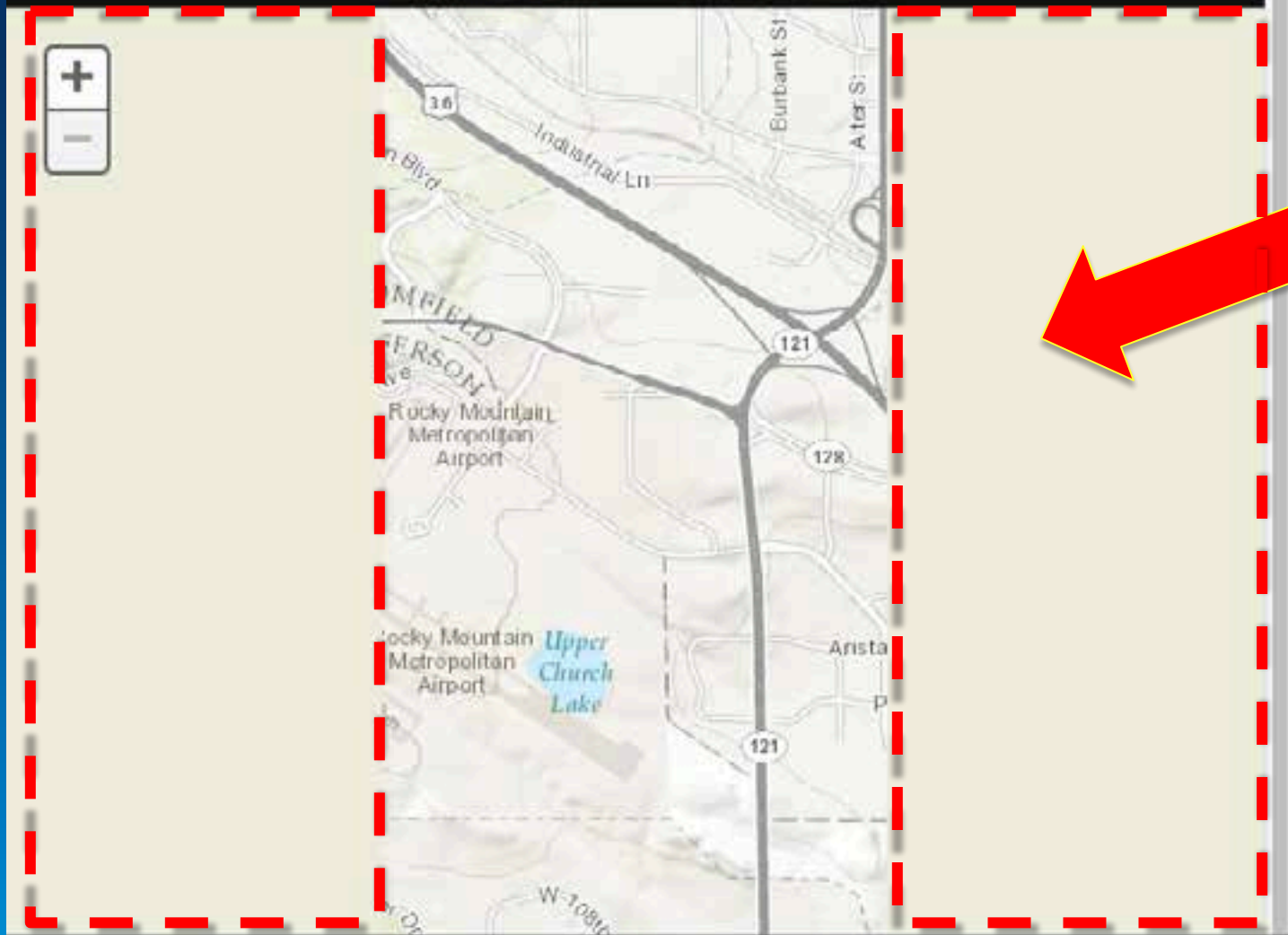
🕒 home showing

❌ ▶ Error: Invalid value for <image> attribute x="NaN"

❌ ▶ Error: Invalid value for <image> attribute y="NaN"

>

HTML5 Geolocation



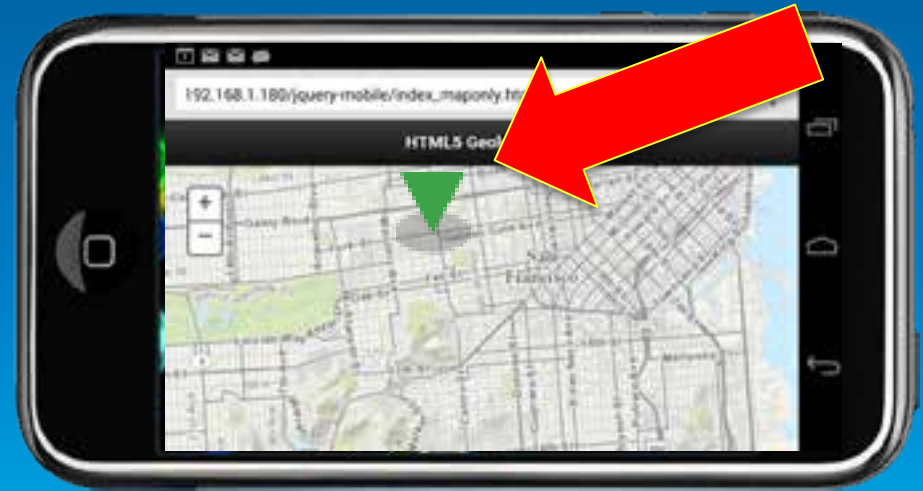
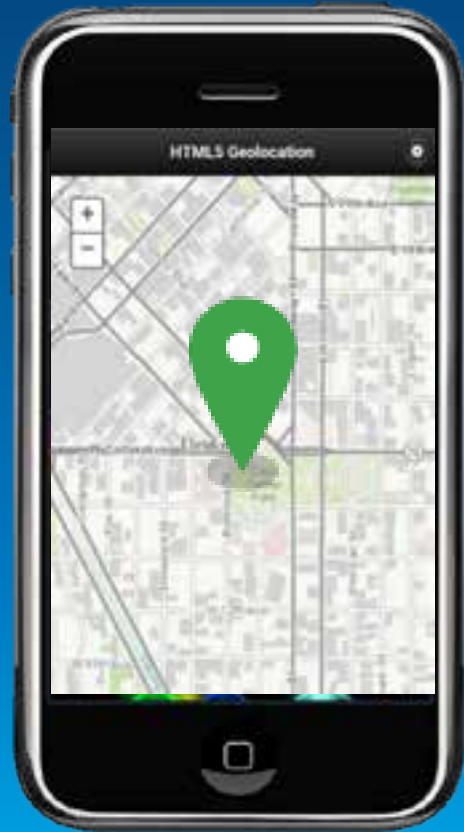
```
× Elements Resources Network Sources Timeline Profiles Audits Console
❌ XMLHttpRequest cannot load http://services.arcgisonline.com/ArcGIS/rest/info?f=json. Origin
  ▶ Resource interpreted as Script but transferred with MIME type text/plain: "http://service
    f=json&callback=dojo.io.script.io&dojoToScript1_ison&callback".
🔍 home showing
❌ ▶ Error: Invalid value for <image> attribute x="NaN"
❌ ▶ Error: Invalid value for <image> attribute y="NaN"
>
```

The following won't work in all use cases:

```
map.reposition();
```

```
map.resize();
```

Use Case - Recenter the map



jQuery Helper library

Page rotation – landscape/portrait

Recentering

Multiple views

```
var helper = new jQueryHelper(map);
```

<https://github.com/Esri/jquery-mobile-map-js>

Auto-recenter after orientation change

```
//Listen for map load event
map.on("load",init);

function init(){
  try{
    helper = new jQueryHelper(map);
    helper.setCenterPt(x,y,4326);
  }
  catch(err) {
    console.log("jQueryHelper " + err.message);
  }

  //Some browsers don't show full height after onLoad
  map.reposition();
  map.resize();
}
```

Multiple page app – **Map** Life Cycle

Listen for “helper-map-loaded” event

```
//Custom event from jQueryHelper
$(document).on("helper-map-loaded",function(evt){
    map = helper.map;

    if(geoEnabled == true) {
        startGeolocation();
    }
});
```

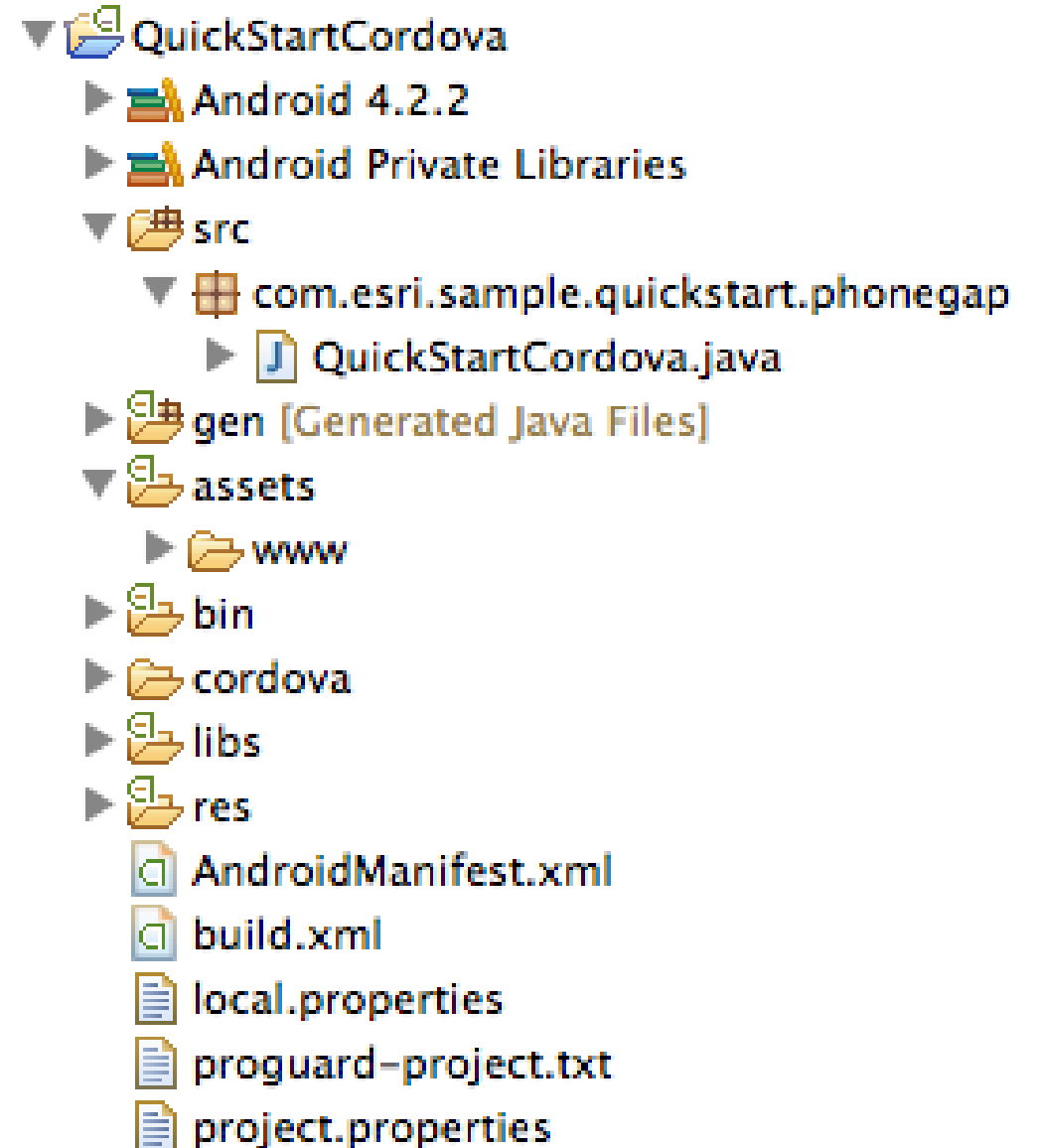


Putting it all together

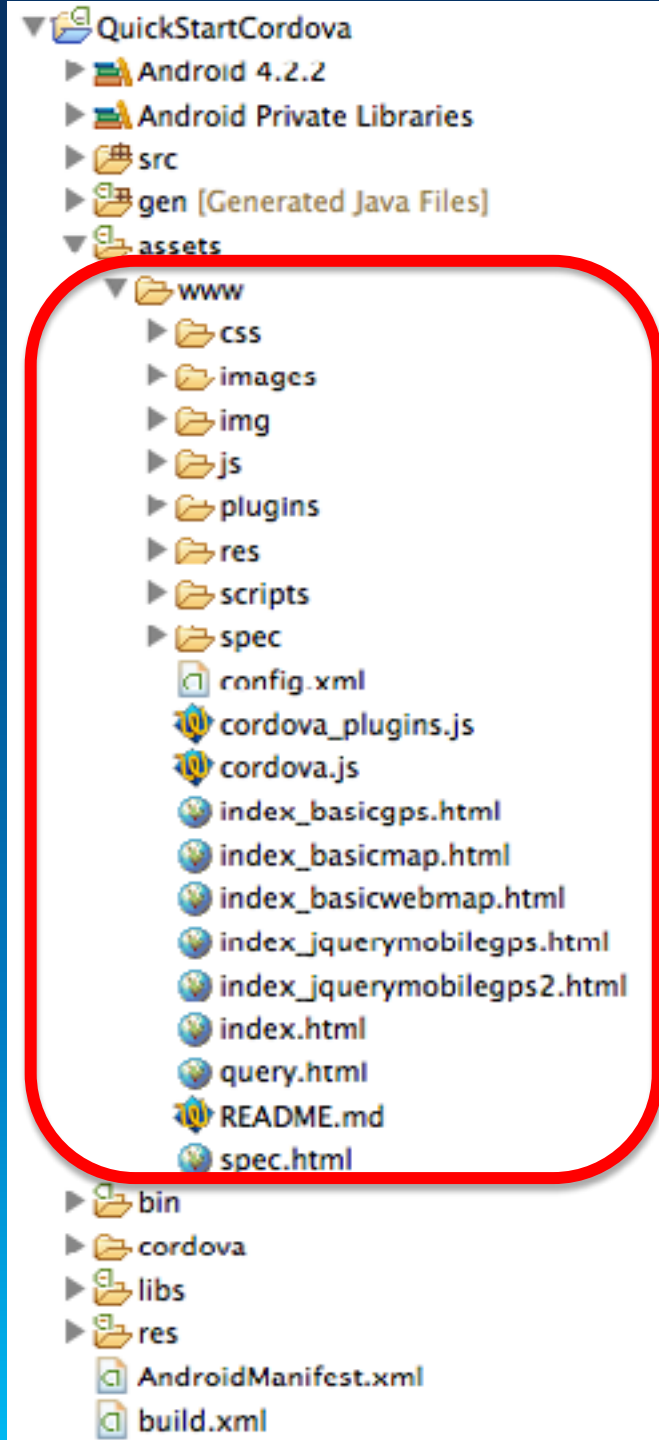
PhoneGap + jQuery + ArcGIS

Andy Gup

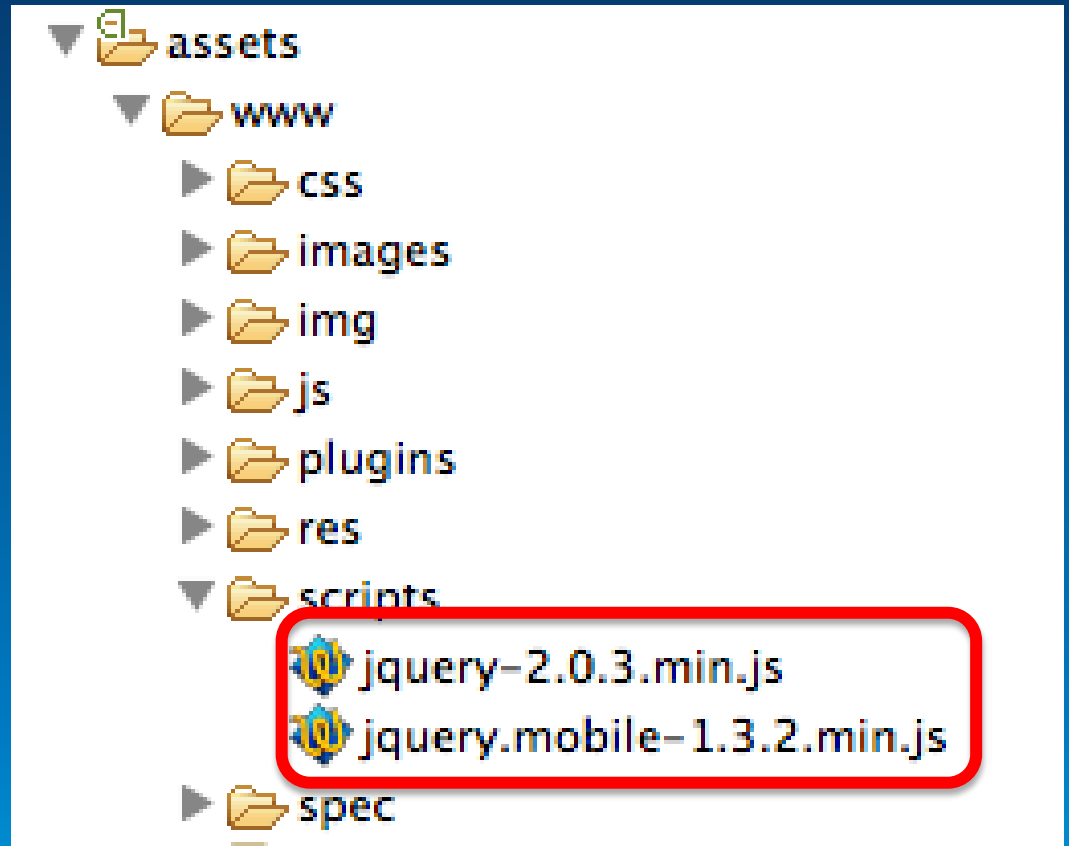
PhoneGap + jQuery + Arcgis



assets/www/



Host JS libs locally (if possible)



Set PhoneGap config.xml

```
<?xml version='1.0' encoding='utf-8'?>
<!-- look under /res/xml/config.xml for the active file -->
<widget id="com.esri.sample.quickstart.phonegap" version="0.1.0"
  xmlns="http://www.w3.org/ns/widgets" xmlns:cdv="http://cordova.apache.org/ns/1.0">
  <name>QuickStartCordova</name>
  <description>
    A sample Apache Cordova application that responds to the deviceready event.
  </description>
  <author email="agup@esri.com" href="http://developers.arcgis.com">
    Esri Developer Evangelism team
  </author>
  <content src="index.html" />
  <access origin="*" />
  <preference name="fullscreen" value="false" />
  <preference name="webviewbounce" value="true" />
  <feature name="Geolocation">
    <param name="android-package" value="org.apache.cordova.geolocation.GeoBroker" />
  </feature>
</widget>
```




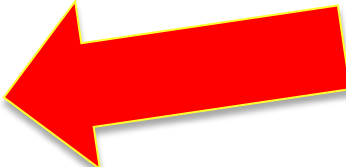
Native wrapper – home view

```
package com.esri.sample.quickstart.phonegap;

import android.os.Bundle;

public class QuickStartCordova extends CordovaActivity
{
    @Override
    public void onCreate(Bundle savedInstanceState)
    {
        super.onCreate(savedInstanceState);
        super.init();

        // NOTICE: Set by <content src="index.html" /> in config.xml
        super.loadUrl(Config.getStartUrl());
        //super.loadUrl("file:///android_asset/www/index_basicwebmap.html");
    }
}
```



Demonstration

Putting it all together

Andy Gup

Going Offline

Why?

A need for editing and mapping offline

Apps used in areas of limited or no connectivity

Re-use JavaScript skills

Cross-platform

[Github.com/esri/Offline-editor-js](https://github.com/esri/Offline-editor-js) (sample library)

What does offline JavaScript mean?

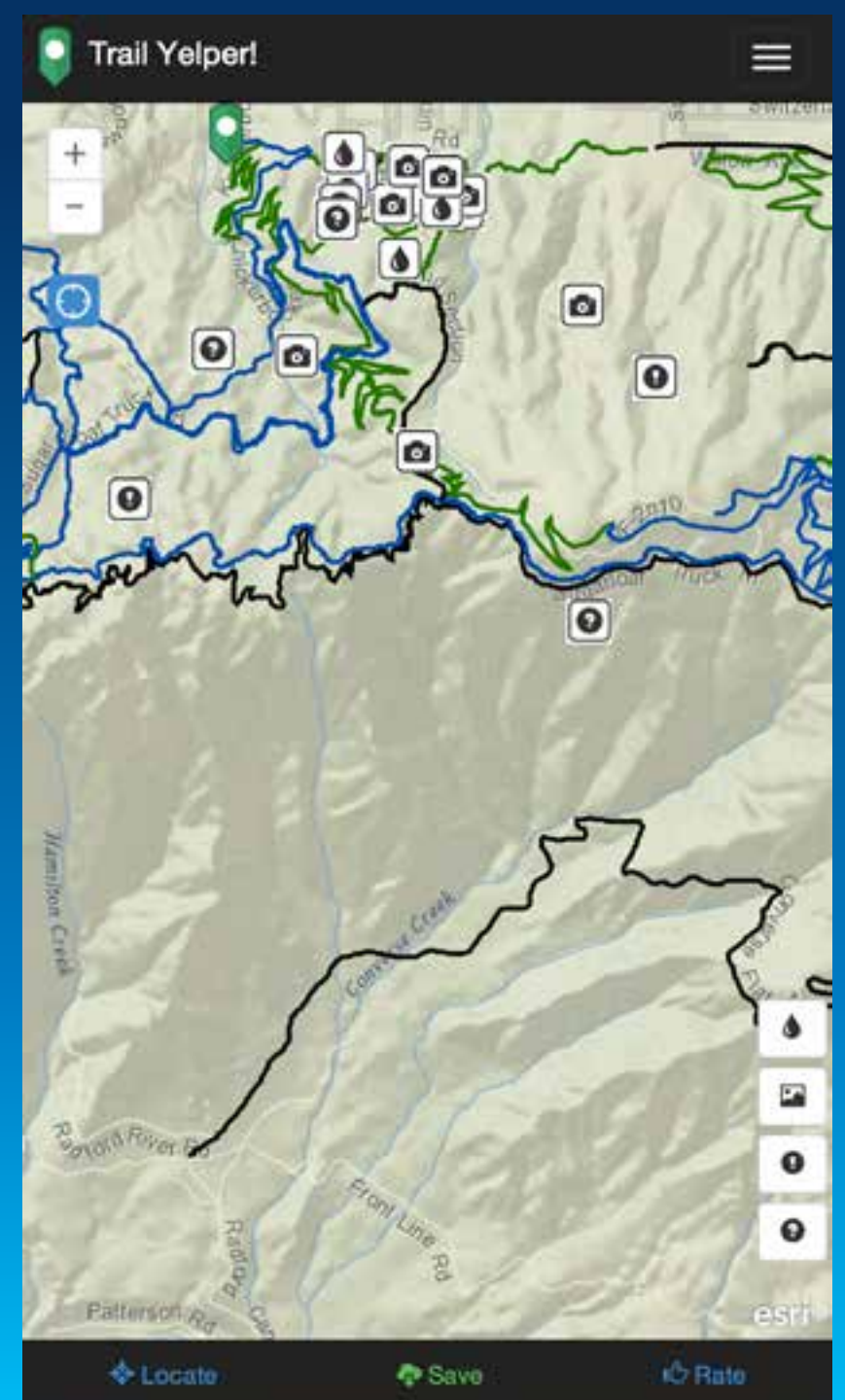
Take map tiles offline

Storing/syncing feature edits

Storing/syncing attachments - TBD

These work in browser and with PhoneGap!

Offline Demo – trailyelper



GPS Best Practices

When viewing non-map pages

- **Do not write points to map**
- **Cache points in localStorage (if needed)**

Enable Geolocation*

STEP 1

```
$ cordova plugin add org.apache.cordova.geolocation
```

STEP 2 - in app/res/xml/config.xml

```
<feature name="Geolocation">  
  <param name="android-package" value="org.apache.cordova.geolocation.GeoBroker" />  
</feature>
```

STEP 3 - in app/AndroidManifest.xml

```
<uses-permission android:name="android.permission.INTERNET" />  
<uses-permission android:name="android.permission.ACCESS_FINE_LOCATION" />  
<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION" />
```

GPS Best Practices

When returning to map page

- **“helper-map-loaded” event**
- **Turn GPS back on (or set a boolean)**
- **Recenter map**
- **Write cache points to map**

Working with GPS

```
var mapLoaded = false;
navigator.geolocation.watchPosition(
  locationSuccess,
  locationError,
  {setHighAccuracy:true}
);

map.on("load",function(evt){
  mapLoaded = true;
});

function locationSuccess(evt){
  if(mapLoaded){ . . .}
}
```

Working with other libraries

github.com/esri

[sencha-touch-map-checkin-js](#)

[bootstrap-map-js](#)

[jquery-mobile-map-js](#)

[dojo-bootstrap-ui](#)

Questions?

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Understanding our world.