Building Apps with Esri Leaflet
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Agenda

1. Fundamentals
2. Jungle boat cruise
3. Demos
4. State of the Union
Its a group effort

- open source, community supported
- no roadmap, no product lifecycle
what is **Leaflet**?

an open-source JavaScript library for mobile-friendly interactive maps

small, stable, **popular**
var map = L.map("mapDiv").setView([-45, -120], 10);

// do the same thing without method chaining
var map = L.map("mapDiv");
map.setView([45, -120], 10)

coordinates are passed in Y,X order
How small is Leaflet?

36kb!
so small it doesn't help you fetch .geojson files

// leaflet.css
// leaflet.js

// then a plugin
// <script src="https://unpkg.com/leaflet-ajax@2.1.0"></script>

L.GeoJson.ajax("/data/giraffes.geojson").addTo(map);

an extra plugin just to load a file!
luckily **Leaflet** has a *big* plugin community
Esri Leaflet is a plugin to make working with the most popular ArcGIS Services a pleasure.
Goals

1. provide sensible defaults
2. mimic Leaflet's own conventions
3. keep it simple
Let's take a tour!
// /lib/leaflet.css
// /lib/leaflet.js

var url = '//{s}.tile.osm.org/{z}/{x}/{y}.png';

var tiled = L.tileLayer(url, {
  attribution: '© <a href="http://osm.org/copyright">OpenStreetMap</a> contributors'
});

tiled.addTo(map);

requires manual attribution and knowledge of tiling scheme
L.esri.basemapLayer

// /lib/leaflet.css
// /lib/leaflet.js
// /lib/esri-leaflet.js

L.esri.basemapLayer('Streets').addTo(map);

// or
L.esri.basemapLayer('Streets', {
    minZoom: 3
}).addTo(map);

map credits update on pan/zoom

L.TileLayer properties, methods and events are inherited
some Leaflet fundamentals
```javascript
var data = {
  "type": "Feature",
  "geometry": {
    "type": "Point",
    "coordinates": [125.6, 10.1]
  },
  "properties": {
    "color": "green",
    "name": "Dinagat Islands"
  }
};

var islands = L.geoJSON(data);
islands.bindPopup((layer) =>
  layer.feature.properties.name
);
```
Esri Leaflet builds on the fundamentals
var buses = L.esri.featureLayer({
    url: '../services/Buses/MapServer/0',
    where: "direction='North'"
})
buses.bindPopup((layer) =>
    layer.feature.properties.stop_name;
);buses.addTo(map);

spatial/sql filtering, popups bound when feature is clicked
L.esri.tiledMapLayer({ url: '//server.com/Cached/MapServer' });
```javascript
var dynLayer = L.esri.dynamicMapLayer({
    url: '../services/SampleWorldCities/MapServer',
    layerDefs: { 0: 'POP_RANK < 2' }
}).addTo(map);

dynLayer.bindPopup(function (error, collection) {
    return collection.features[0].properties.NAME;
});
```
L.esri.imageMapLayer(
  {
    url: landsatUrl,
    bandIds: [4,3,2],
    from: new Date('2000'),
    to: new Date('2000')
  }).addTo(map);

// or

var rule = {
  "rasterFunction": 'NDVI Colorized'
};

L.esri.imageMapLayer(
  {
    url: landsatUrl,
    // other parameters
  });
more Esri Leaflet plugins

- address search
- server side renderers
- geoprocessing services
more Esri Leaflet plugins

- driving directions*
- Stream Layers from GeoEvent
- web maps
- Legends
61 different contributors!
bug fixes / improvements

- @Biboba added a new ImageryClarity basemap
- @finneganh updated our last ES6 imports
- @spoilsportmotors made sure custom tile layers use a proxy
- @jmford added Query.returnM()
bug fixes / improvements

- @joelondon added `Query.distinct()`
- @bbehling non-point input geometries for `IdentifyFeatures`
- @scaddendp added polar projection support to `dynamicMapLayer`
- @Saulzi added error handling to classes that extend `L.ImageOverlay`
modular dependencies
// convert ArcGIS JSON to GeoJSON
var geojson = arcgisToGeoJSON({
  "x": -122.6764,
  "y": 45.5165,
  "spatialReference": {
    "wkid": 4326
  }
});

// GeoJSON to ArcGIS JSON
var arcgis = geojsonToArcGIS({
  "type": "Point",
  "coordinates": [45.5165, -122.6764]
});

ES6 (also shipped as a UMD)
leaflet-virtual-grid

A DOM-less tile layer that can be used to query APIs with bounding boxes or center/radius.
var vg = new VirtualGrid();

vg.on("cellenter", function(e){
    console.log(e.type, e); // listen for when cells reenter the current view
});
npm install tiny-binary-search

var index = new BinarySearchIndex([{
  value: 0, id: "A" },
  { value: 1, id: "B" },
  { value: 2, id: "C" },
  { value: 3, id: "D" }
]);

// get the item with a value of 2
index.query(2);
// get all items with values between 1 and 3 (inclusive)
index.between(1, 3);

// add an array of items to the index
index.bulkAdd([{
  id: "BB"
}]);
Let's check out a couple new demos!
Find the Closest Facility
Traveling Salesman
what now?
Leaflet stable at v1.3.1
Esri Leaflet is mature too.

- 3D
- rotation
- WebGL
- webpack
- rollup
- browserify
but check out esri-loader too
please, please, please fill out a session survey

1. download the Esri Events App
2. select Dev Summit
3. search for "Leaflet"
4. leave feedback!
idea, question, issue, or success story?

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