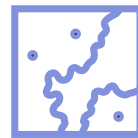




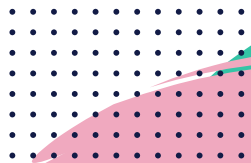
A Developer's Guide to Open Source Web Mapping Libraries



Courtney Yatteau

← Add to our audience map!

Add your name, choose pin and map
style, then search for a location



Courtney Yatteau

Developer Advocate, Esri



c_yatteau



c_yatteau

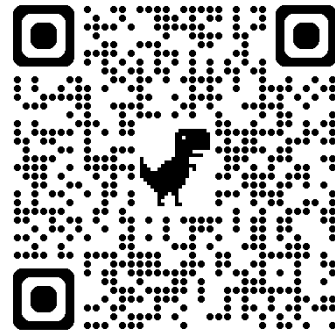


cyatteau



courtneyyatteau

Agenda



github.com/cyatteau/oredev25-open-source-mapping

01

Intro to Mapping

Vocab, concepts, etc.

02

Web Mapping Libraries

Two different open source options

03

Other Library Integrations

Using third-party plugins

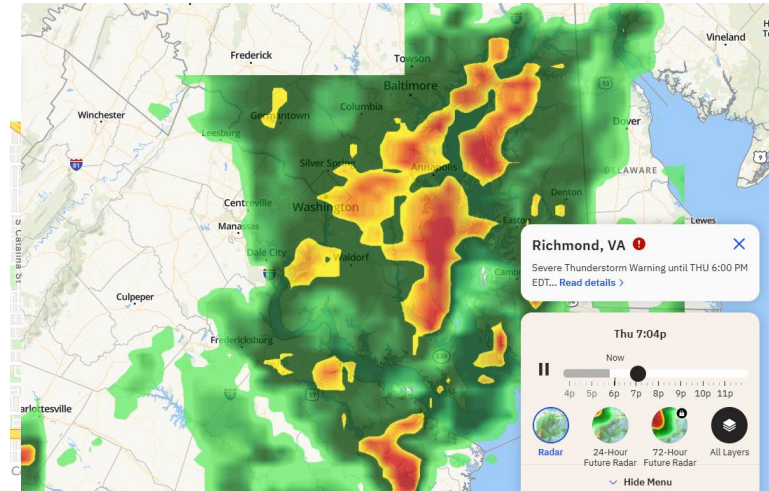
04

Conclusions

Real-world examples and summaries

Role of Mapping

- 01 Visualization 🎨
- 02 Navigation 🚗
- 03 Communication 🗣️
- 04 Prediction 🌌



Key Web Mapping Concepts



Basemaps

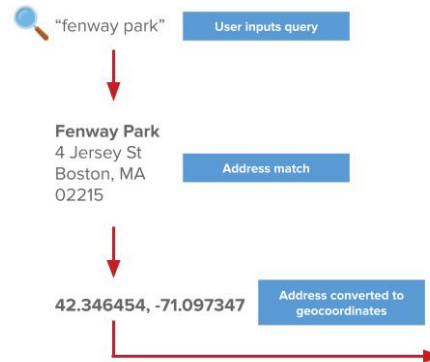


Data Layers



Geocoding

Geocoding



Basemap Formats

Raster Tiles

- Fixed look
- Quick and easy
- Reliable in low bandwidth

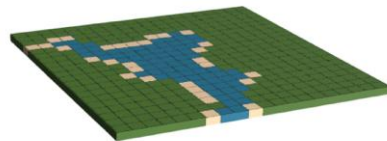
Vector Tiles

- Customizable
- Smooth and interactive
- Efficient on various devices

Real World



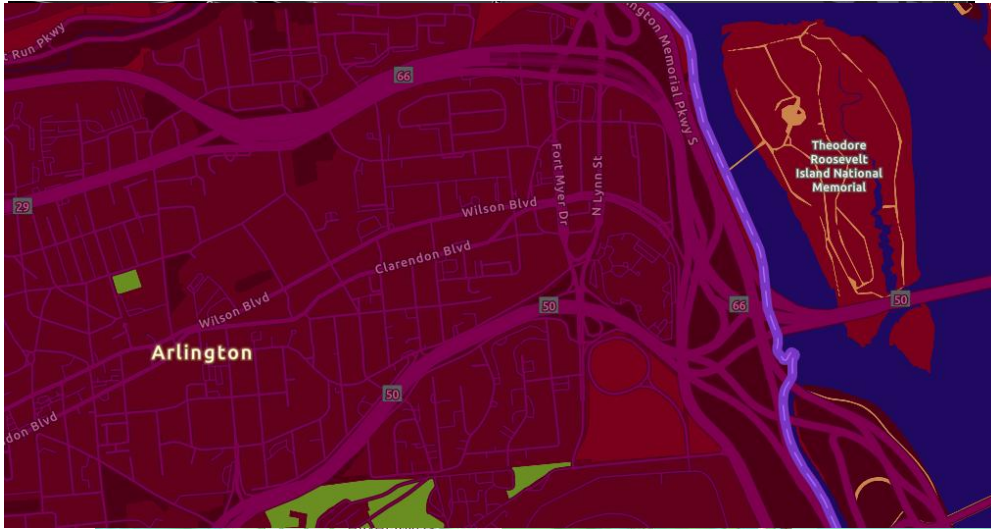
Raster/Image



Vector



Basemap Styles



Streets



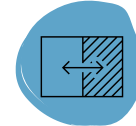
Satellite Imagery



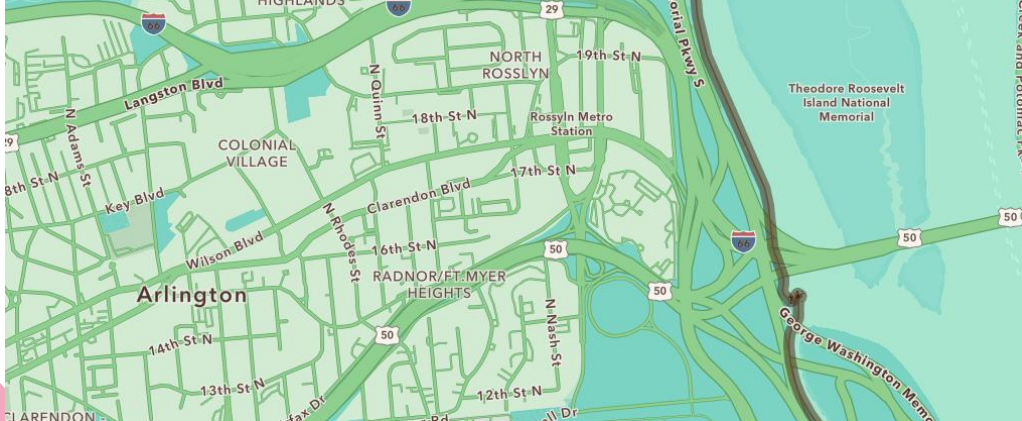
**Terrain/
Topographic**



**Dark/Light
Modes**



**Custom
Themes**



Data Layer Types

01

GeoJSON Layer

02

Esri Feature Layer

03

Vector Tile Layer

```
{
  "currentVersion": 11.2,
  "name": "Educational_Institutions_of_Colombia",
  "capabilities": "TilesOnly,Tilemap",
  "type": "indexedVector",
  "serviceItemId": "89a416863d324250b84e4bf95a4a76fe",
  "publishJobId": "90bc7681-d478-49a9-93db-5012ea095490",
  "jobServiceId": "453a16cb-0963-40e4-b863-07d0c8745a0b",
  "ownerUserName": "",
  "serviceDescription": "",
  "description": "",
  "isEnabled": true,
  "id": 3219,
  "sourceServiceName": "Educational_Institutions_of_Colombia",
  "sourceServiceType": "FeatureServer",
  "tileContainerName": "fabd007f6da142d99b9a8bed9a0272f9",
  "creationDate": 1731431561310,
  "datasource": "db",
  "exportTilesAllowed": false,
  "maxExportTilesCount": 100000,
  "tileMap": "tilemap",
  "defaultStyles": "resources/styles",
  "tiles": [ ... ], // 1 item
  "initialExtent": { ... }, // 5 items
  "fullExtent": { ... }, // 5 items
  "minScale": 295828763.795777,
  "maxScale": 35.265536760789715,
  "maxZoom": 23,
  "tileInfo": { ... }, // 8 items
  "resourceInfo": {
    "styleVersion": 8,
    "tileCompression": "gzip",
    "cacheInfo": { ... } // 1 item
  }
}
```

Library Commonalities

Core Tech

- Built on JavaScript
- Compatible with HTML & CSS
- Works across modern browsers

Open Source

- Cost-Effectiveness
- Community-driven
- Modifiable
- Interoperable

Easy to Learn

- Simple APIs
- Extensive documentation
- Abundance of Resources

Key Features

- Interactive & mobile friendly
- Customizable
- Web Mercator projection

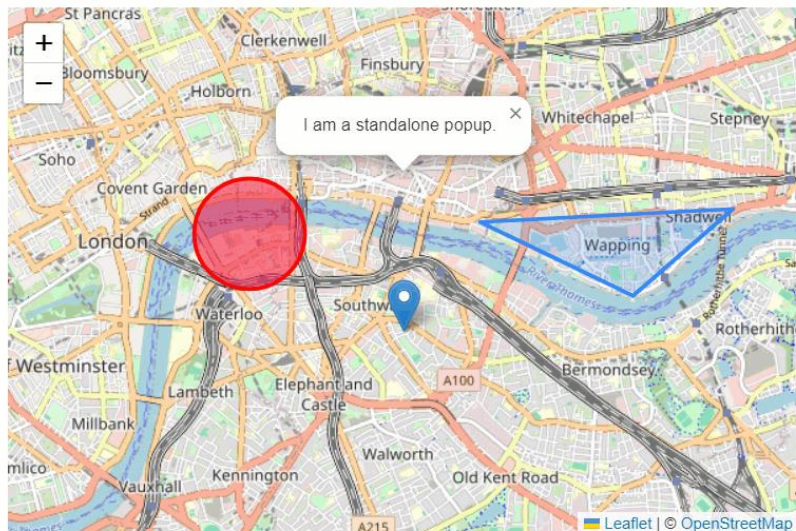
Leaflet



leafletjs.com



github.com/Leaflet



- Lightweight (~42 KB JS)
- Tons of plugins
- Focuses on simplicity and performance

Esri Leaflet



developers.arcgis.com/esri-leaflet



github.com/Esri/esri-leaflet

Esri/**esri-leaflet**

A lightweight set of tools for working with ArcGIS services in Leaflet. 🚀



89
Contributors

5k
Used by

2k
Stars

795
Forks



- Seamless ArcGIS integration
- Developer-friendly
- Extensive Documentation

ArcGIS REST JS



developers.arcgis.com/arcgis-rest-js



github.com/Esri/arcgis-rest-js

Esri/**arcgis-rest-js**

compact, modular JavaScript wrappers for the
ArcGIS REST API



 71
Contributors

 386
Used by

 3
Discussions

 359
Stars

 123
Forks



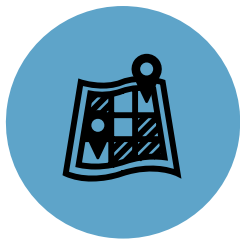
- Wrapper for ArcGIS REST APIs
- Module & promise-based
- No map component

Leaflet Demos



- 1) Simple map
- 2) GeoJSON layer
- 3) Feature layer
- 4) Feature layer
Geosearch
- 5) Places Service

Leaflet Demos Takeaways



Demo 1: Simple Map

- Basemap - image tiles
- Small geoJSON layer



Demo 2: Large Data Sets

- Feature Layers – load to extent
- Clustering features



Demo 3: Geosearch

- Search with providers and set parameters

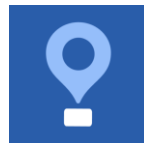


Demo 4: Places Service

- On-demand place search
- Near-point or extent



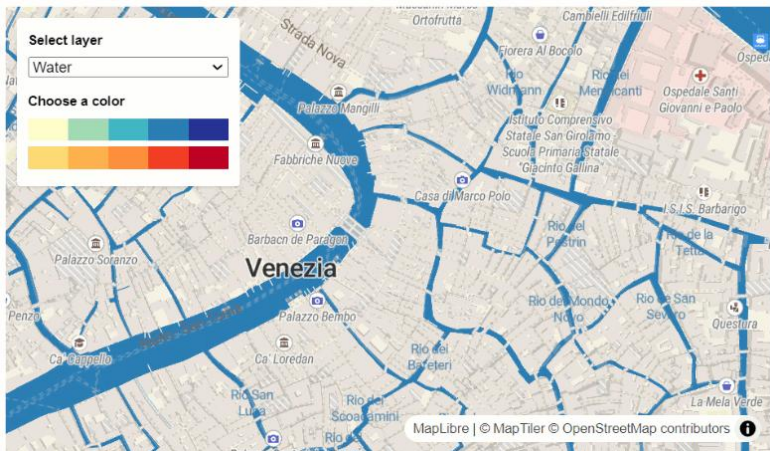
MapLibre GL JS



maplibre.org



github.com/maplibre/maplibre-gl-js



- Fork of Mapbox GL JS 1.x
- WebGL rendering
- Dynamic data integration
- Customizable styling options

MapLibre ArcGIS Plugin



developers.arcgis.com/maplibre-gl-js



github.com/Esri/maplibre-arcgis

MapLibre GL JS and ArcGIS

This guide covers how to build mapping applications with MapLibre GL JS and ArcGIS. It shows you how to use the [MapLibre ArcGIS plugin](#) and [ArcGIS REST JS](#) to access [location services](#), [data services](#), and the [spatial analysis service](#).

What's in this guide

Learn how to

- Display basemap styles
- Create custom styles
- Migrate Mapbox apps and data
- Display feature, vector tile, and map tile data
- Geocode, route, and find places
- Perform mapping and analysis operations

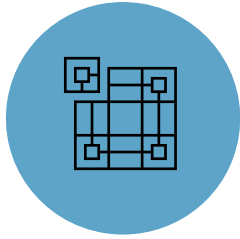
- Easy access to ArcGIS:
 - Basemap Styles service
 - feature services
 - vector tile services

MapLibre GL JS Demos



- 1) Simple map + styles
- 2) Feature layer
 - Clustering
 - Querying
- 3) Vector tile layer
- 4) Data Enrichment

MapLibre GL JS Demos Takeaways



Demo 1: Simple Map + Styles

- Basemap - vector tiles
- Various styles



Demo 2: Feature Layer

- Pagination
- Querying



Demo 3: Vector Tile Layer

- Handle large datasets

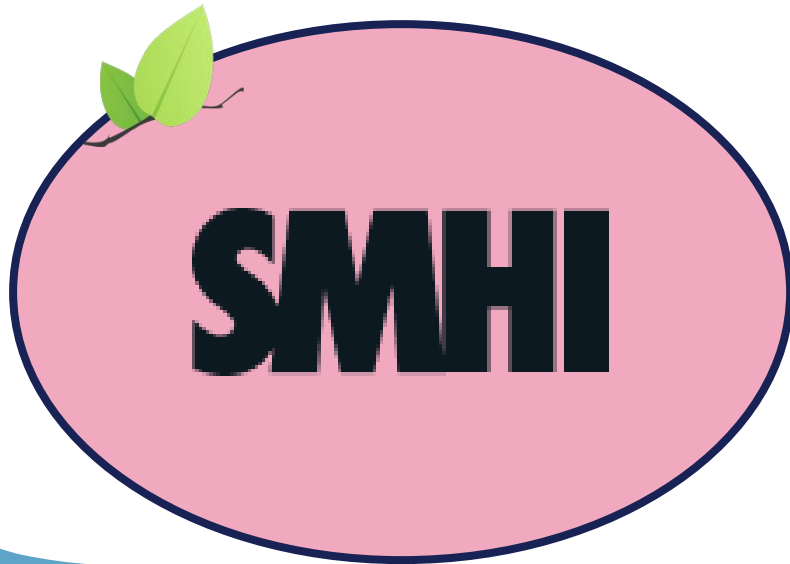


Demo 4: Data Enrichment

- Gain location-based insights



Real-World Examples



Conclusions



Leaflet

Pros

- Lightweight, easy
- Many plugins

Cons

- Limited for large datasets
- Simple visualizations



MapLibre GL JS

Pros

- Large dataset handling
- vector basemaps

Cons

- Resource-intensive

Additional Resources

- [Leaflet basemap styles providers](#)
- [Malmo's open data portal](#)
- [ArcGIS Hub \(open data\)](#)
- [Analysis Variable Finder](#)

Thank you, Øredev!

Courtney Yatteau

  c_yatteau

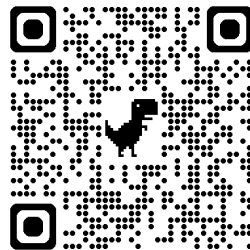
 courtneyyatteau

 cyatteau



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Please leave your feedback!



github.com/cyatteau/oredev25-open-source-mapping