

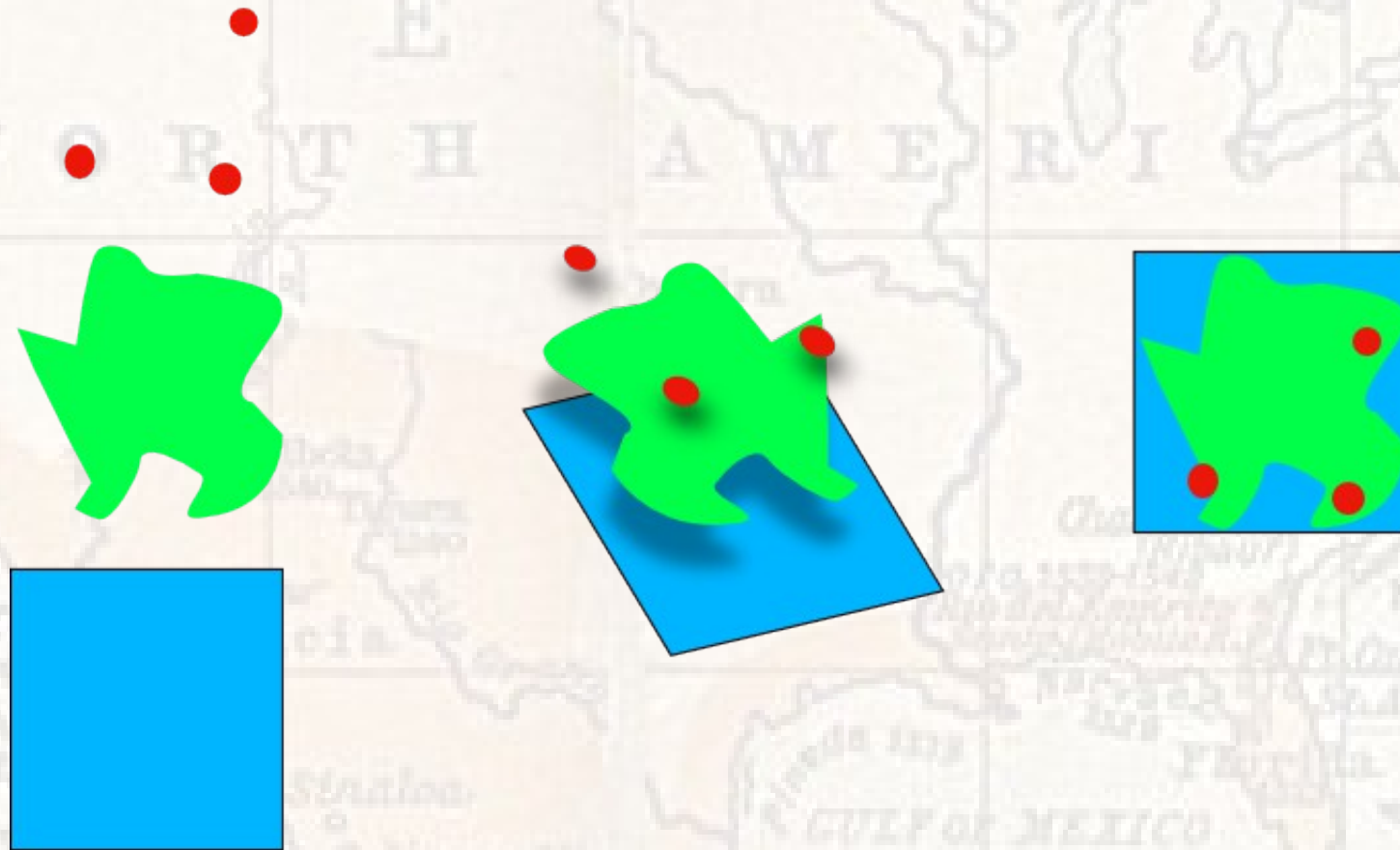
An Introduction to Leaflet

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flatrockgeo.com

Mini-Survey of Web Mapping

- Google Maps
- Bing Maps
- MapQuest
- Open Layers
- Leaflet.js

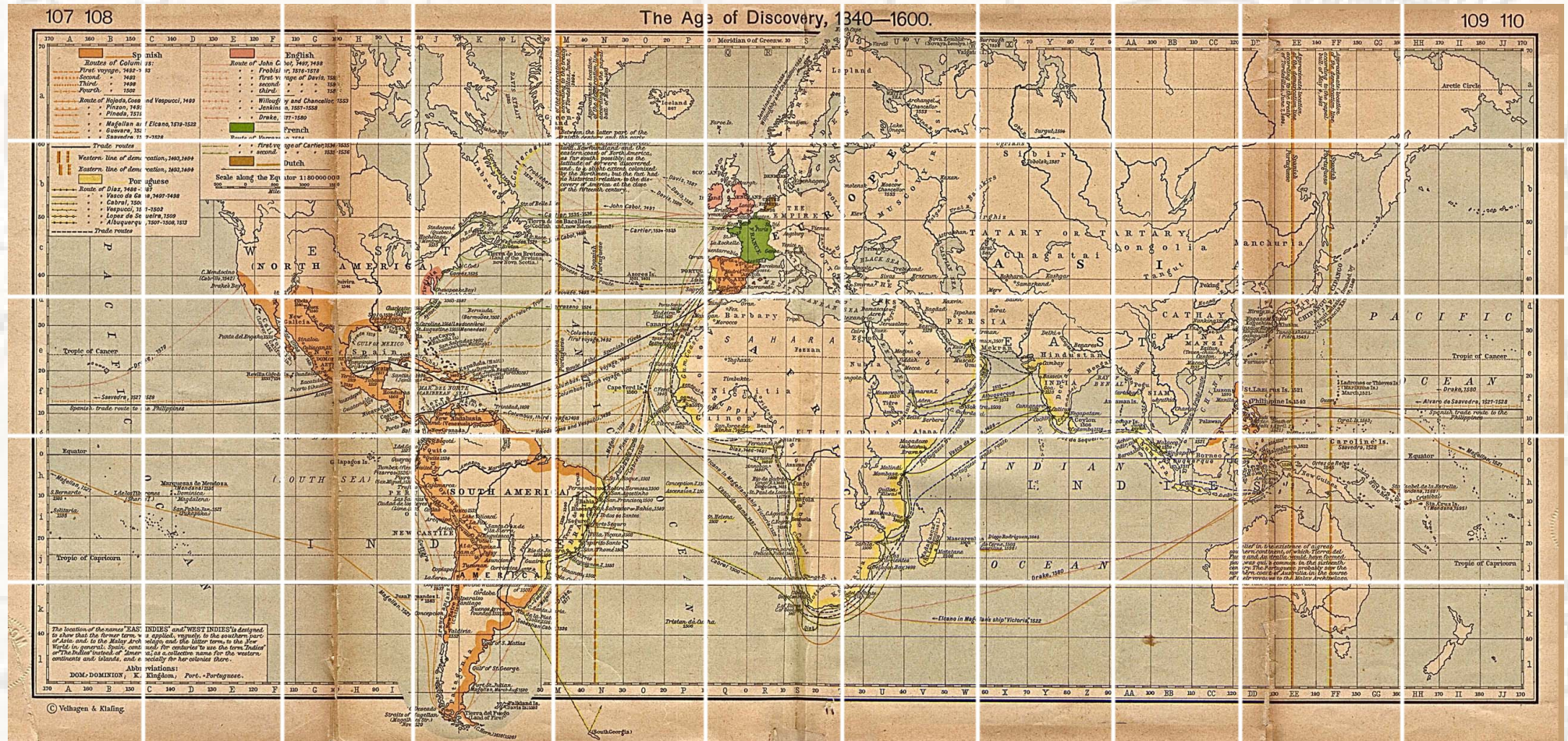
Basics of Web Mapping: Layers!



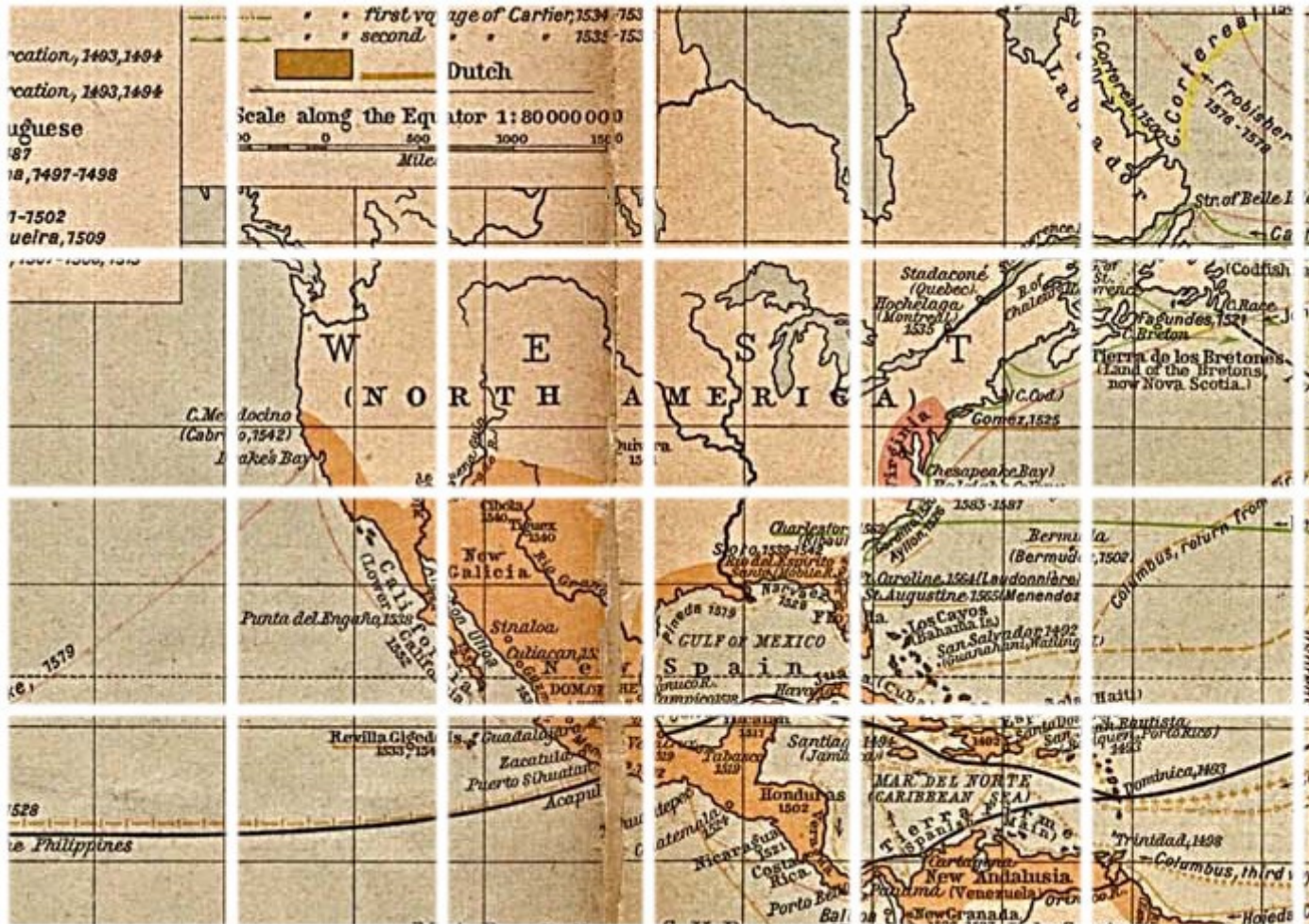
es!



Basics of Web Mapping: Tiles!



Basics of Web Mapping: Tiles!



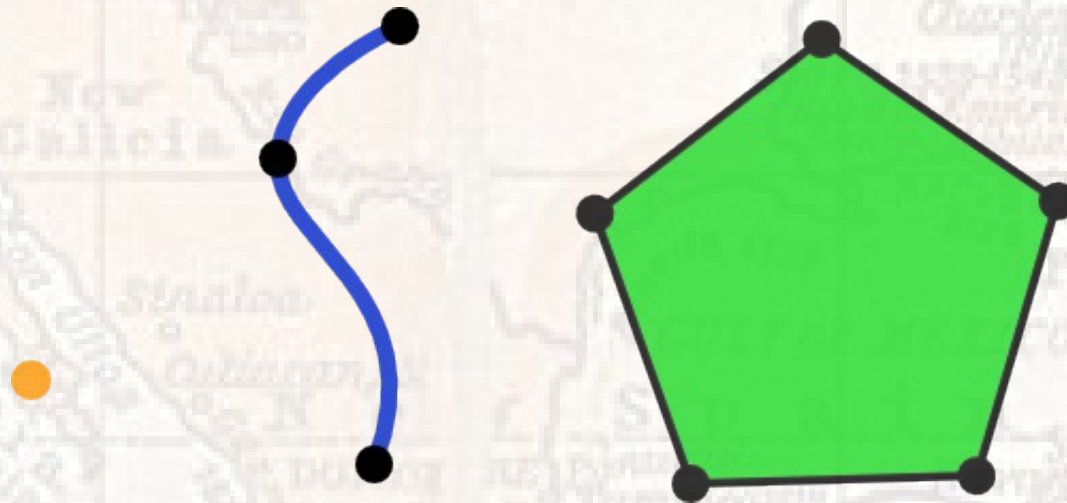
- Usually used for base layers
- Zoom level 1: Whole world
- Max zoom usually 17-21
- Each level has 2x zoom

Tile Sources

- Google Maps Tiles
- Open Street Maps
- MapQuest
- Mapbox
- CloudMade

Basics of Web Mapping: Vectors!

- Shapes made from points and lines
- Points, Lines and Polygons
- AKA: Features, “Point Features”, etc.
- Can be made Clickable, etc

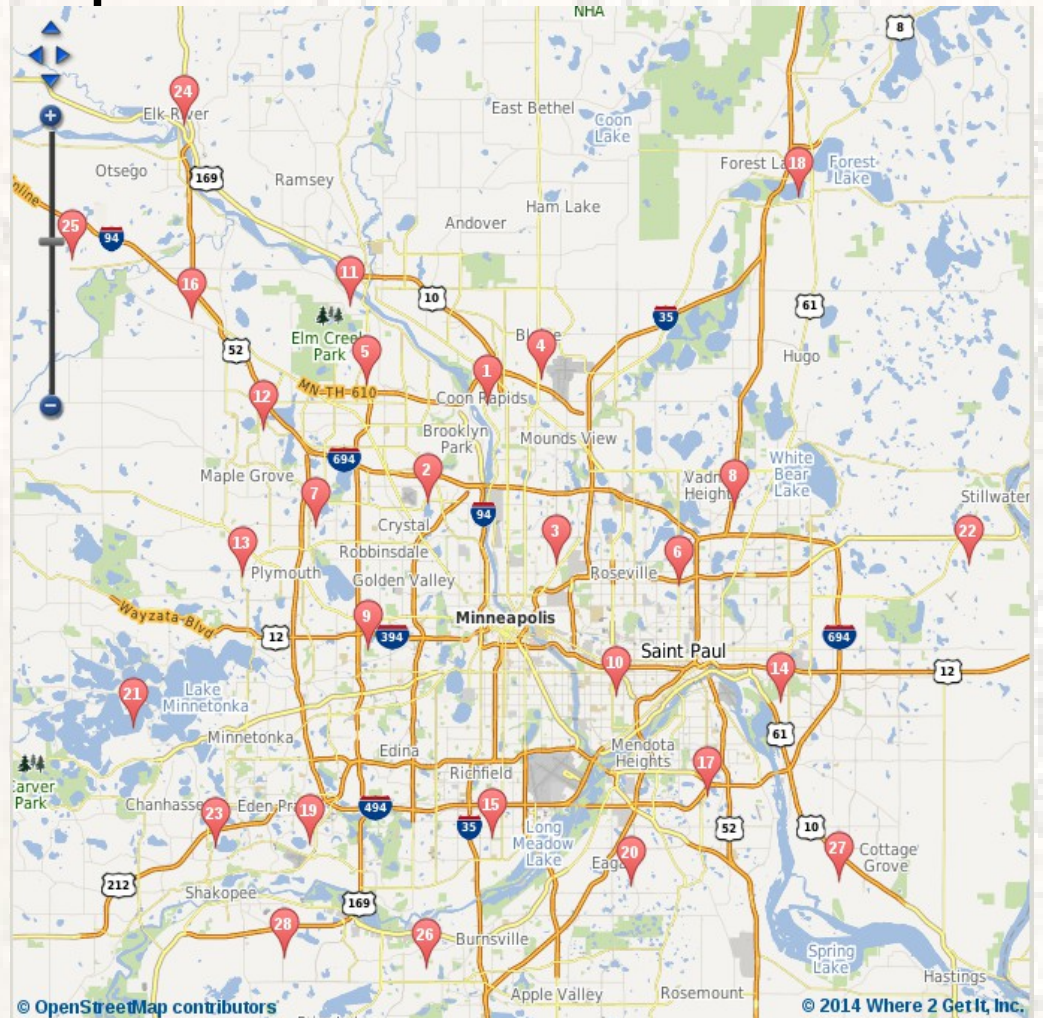


Why Leaflet?

- Good documentation
- Plugins
- Lightweight
- Free
- Easy to use
- Pretty good examples

Demo Use Case

- Business Locations Map
- We'll need
 - Basic Web page
 - Leaflet Map
 - Basemap
 - Store locations



Making a Website

- Get a text editor
 - Syntax highlighting
 - Indentation
 - One popular option is: [Notepad++](#)
- Get a browser
 - Firefox and Chrome have best development tools
- Make a workspace (folder)
 - Organize your code

Basic HTML Webpage

```
<!DOCTYPE HTML>
<html>
  <head>
    <title>Culvers</title>
  </head>
  <body>
    <h1>Culvers Map</h1>
  </body>
</html>
```

Add Leaflet

Leaflet Download Page

Using a Hosted Version of Leaflet

The latest stable Leaflet release is hosted on a CDN — to start using it straight away, place this in the head of your HTML code:

```
<link rel="stylesheet" href="http://cdn.leafletjs.com/leaflet-0.7.2/leaflet.css" />
<script src="http://cdn.leafletjs.com/leaflet-0.7.2/leaflet.js"></script>
```

```
<head>
  <title>Culvers</title>
  <link rel="stylesheet" href="http://cdn.leafletjs.com/leaflet-0.7.2/leaflet.css" />
  <script src="http://cdn.leafletjs.com/leaflet-0.7.2/leaflet.js"></script>
</head>
```


Make A Place For Our Map

```
<body>  
  <h1>Culvers Map</h1>  
  <div id='mapdiv' style='height:500px;'>A map will appear here.</div>  
</body>
```

Note: <div> elements have zero height by default, so we set it to 500px tall

Add our Custom JavaScript

- Make a new directory (js)
- Make a new file js/culvers.js
- Add `<script>` tag after our mapdiv

```
<div id='mapdiv' style='height:500px'>A map will appear here.</div>  
<script src='js/culvers.js'></script>
```


JavaScript Code

```
// Make a new map object and set the center coordinate and zoom level.  
// Zoom level 1 is the whole world and the max zoom is 19. We'll choose  
// something about half way.  
var map = L.map('map').setView([45, -93], 8);
```

Nothing Shows Up!?

- We don't have any layers yet. Let's start with a base layer
- We're going to use MapQuest OSM Tiles
 - They're free!
 - No API key needed!
 - Other tiles are slightly simpler to use, but you can copy and paste the code on the next slide

Adding a Basemap

```
/****** Base map *****/
```

```
// Let's set some basemap options
```

```
var tile_options = {  
  subdomains: '1234',  
  attribution: 'Map data OpenStreetMaps and MapQuest'  
};
```

```
// Now we add the actual tile layer
```

```
var basemap = L.tileLayer('http://otile{s}.mqcdn.com/tiles/1.0.0/map/{z}/{x}/{y}.png', tile_options);  
basemap.addTo(map);
```


The Create then Add Pattern

- A common pattern in Leaflet
 - Create an object
 - Then add it to the map

```
var basemap = L.tileLayer(.....);  
basemap.addTo(map);
```

Now We Need Culver's Points

- Culver's Website: [View All Locations](#)



Your Roadmap to Delicious
Download our [POI file](#) to find the Culver's nearest you.

Turns out to be a CSV file!

- But it has a bunch of extra columns
- Open it in Excel or OpenOffice and save it as a CSV file again
 - This removes the extra columns from the file

Loading the CSV Data

- We're going to cheat a little bit so that you don't need to set up an actual server.
- Open the CSV file in your text editor and copy the whole file (Select All, Copy)
- Create a new `<div>` after the `mapdiv`, in the `html` and paste the CSV contents inside it

```
<div id='mapdiv' style='height:500px'>A map will appear here.</div>
```

```
<div id='locations' style='white-space:pre;'>
```

```
-89.729864,43.270689,Culver's,716 Phillips Blvd
```

```
-89.978353,43.532969,Culver's,2075 E Main St
```

```
-89.766472,43.475169,Culver's,420 Linn St
```

```
...
```

```
</div>
```


Leaflet Plugin: Finding Plugins

- Leaflet Plugins Page

[Leaflet.geoCSV](#)

Leaflet plugin for loading a CSV file as geoJSON layer.

- That looks promising!
- Follow the links...Click the **Raw** link



joker-x / [Leaflet.geoCSV](#)

★ Star

35

🔗 Fork



branch: master ▾

[Leaflet.geoCSV](#) / [leaflet.geocsv.js](#)



ryan-feagin 24 days ago Dynamic lat lng title names

2 contributors



file | 6 lines (6 sloc) | 2.574 kb



Open

Edit

Raw

Blame

History

Delete

1

/*

March 5, 2014

Leaflet Plugin: Downloading Plugins

- Save the JavaScript file to your *js* directory
- Add a new `<script>` tag to your html file, right after the Leaflet.js script tag

```
<head>  
  <title>Culvers</title>  
  <link rel="stylesheet" href="http://cdn.leafletjs.com/leaflet-0.7.2/leaflet.css" />  
  <script src="http://cdn.leafletjs.com/leaflet-0.7.2/leaflet.js"></script>  
  <script src="js/leaflet.geocsv.js"></script>  
</head>
```

Use CSV Data Plugin

```
/****** CSV Data *****/  
// More options at: https://github.com/joker-x/Leaflet.geoCSV
```

```
// Options for the CSV data  
var csv_options = {  
  fieldSeparator: ',',  
  titles: ['lng','lat','ignore','popup']  
};
```

```
var csvContents = document.getElementById('locations').innerHTML;  
var geoLayer = L.geoCsv(csvContents,csv_options);  
map.addLayer(geoLayer);
```


The CSV Plugin Extends GeoJSON

- Anything we can do with GeoJSON we can do with a CSV layer
 - Like popups!

```
// Options for the CSV data
var csv_options = {
  fieldSeparator: ',',
  titles: ['lng','lat','ignore','popup'],
  onEachFeature: function(feature,layer){
    layer.bindPopup(feature.properties.popup);
  }
};
```

HTML At This Point

```
<!DOCTYPE HTML>
<html>
  <head>
    <title>Culvers</title>
    <link rel="stylesheet" href="http://cdn.leafletjs.com/leaflet-0.7.2/leaflet.css" />
    <script src="http://cdn.leafletjs.com/leaflet-0.7.2/leaflet.js"></script>
    <script src="js/leaflet.geocsv.js"></script>
  </head>
  <body>
    <h1>Culvers Map</h1>
    <div id='mapdiv' style='height:500px'>A map will appear here.</div>
    <div id='locations' style='white-space:pre;'>
      -89.729864,43.270689,Culver's,716 Phillips Blvd
      ...
      -112.360772,34.579937,Culver's,2544 N Stoneridge Dr
    </div>
    <script src='js/culvers.js'></script>
  </body>
</html>
```

JavaScript At This Point

```
// Comments stripped so code fits in the presentation
var map = L.map('mapdiv').setView([45, -93], 8);
```

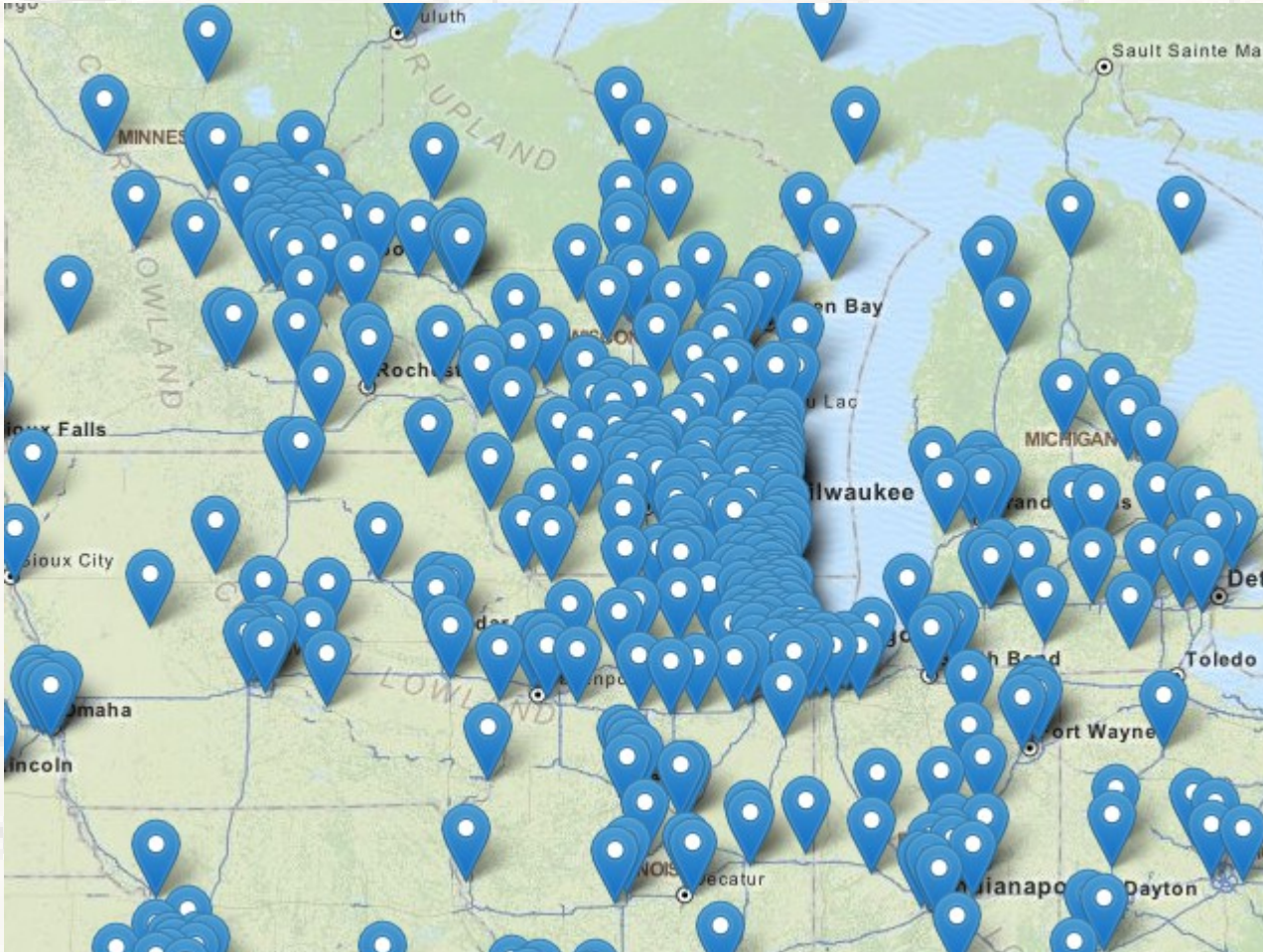
```
var tile_options = {
  subdomains: '1234',
  attribution: 'Map data OpenStreetMaps and MapQuest'
};
```

```
var basemap = L.tileLayer('http://otile{s}.mqcdn.com/tiles/1.0.0/map/{z}/{x}/{y}.png', tile_options);
basemap.addTo(map);
```

```
var csv_options = {
  fieldSeparator: ',',
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  onEachFeature: function(feature, layer){
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  }
};
```

```
var csvContents = document.getElementById('locations').innerHTML;
var geoLayer = L.geoCsv(csvContents, csv_options);
map.addLayer(geoLayer);
```


Too Cluttered? More Plugins!



It's working, but it's too Cluttered.

Let's use a Clustering plugin.

Leaflet MarkerCluster Plugin

- MarkerCluster Website
- We need 3 files:
 - `leaflet.markercluster.js`
 - `MarkerCluster.css`
 - `MarkerCluster.Default.css`
- Save the files to the js directory

Include MarkerCluster Plugin

```
<head>
  <title>Culvers</title>
  <link rel="stylesheet" href="http://cdn.leafletjs.com/leaflet-0.7.2/leaflet.css" />
  <script src="http://cdn.leafletjs.com/leaflet-0.7.2/leaflet.js"></script>
  <script src="js/leaflet.geocsv.js"></script>
  <script src="js/leaflet.markercluster.js"></script>
  <link rel="stylesheet" href="js/MarkerCluster.css" />
  <link rel="stylesheet" href="js/MarkerCluster.Default.css" />
</head>
```

Tell Leaflet To Cluster Points

```
// comment out this line. We don't want to add this layer anymore  
// map.addLayer(geoLayer);
```

```
// Instead we want to add the geoLayer to a marker cluster  
// and add the marker cluster to the map  
var markers = new L.MarkerClusterGroup();  
markers.addLayer(geoLayer);  
map.addLayer(markers);
```


Questions?

- Source Code
 - <https://github.com/stuporglue/leaflet-crash-course>