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Turf &
tile-reduce

http://turfjs.org/

Turf manipulates map data

GeoJSON

results can be displayed anywhere

- mapbox.js
- leaflet
- d3
- mapbox studio
- QGIS
- ArcGIS Desktop
- etc

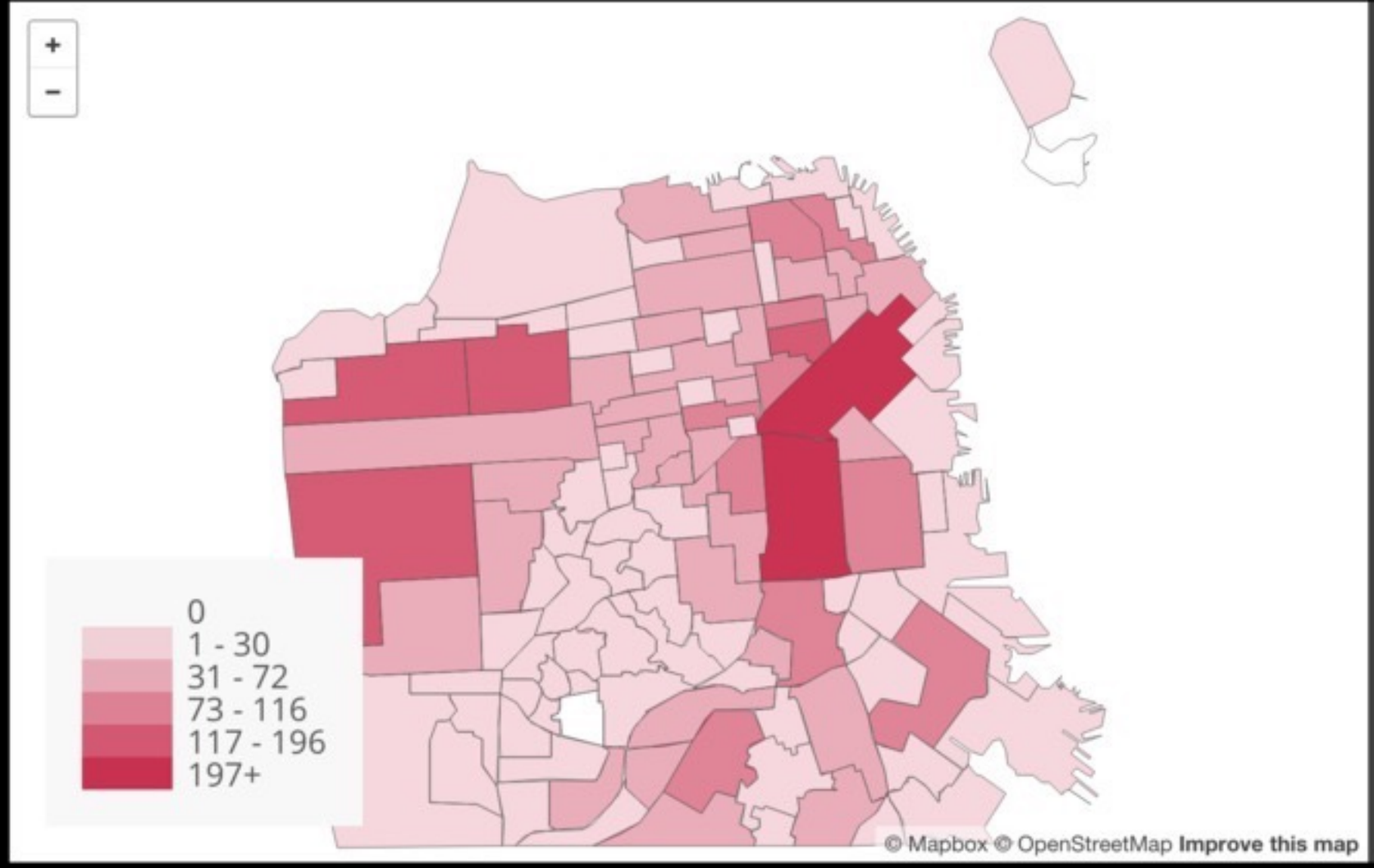
Javascript runs everywhere

everywwhere?

- "the cloud"
- browsers
- your laptop
- your mobile

these

slides



SF 311

past 7 days

Show Calls

Data from DataSF

flexible

- open
- modular
- runs everywhere

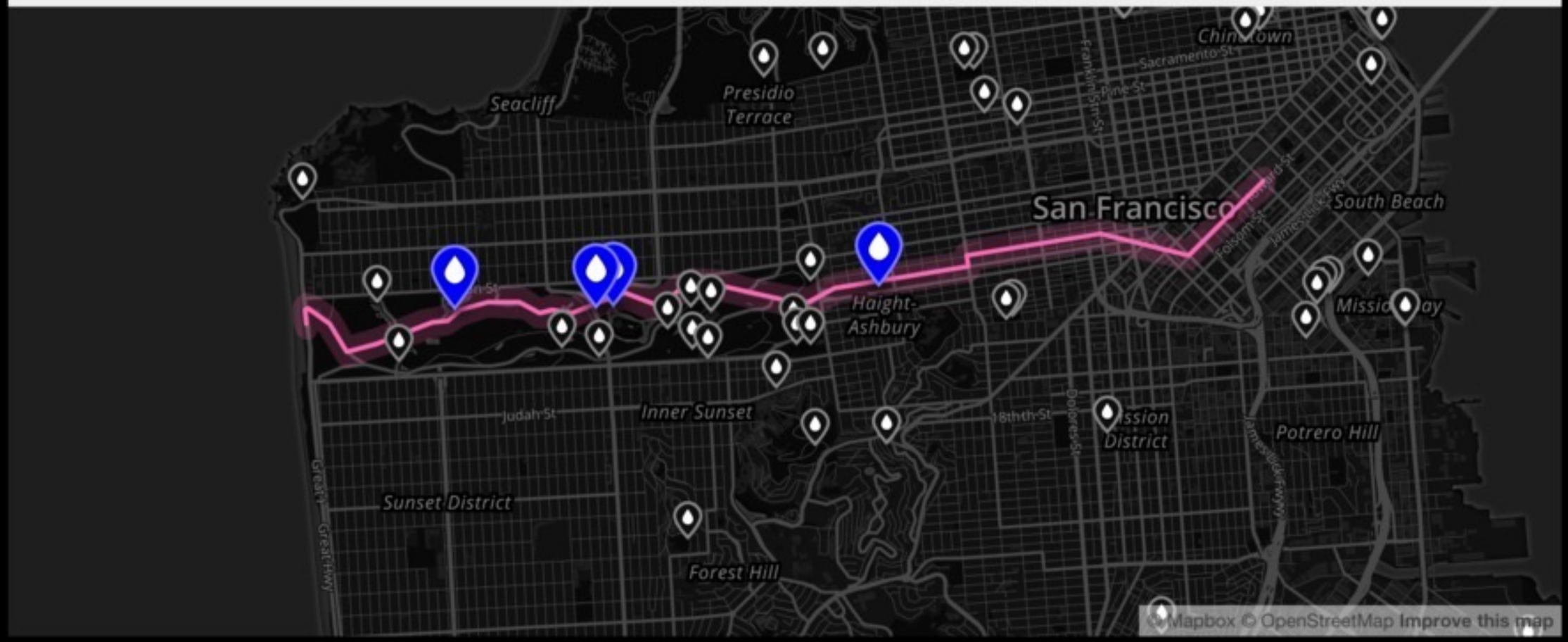
what can it do?

buffers

```
turf.buffer(point,
1, 'mile')
```

Water Fountains accessible within 500 feet of the Bay to Breakers race route.

A GeoJSON route is buffered with turf-buffer and points are found with turf-within.



smoothing

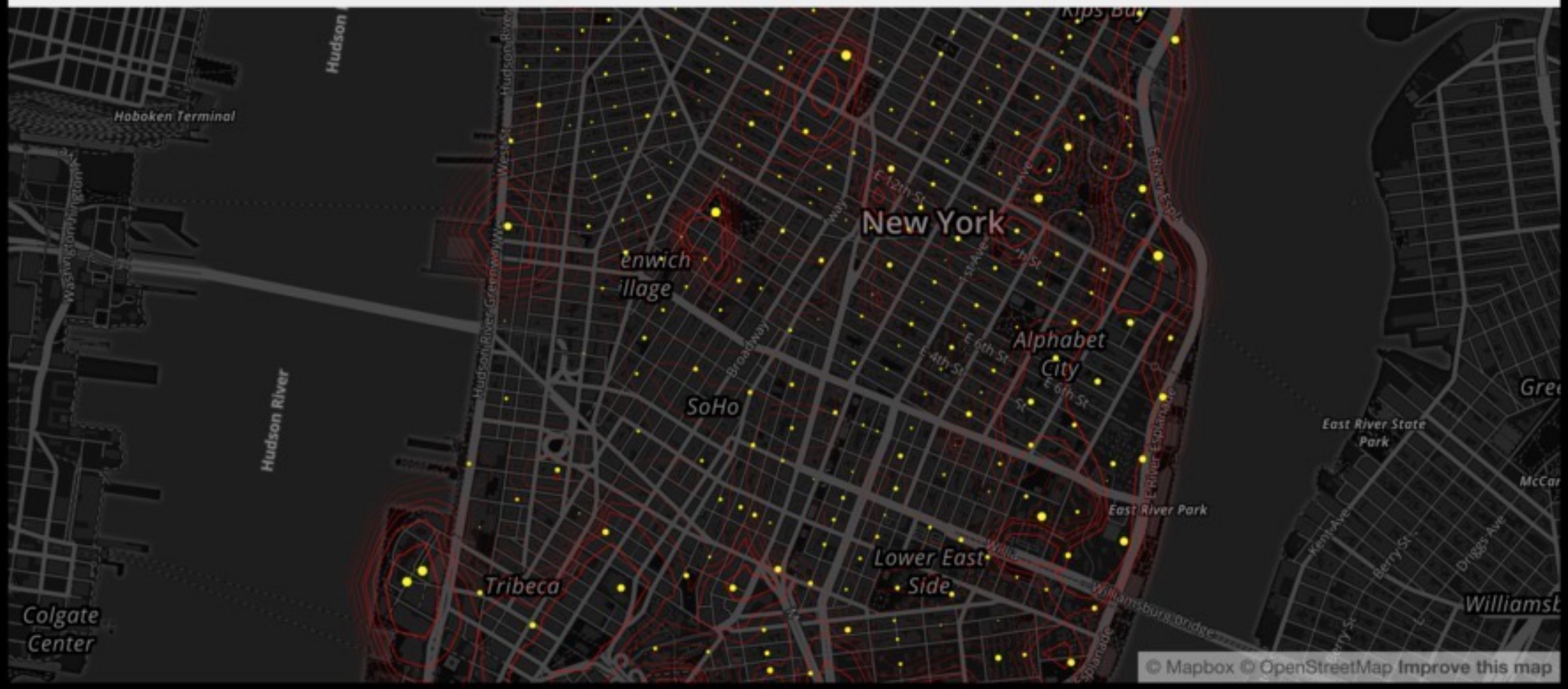
bezier(line,
5000, .85)


Bayamo
Baracoa
Guantánamo
iquero
Santiago
de Cuba
Port-de-
Paix
Les Gonaïve
Jérémie
Montego
Bay
Port Maria
Jamaica
© Mapbox © OpenStreetMap Imp

contours

```
isolines(points,
z, resolution,
breaks)
```

Population data from the US Census transformed in real-time into population isolines with turf-isoline.



aggregation

Water Fountains in Washington, DC, hexbinned on the fly

raw data | turf-hex | turf-count

lots of

other stuff

turf-isobands turf-average turf-bboxPolygon turf-bearing turf-bezier turf-buffer turf-center turf-centroid turf-combine turf-concave turf-convex turf-count turf-destination turf-deviation turf-distance turf-envelope turf-erase turf-explode turf-extent turf-featurecollection turf-filter turf-flip turf-grid turf-hex turf-inside turf-intersect turf-isClockwise turf-aggregate turf-isolines turf-jenks turf-kinks turf-linestring turf-max turf-median turf-merge turf-midpoint turf-min turf-nearest turf-planepoint turf-point-on-surface turf-point turf-polygon turf-quantile turf-reclass turf-remove turf-sample turf-simplify turf-size turf-square turf-sum turf-tag turf-tin turf-union turf-variance turf-within

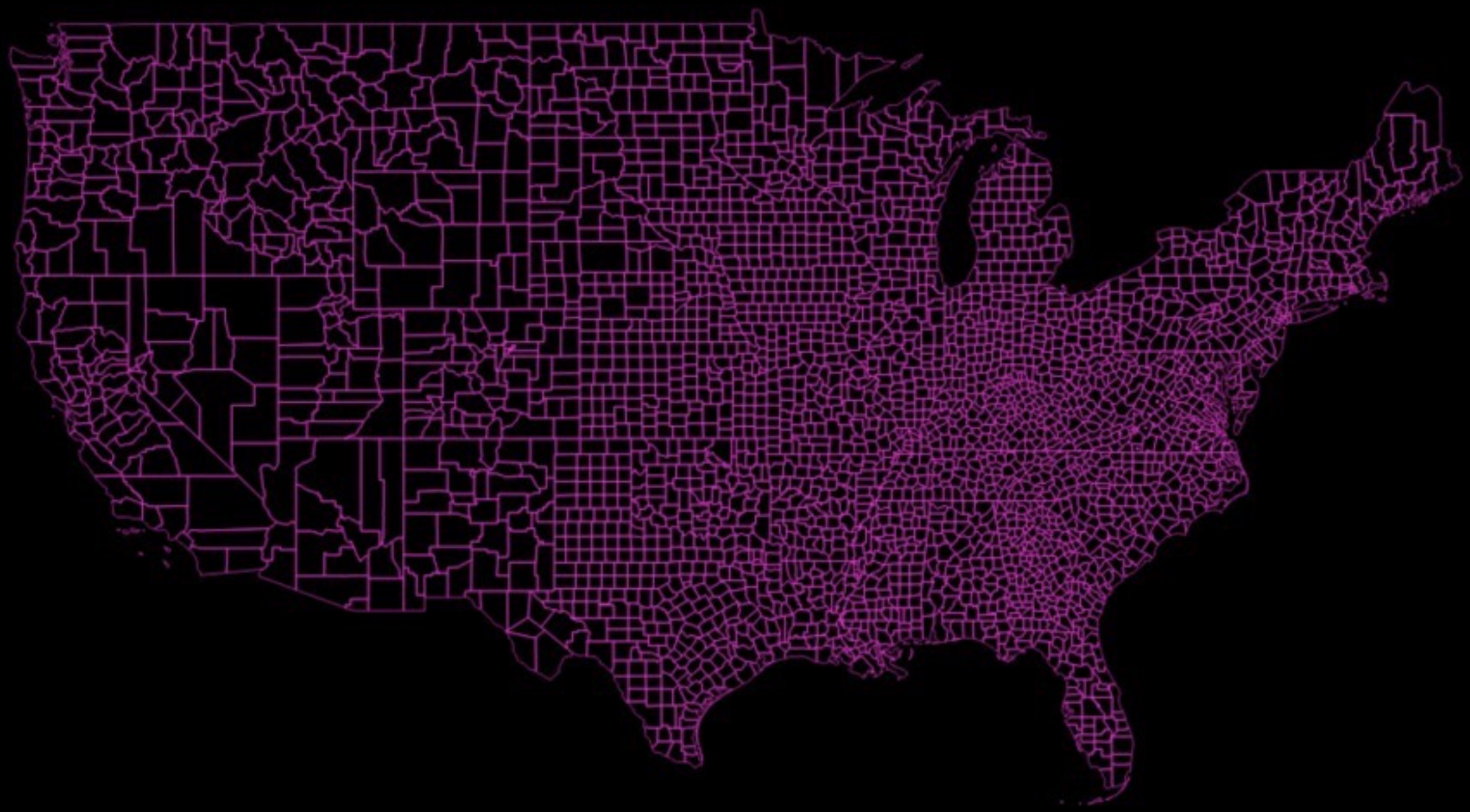
Turf is GIS for the Web

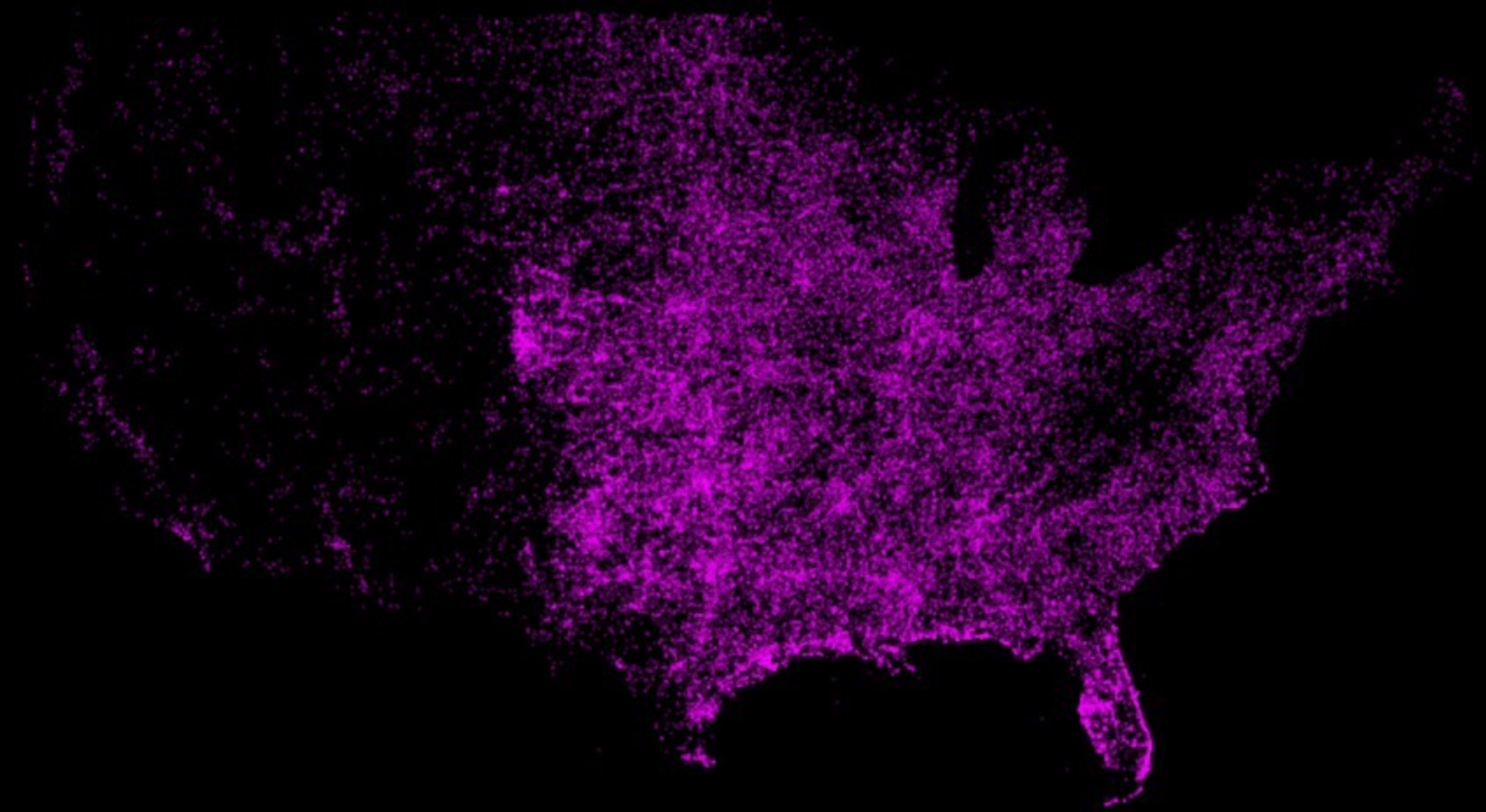
Turf is GIS for everything

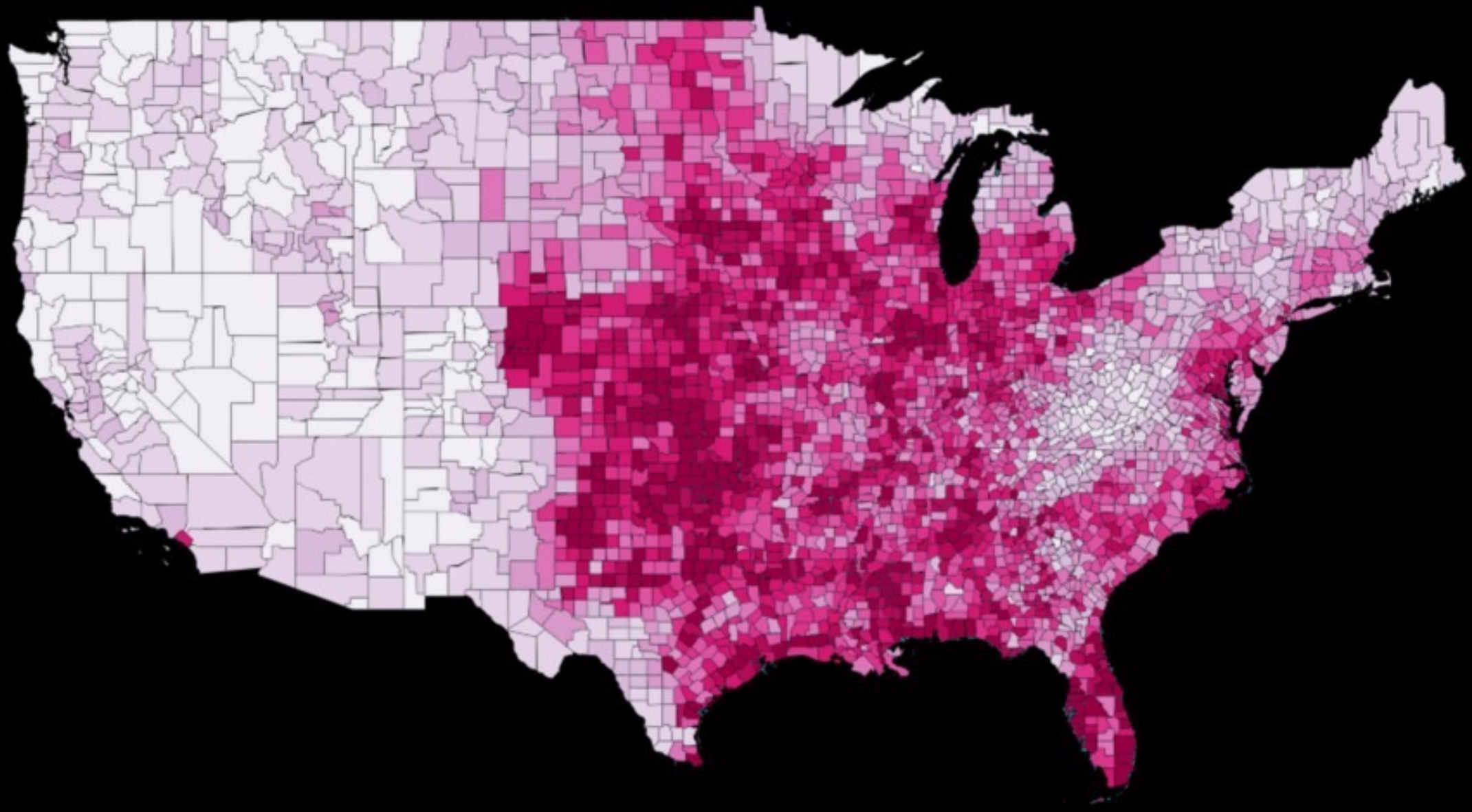
automate processing so you can spend your time thinking not clicking

~~browser~~

~~limits~~







~~computing~~
~~limits~~

tile-
reduce

OSM QA tiles

osmlab.github.io/osm-qa-tiles/

OSM QA TILES

OSM QA tiles are a vector tile set designed for data analysis of OpenStreetMap with Tile Reduce.

OSM QA tiles contain the full spectrum of OpenStreetMap data, tile by tile:

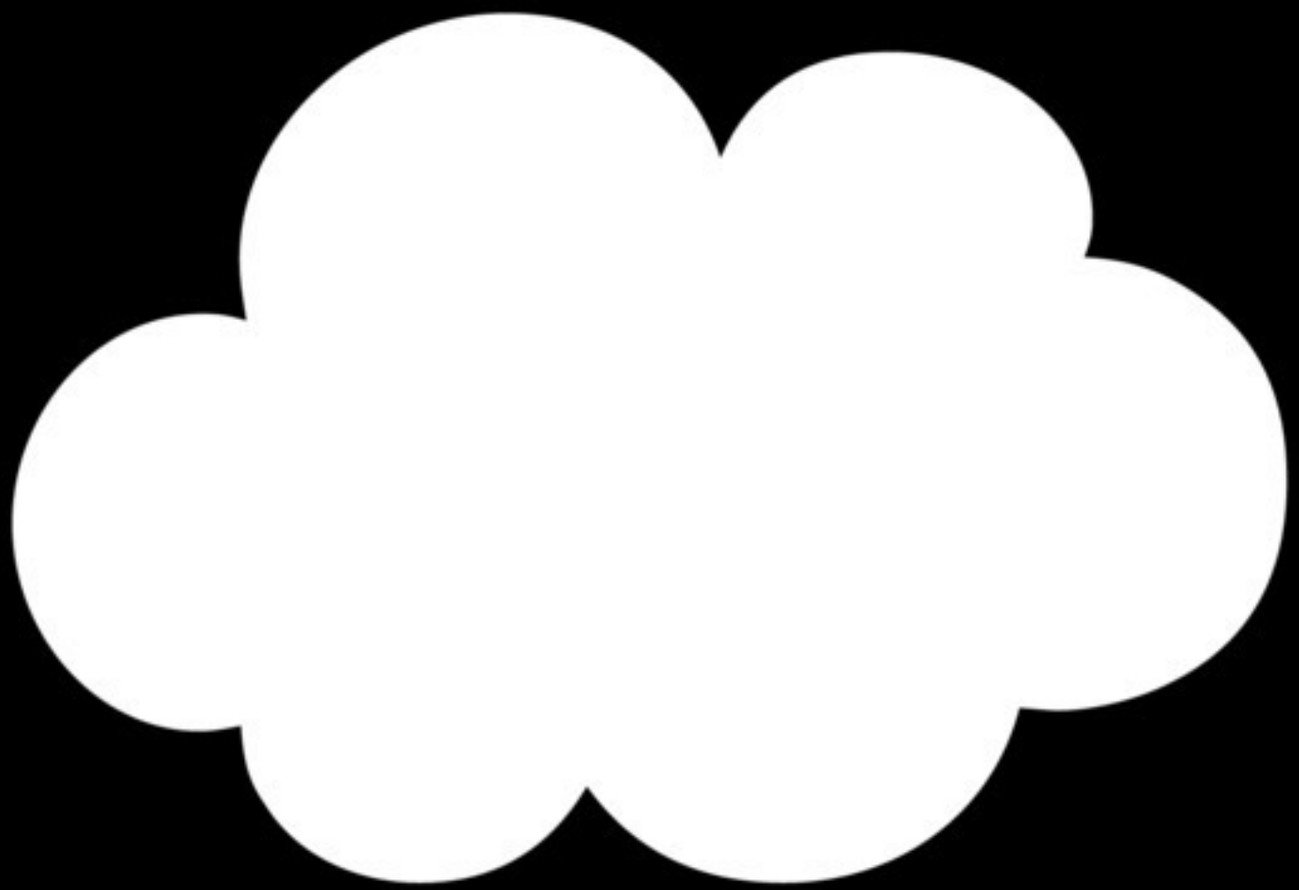
- unsimplified geometries
- all OpenStreetMap tags
- additional properties like changeset, time, and user ids

In combination with a tile based processing framework like Tile Reduce OSM QA tiles allow for fast and parallelized analysis.


STATE OF GEORGIA
CONSTITUTION
WISDOM
JUSTICE
MODERATION
1776

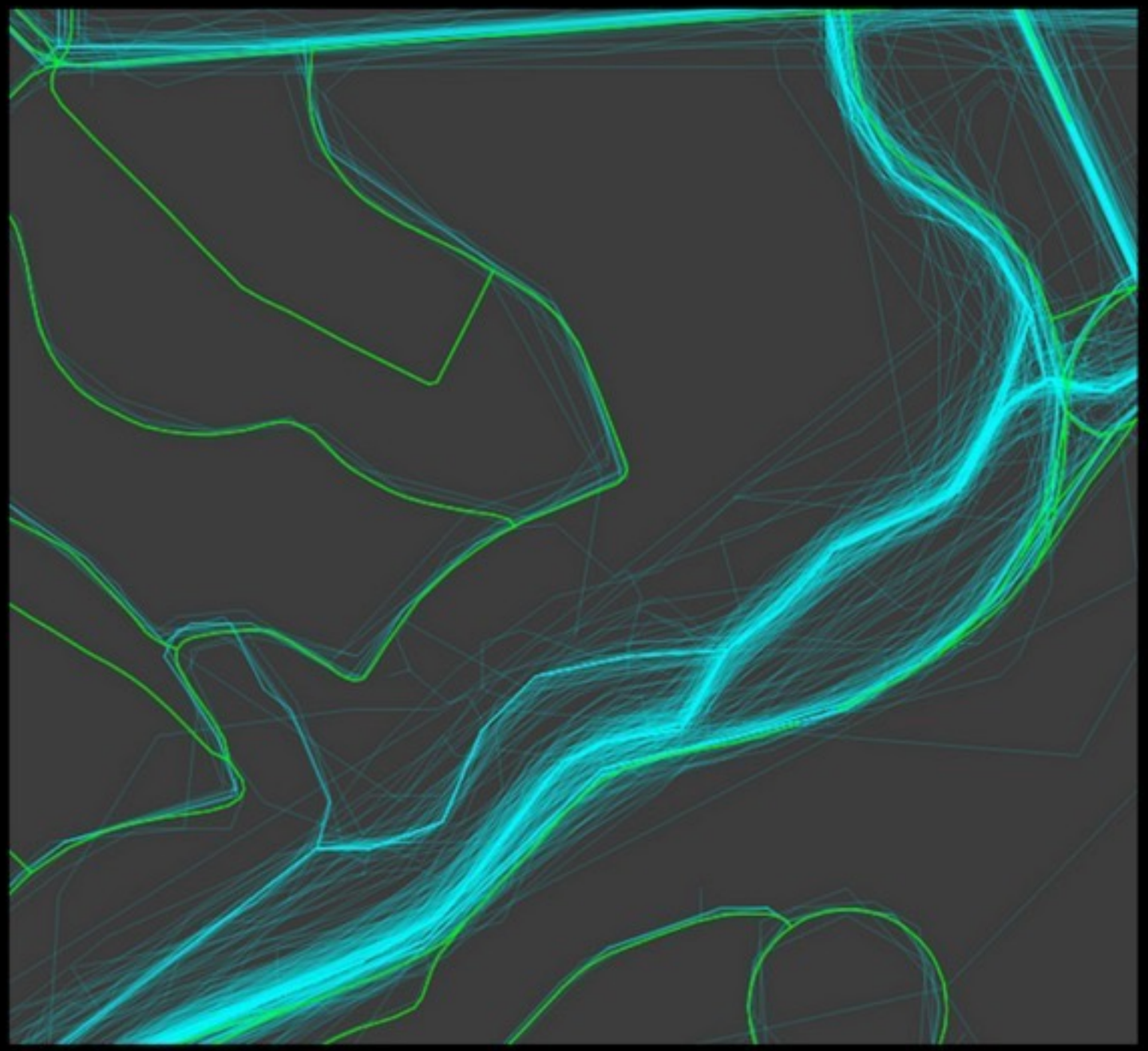
```
var turf = require('turf');

module.exports = function (tileLayers, opts, callback) {

  // initialize per-fruit count-keeping & regex variables
  var fruitCount = {}, regex = {};
  ['apple', 'banana', 'cherry', 'grape', 'lemon', 'orange', 'peach', 'pear', '
    .forEach(function(fruit) {
      fruitCount[fruit] = { km: 0, count: 0};
      regex[fruit] = new RegExp('(^|\\s)' + fruit + '.*', 'i');
    });
  var totalRoads = 0, totalRoadLength = 0;

  // loop through features in this tile layer
  for( var i=0; i < tileLayers.osmdata.osm.features.length; i++ ) {
    var feature = tileLayers.osmdata.osm.features[i];

    // ensure feature is a highway with a name & appropriate geometry
    if (feature.properties.highway && feature.properties.name &&
      (feature.geometry.type === 'LineString')) {

      // calculate length of feature
      var roadLength = turf.lineDistance(feature, 'kilometers');

      // add to totals
```

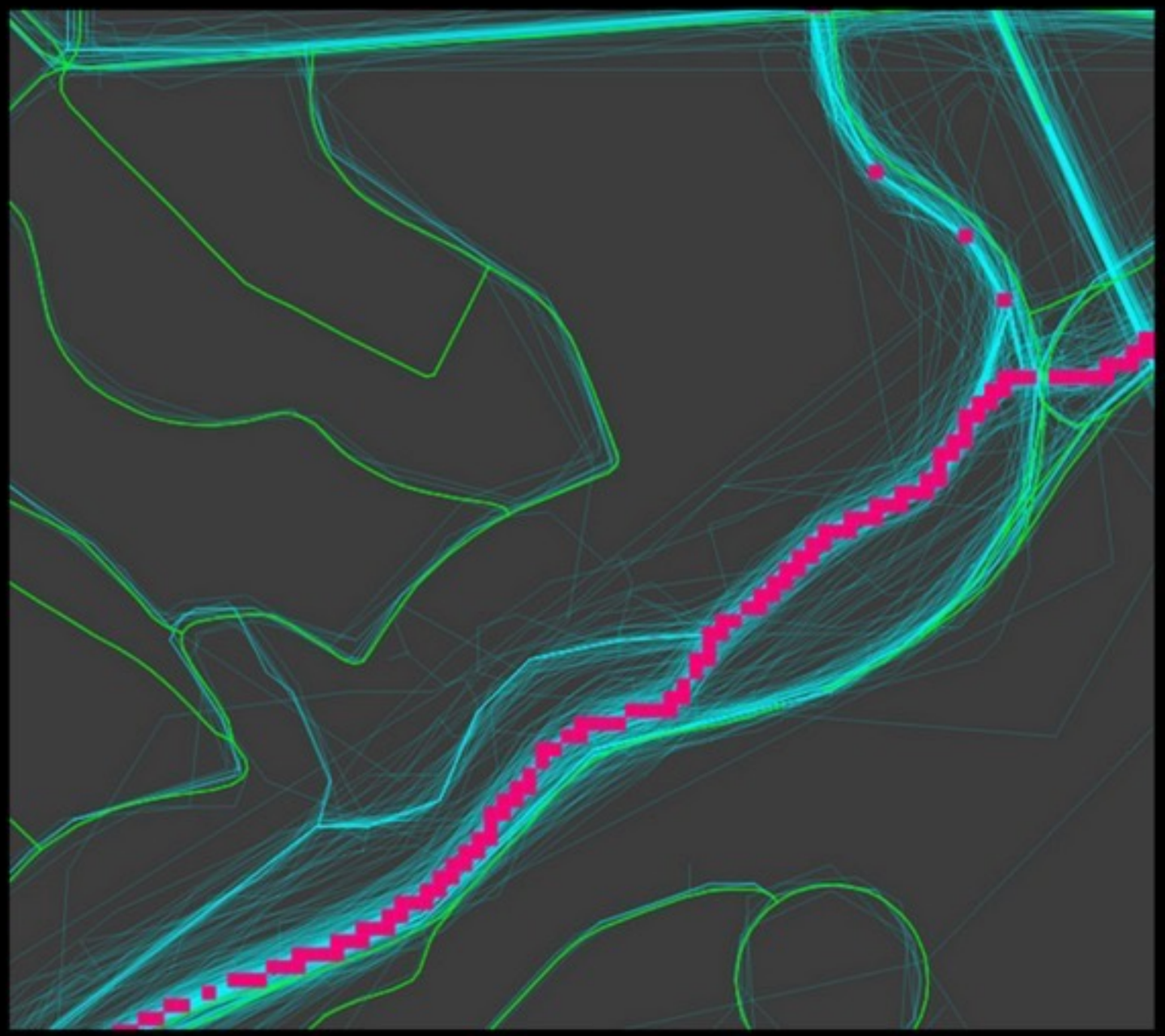
```
var TileReduce = new require('tile-reduce');
var sprintf = require('sprintf');

var opts = {
  map: __dirname + '/fruit.js',
  tileLayers: [
    {
      name: 'osmdata',
      mbtiles: '/Users/tomlee/latest.planet.mbtiles',
      layers: ['osm']
    }
  ],
  zoom: 15
};

var bbox = {
  SF: [-122.66, 37.61, -122.15, 38],
  DC: [ -77.19, 38.79, -76.9, 39 ],
  Atlanta: [ -84.52, 33.61, -84.23, 33.93 ]
};

var tilereduce = TileReduce(bbox.Atlanta, opts);

// called after every calculation
var totals = {};
tilereduce.on('reduce', function(result) {
```

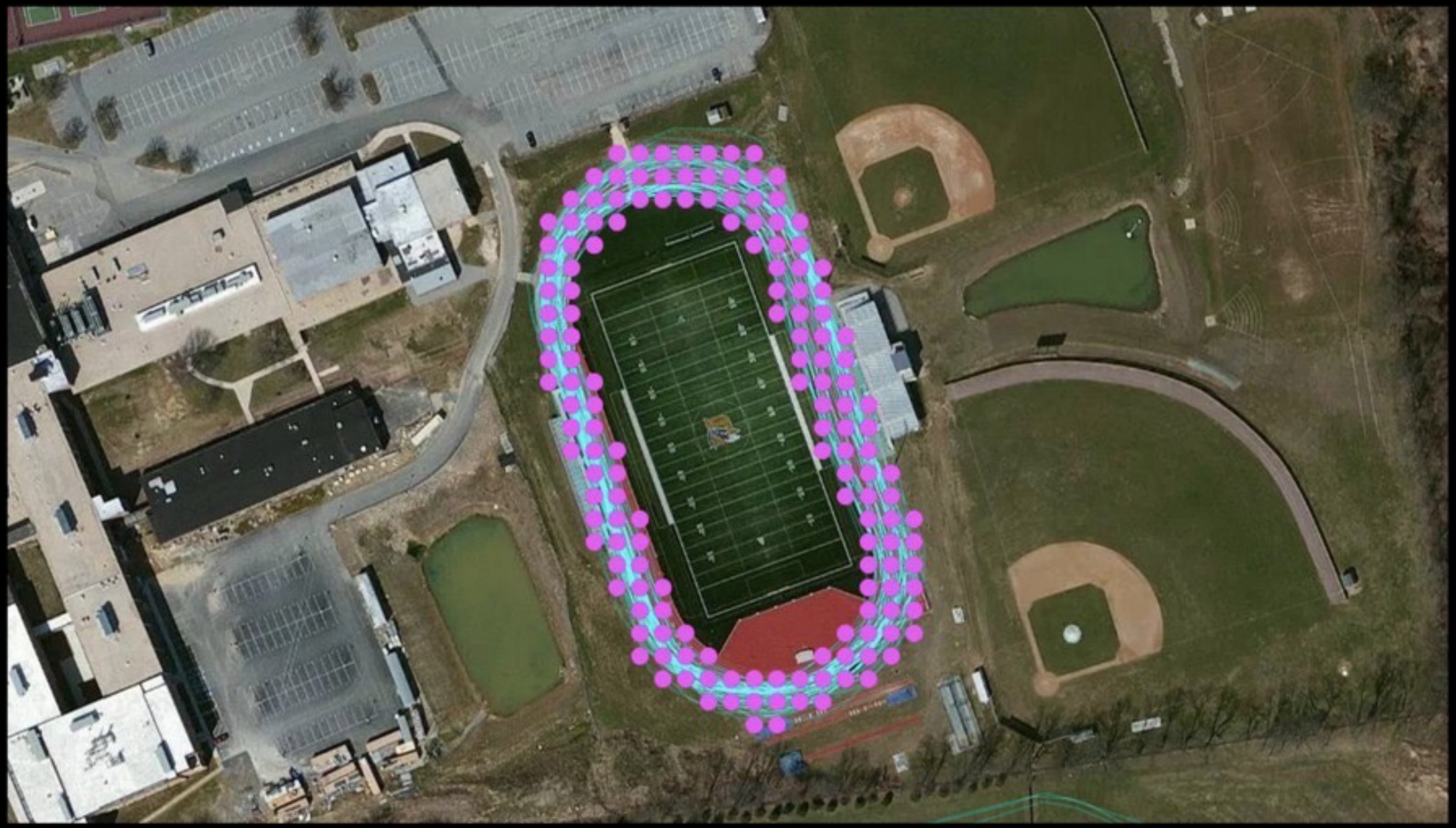


```
 1  [    0.0%]     9  [    0.0%]     17 [    0.0%]     25 [    0.0%]
 2  [    0.0%]     10 [    0.0%]     18 [|   0.7%]     26 [    0.0%]
 3  [    0.0%]     11 [    0.0%]     19 [    0.0%]     27 [    0.0%]
 4  [    0.0%]     12 [    0.0%]     20 [    0.0%]     28 [    0.0%]
 5  [    0.0%]     13 [    0.0%]     21 [    0.0%]     29 [    0.0%]
 6  [    0.0%]     14 [    0.0%]     22 [    0.0%]     30 [    0.0%]
 7  [    0.0%]     15 [    0.0%]     23 [    0.0%]     31 [    0.0%]
 8  [|   0.7%]     16 [    0.0%]     24 [    0.0%]     32 [    0.0%]
Mem[|||                807/60387MB]  Tasks: 42, 71 thr; 1 running
Swp[                         0/0MB]  Load average: 0.15 0.15 0.08
                                     Uptime: 00:07:45
```


Marina District
Russian Hill
Chinatown
Seacliff
Presidio Terrace
Lower Pacific Heights
Richmond District
San Francisco
South Beach
Haight-Ashbury
Inner Sunset
Mission District
Potrero Hill
Doelger City
Noe Valley
Forest Hill
Saint Francis Wood
Bayview District
Ingleside
BALBOA ST
LINCOLN WAY
JUDAH ST
NORIEGA ST
TARAVAL ST
SLOAT BLVD
OCEAN AVE
GREAT HWY
EVANS AVE
SILVER AVE
PINE ST
BUSH ST
CALIFORNIA ST
200 m








LOFTY MAPLES TRAIL
LOFTY MAPLES TRAIL
WILLOW TERRACE DR
WILLOW TERRACE DR
CHESTNUT GROVE LN
CHESTNUT GROVE LN
SCENIC SHORE DR
BROOKSIDE PINE LN
SCENIC SHORE DR
SCENIC SHORE DR
SCENIC SHORE DR
ELMWOOD HILL LN

free & open source

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