

Extending Survey123 with JavaScript



Kray Freestone – krayf@northpointgis.com

GIS Developer at North Point Geographic Solutions

Why Use JavaScript?



- Arcade can be limiting & verbose
- Perform complex calculations
- Access external APIs
- Access powerful JS Libraries
 - E.g. turf.js



arcade



javascript

Limitations



- Does not work in public surveys
- Only works within the same organization
- You cannot access local files
- You cannot use frameworks like jQuery, React, Angular, etc.
- You cannot make asynchronous POST/GET requests

Syntax Example



File name	function	arg1	arg2
-----------	----------	------	------

```
pulldata( "@javascript", "jsFile.js", "functionName", ${field1}, ${field2} )
```

Simple Demo



```
pulldata("@javascript","jsFile.js","functionName",{field1},{field2})
```

```
function helloFunction(argument1) {  
  if (argument1 !== null) {  
    let msg = "Hello " + argument1;  
    return msg;  
  }  
}
```

Arch Rock, Mackinac Island



Simple Demo



```
function haversine(lat1, lon1) {
  if (!lat1) return null;
  // arch rock
  let x2 = -84.606
  let y2 = 45.857
  let R = 6371; // Radius of the earth in km
  let dLat = deg2rad(y2 - lat1); // deg2rad below
  let dLon = deg2rad(x2 - lon1);
  let a =
    Math.sin(dLat / 2) * Math.sin(dLat / 2) +
    Math.cos(deg2rad(lat1)) * Math.cos(deg2rad(y2)) *
    Math.sin(dLon / 2) * Math.sin(dLon / 2);
  let c = 2 * Math.atan2(Math.sqrt(a), Math.sqrt(1 - a));
  let d = R * c; // Distance in km
  return `You are ${d.toLocaleString()} km from Arch Rock.`;
}
```

Weather Demo



```
function weather(x, y) {  
  let xmlhttp = new XMLHttpRequest();  
  let url = `https://api.openweathermap.org/data/2.5/weather?  
            units=imperial&lat=${y}&lon=${x}&appid=${apiKey}`;  
  
  xmlhttp.open("GET",url,false);  
  xmlhttp.send();  
  let response = JSON.parse(xmlhttp.responseText);  
  return JSON.stringify(response);  
}
```


Weather Demo



```
pulldata("@json", ${myJSON}, "weather[0].description")
pulldata("@json", ${myJSON}, "main.temp")
pulldata("@json", ${myJSON}, "main.feels_like")
pulldata("@json", ${myJSON}, "wind.speed")
```

```
{
  "coord": {
    "lon": -117.1863,
    "lat": 34.0541
  },
  "weather": [
    {
      "id": 721,
      "main": "Haze",
      "description": "haze",
      "icon": "50d"
    }
  ],
  "main": {
    "temp": 84.22,
    "feels_like": 83.52,
    "temp_min": 77.29,
    "temp_max": 92.39,
    "pressure": 1010,
    "humidity": 40
  },
  "wind": {
    "speed": 4,
    "deg": 233,
    "gust": 11.99
  },
  "name": "Redlands"
}
```

Weather Demo



```
function getData(parentGUID, tok) {
  if (parentGUID) {
    let xmlhttp = new XMLHttpRequest();
    // not the actual URL
    let url = `https://services1.arcgis.com/FeatureServer/1/
              query?f=pjson&outFields=*&
              where=ParentGlobalID='${parentGUID}'&token=${tok}`;
    xmlhttp.open("GET", url, false);
    xmlhttp.send();
    let response = JSON.parse(xmlhttp.responseText);
    let features = response.features;

    // get the most recent values
    let recent = features.reduce(
      (a, b) => a.attributes.INSPECTED > b.attributes.INSPECTED ? a : b
    );

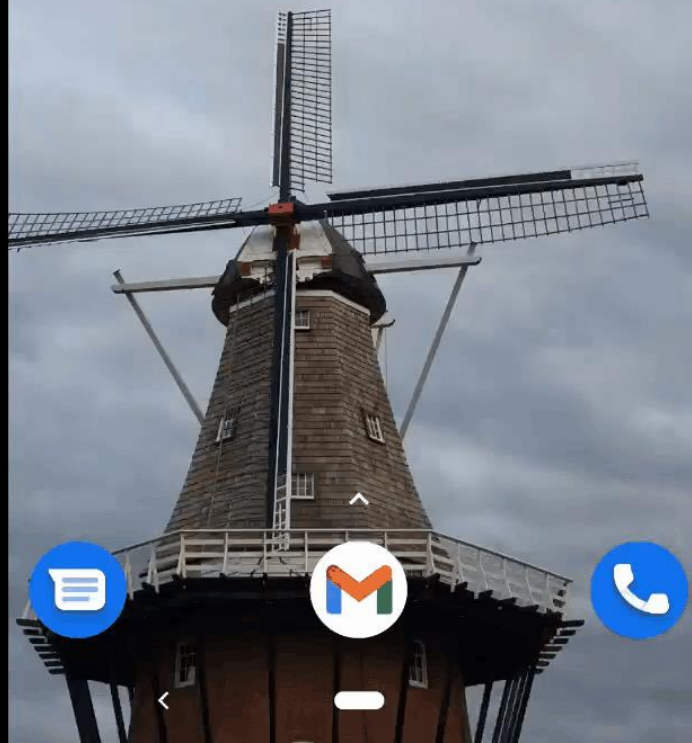
    // get all GPM vals and then get average (function not shown here)
    let allGPM = features.map(x => x.attributes.GPM);
    let gpmAverage = avg(allGPM);

    let toReturn = {
      'recent': recent.attributes.GPM,
      'average': gpmAverage
    }

    return JSON.stringify(toReturn);
  }
}
```



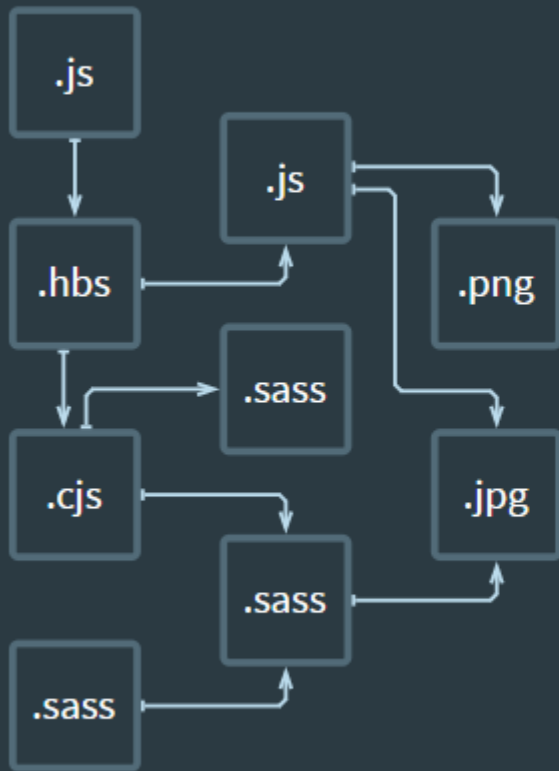
Field Maps



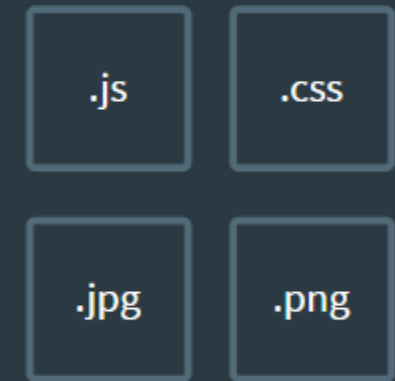
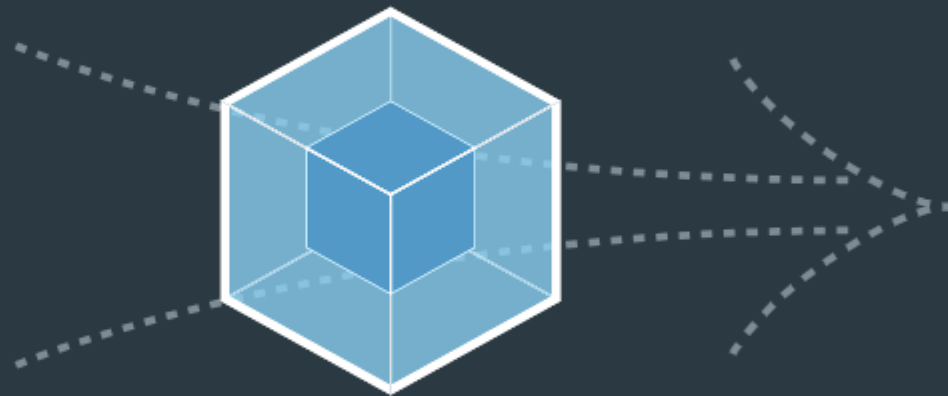
Webpack



bundle your assets



MODULES WITH DEPENDENCIES



STATIC ASSETS

Webpack



- Allows you to use extra libraries for complex operations
- <https://github.com/EsriPS/survey123-webpack>
- <https://www.youtube.com/watch?v=iahSB3P4q1A>

Extending Survey123 with JavaScript

Kray Freestone – krayf@northpointgis.com

GIS Developer at North Point Geographic
Solutions