Agenda

Capabilities
Managing app life-cycle
Working with locally hosted builds
Working from JS frameworks
Debugging
GPS
Expectations
Capabilities
Lloyd Heberlie
Touch
Demo
BasemapGallery
BasemapToggle
Home
LayerList action
Compass
Popups
Calcite Maps - Settings
Calcite Maps - Basemaps
Calcite Maps - Basemaps
HTML5 input types

type="email"
type="tel"
type="date"
Mobile media queries

```html
<!DOCTYPE html>
<html data-browser="Mozilla/5.0 (Linux; Android 6.0; Nexus 5 Build/MRA58N) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.115 Mobile Safari/537.36">
<head>
  <meta charset="utf-8">
  <meta name="viewport" content="initial-scale=1,maximum-scale=1,user-scalable=no">
  <title> - 4.4</title>
  <head>

  </head>
<body>
<script>
// ---------------------------------------------
// js, sass - user-agent mixin
// ---------------------------------------------

document.documentElement.setAttribute("data-browser", navigator.userAgent);
</script>
</body>
</html>
```
Mobile media queries

**Constructors**

```javascript
new MapView(properties)
```

**Parameter:**

- `properties` *object*

(Optional)

See the `properties` for a list of all the properties that may be passed into the constructor.

**Example:**

```javascript
// Typical usage
var view = new MapView(
    // ID of DOM element containing the view container: "viewDiv",
    // Map/WebMap object
    map: new Map()
);
```

**Property Overview**

Any properties can be set, retrieved or listened to. See the Working with Properties topic.
Mobile media queries

```html
<!DOCTYPE html>
<html data-browser="Mozilla/5.0 (Linux; Android 6.0; Nexus 5 Build/MRA58N) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/59.0.3071.115 Mobile Safari/537.36">
<head>
  <meta charset="utf-8">
  <meta name="viewport" content="initial-scale=1,maximum-scale=1,user-scalable=no">
  <title></title>
</head>
<body>
<script>
// Tableta and phone viewports need a different CSS selector than desktop viewports.
// ----------------------------------------
var mqDesktop = window.matchMedia("(min-width: 1024px) and (max-width: 2560px)");
var mqTablet = window.matchMedia("(min-width: 768px) and (max-width: 1023px)";)
var mqPhone = window.matchMedia("(max-width: 767px)";)
if (mqDesktop.matches){
  console.log("Desktop");
}
if (mqTablet.matches){
  console.log("Tablet");
}
if (mqPhone.matches){
  console.log("Phone");
}
</script>
</body>
</html>
```
Managing initial load times
Initial loading in a mobile browser

Often misunderstood

Many things happening

Vulnerable to timing issues

Consider user’s experience
Initial loading in a mobile browser

CSS
3rd party libraries
Frameworks
Framework plugins
ArcGIS JS API
GIS queries
GET map tiles
Initial loading in a mobile browser

CSS
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Initial loading in a mobile browser

Wait for framework initialization
- In Angular: implements OnInit
- In Cordova: ‘deviceready’ event
- In ArcGIS: dojo/domReady!
Consider synchronous patterns

Framework init → dojo/ready! → Map ready → Feature service loaded
Lazy load modules and libraries

Map ready → Wait for user input → Load widget
Lazy load demo

```javascript
function lazyLoadPointCloudLayer()
{
    require(["esri/layers/PointCloudLayer"], function(PointCloudLayer) {
        var plc = new PointCloudLayer();
    });
}
```
Reserve async for after app load

Wait for framework initialization
- In Angular: implements OnInit
- In Cordova: ‘deviceready’ event
- In ArcGIS: dojo/domReady!
MapView ready?

The View has a Map
View container size is greater than zero
View has a spatial reference

API Reference MapView.ready

Demo
Loadable Patterns

Any resource that handles async data access

Examples: feature layers, tasks, web maps

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>not-loaded</td>
<td>The object's resources have not loaded.</td>
</tr>
<tr>
<td>loading</td>
<td>The object's resources are currently loading.</td>
</tr>
<tr>
<td>loaded</td>
<td>The object's resources have loaded without errors.</td>
</tr>
<tr>
<td>failed</td>
<td>The object's resources failed to load. See loadError for more details.</td>
</tr>
</tbody>
</table>
API reference
WebMap.loadStatus
load() example

```javascript
var webmap = new WebMap({
    portalItem: { // autocasts as new PortalItem()
        id: "f2e9b762544945f390ca4ac3671cfa72"
    }
});

var view = new MapView({
    //map: webmap,
    container: "viewDiv"
});

webmap.load().then(function(r){
    view.map = webmap;
    console.log(r);
    console.log("Load Status: " + webmap.loadStatus)
}).otherwise(function(err){
    console.log("Problem loading webmap: " + error);
});
```
Splash Screens

Distract end user from long load times
Gives you control over when main app visible
Wait for MapView.then()

https://github.com/andygup/splash-screen-js
Using local builds

Lloyd Heberlie
Why?

More modules – more requests
Optimized build for app
Web application vs. Hybrid
Reduce http service calls for Hybrid apps
How to create custom builds?

ArcGIS API for JavaScript Web Optimizer – 3x
Bower
npm
Optimizing Your JavaScript App for Performance
- Thursday, July 13 - 12:30 - 1:15 pm - 45 minutes
- SDCC - Demo Theater 11 - Developer
Using local builds

Demo
Working with Cordova and Ionic Native Mobile
Cordova/Phonegap

Wait for “deviceready” event

https://github.com/Esri/quickstart-map-phonegap
Ionic and loading ArcGIS JavaScript modules

Many helper libraries!

- `angular-esri-loader` (Angular 4+, wraps esri-loader)
- `esri-loader` (platform agnostic)
- `Ionic2-esri-map` (Sample app)
- `ArcGIS TypeScript definitions`
Working with Frameworks
Mobile browser-only
Other frameworks

- Plain old Bootstrap
- calcite-maps
- ember-esri-loader
- esri-loader-react
- esri-system-js
Test Mobile Performance
Google Chrome DevTools

Google Chrome DevTools

Performance > Capture Settings > CPU
Google Chrome DevTools

Performance > Capture Settings > Network
WebPageTest

https://webpagetest.org/

Web Page Performance Test for
https://esri.github.io/html5-geolocation-tool-js/field-location-template.html

From: Denver, Colorado USA - Chrome - Cable

Performance Results (Median Run)

<table>
<thead>
<tr>
<th>Load Time</th>
<th>First Byte</th>
<th>Start Render</th>
<th>Speed Index</th>
<th>Document Complete</th>
<th>Fully Loaded</th>
</tr>
</thead>
<tbody>
<tr>
<td>First View (Run 1)</td>
<td>2.808s</td>
<td>0.325s</td>
<td>1.297s</td>
<td>3528</td>
<td>2.808s</td>
</tr>
<tr>
<td>Resource</td>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>esri.github.io/ion-template.html</td>
<td>205 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>esri.github.io - bootstrapmap.css</td>
<td>60 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>esri.github.io - locationHelper.js</td>
<td>205 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>js.arcgis.com - esri.css</td>
<td>417 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>js.arcgis.com - 3.20/</td>
<td>50 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>netdna.bootstrapcdn.min.css</td>
<td>442 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>netdna.bootstrapcdn.font-awesome.css</td>
<td>263 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>code.jquery.com...ry-1.11.1.min.js</td>
<td>586 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>maxcdn.bootstrapcdn.init.js</td>
<td>445 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>js.arcgis.com - init.js</td>
<td>858 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>netdna.bootstrapcdn.ings-regular.woff</td>
<td>527 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>js.arcgis.com - jsapi_en-us.js</td>
<td>149 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>js.arcgis.com - ortileLayerImpl.js</td>
<td>174 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>js.arcgis.com - svg.js</td>
<td>71 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>esri.github.io...ckground-timer.js</td>
<td>91 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>js.arcgis.com - Circle.js</td>
<td>46 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>esri.github.io - bootstrapmap.js</td>
<td>114 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>js.arcgis.com - blank.gif</td>
<td>49 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Performance metrics to keep in mind

Time until first map tile
Time until last map tile
Example

Each new URL requires a DNS lookup + SSL negotiation
- Solution: self-host as much as possible
Debugging and testing
Lloyd Heberlie
Physical devices

http://blog.adtile.me/2014/01/08/adtile-device-lab/
Remote debugging

- Safari Web Inspector Remote
- Google Chrome remote debugging
- http://livereload.com/
- Browser-sync
Enable iOS remote web inspection

To enable iOS remote web inspection, you need to go to the Settings app, then navigate to Safari, and finally select Advanced. Under Advanced, find the option for Web Inspector and enable it. This will allow you to connect your iOS device to a computer and access web pages on your device from the developer tools on the computer.
Enable Android remote web inspection
Content Security Policy (CSP)
Debugging Mobile
Demo
Working with GPS
Built-in GPS

Don’t use for field data collection!

Okay to use for approximate location

github.com/Esri/html5-geolocation-tool-js
High-accuracy GPS

Bluetooth enabled

Bad Elf GNSS (left)
Trimble R1 (right)
High-accuracy GPS and Web Mapping Apps

Best approach is Hybrid => Cordova, Ionic
Also consider ArcGIS Runtimes

NOTE: Regular browser Geolocation API may provide incorrect data
GPS Drift
Stationary device
Cordova plugin for high-accuracy on Android

Works with high-accuracy GPS via bluetooth
Separates GPS locations from Network locations

https://github.com/Esri/cordova-plugin-advanced-geolocation