Using Open Source Mapping Libraries with Esri's Location Services

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2023 ESRI USER CONFERENCE

Welcome!

What will we discuss?

- Open source JavaScript libraries for web mapping
- ArcGIS location services (geocoding, routing, etc)
- Open source demo apps

- Slides + all code examples are posted on GitHub
- https://github.com/EsriDevEvents/open-source-mapping-with-location-services-2023

Open source mapping libraries

What JavaScript libraries support location services?

- Esri Leaflet
- MapLibre GL JS
- OpenLayers
- CesiumJS

Access ArcGIS location services

ArcGIS location services

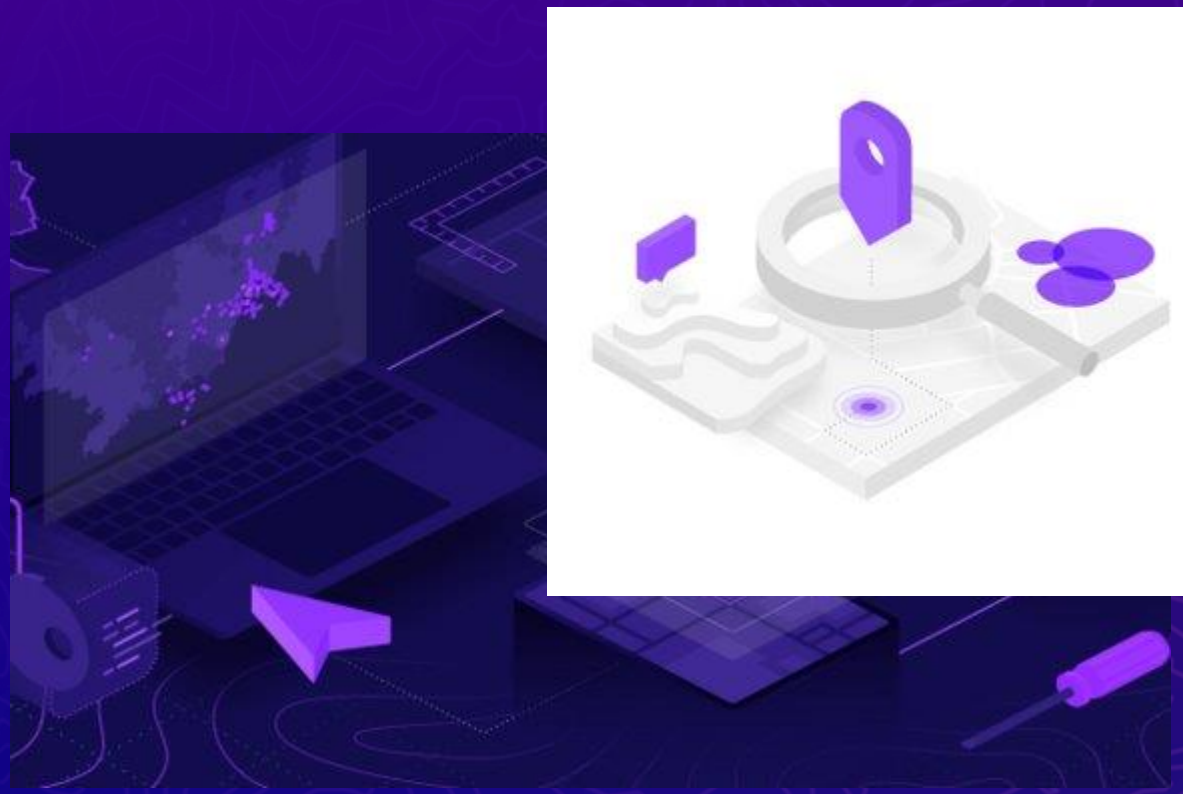
What services are available?

Ready-to-use services

- Basemap layers
- Geocoding
- Routing
- GeoEnrichment
- Places
- Spatial analysis

Data hosting services

- Features
- Vector tiles
- Image tiles



Get started

Access location services in any open source mapping library

1. Log in to an ArcGIS account
2. Get an access token
3. Use ArcGIS REST JS to access services
4. Display results with a mapping library

To learn more, go to developers.arcgis.com/documentation

ArcGIS REST JS

Easily make service requests

- Open source JavaScript library for accessing location services
- Make service requests using built-in functions
- Authenticate requests using access tokens

```
const authentication = arcgisRest.ApiKeyManager.fromKey(apiKey);

arcgisRest
  .queryFeatures({
    url: "https://services3.arcgis.com/GVgbJbqm8hXASVYi/arcgis/rest/services/LA_County_Parcels/FeatureServer/0",
    where: "UseType = 'Residential'",
    resultRecordCount: 1,
    authentication
  })
```

Using ArcGIS REST JS to query a feature service, and authenticating the request with an API key

Authentication

Required to access ArcGIS services

- All service requests must be authenticated with an *access token*
- Access token: an API key or OAuth2 token
- Requires either an ArcGIS Developer account or an ArcGIS Online account
- Requests consume dollars or credits on the linked account

```
const apiKey = "YOUR_API_KEY";

const authentication = arcgisRest.ApiKeyManager.fromKey(apiKey);
```

```
ArcGISIdentityManager.beginOAuth2({
  clientId: clientId,
  redirectUri: redirectUri,
  popup: true
})
```

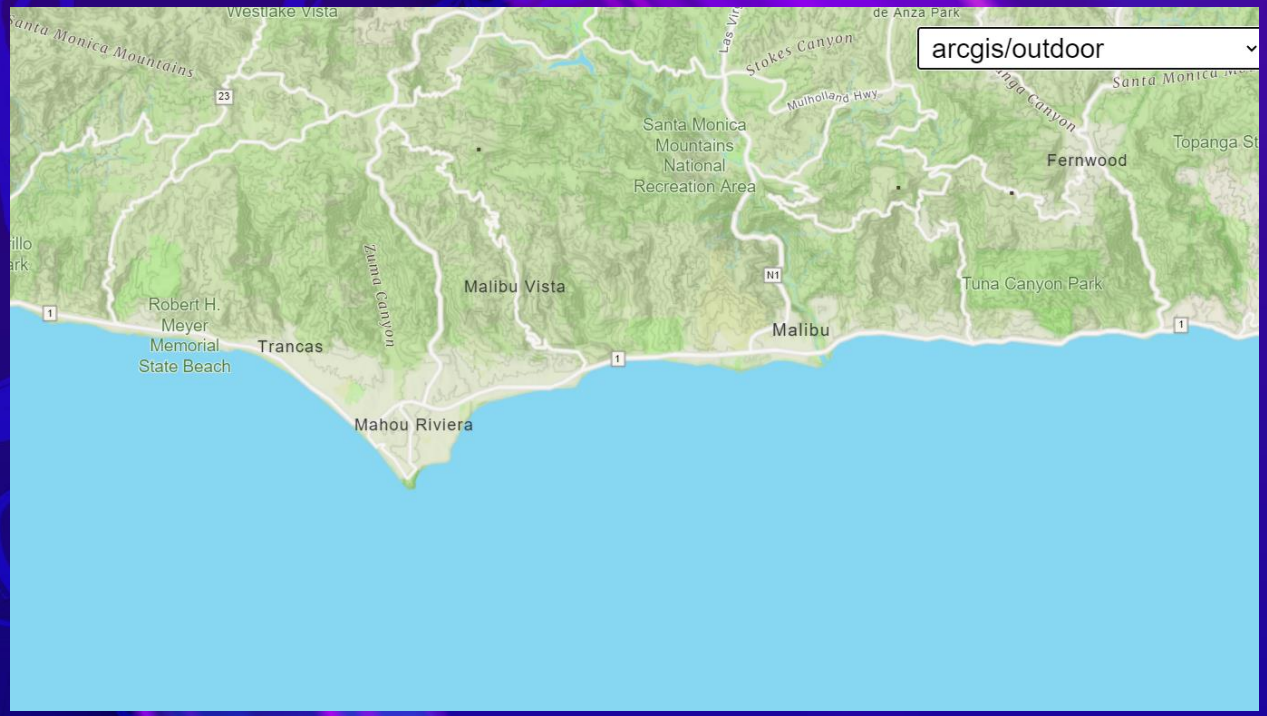
Location service rundown

+ Demo apps!

Basemap styles service

Add context and style to your maps

- Provides the foundation for your maps
  - Imagery, borders, labels, detail, etc
- Many different styles and languages available
- Customize styles with the Vector Tile Style Editor



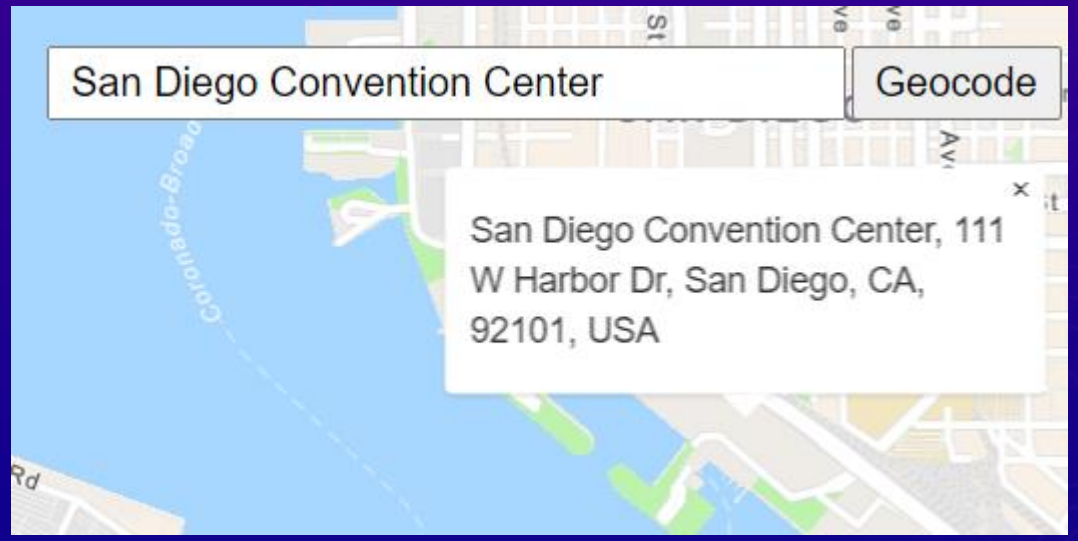
Display a map

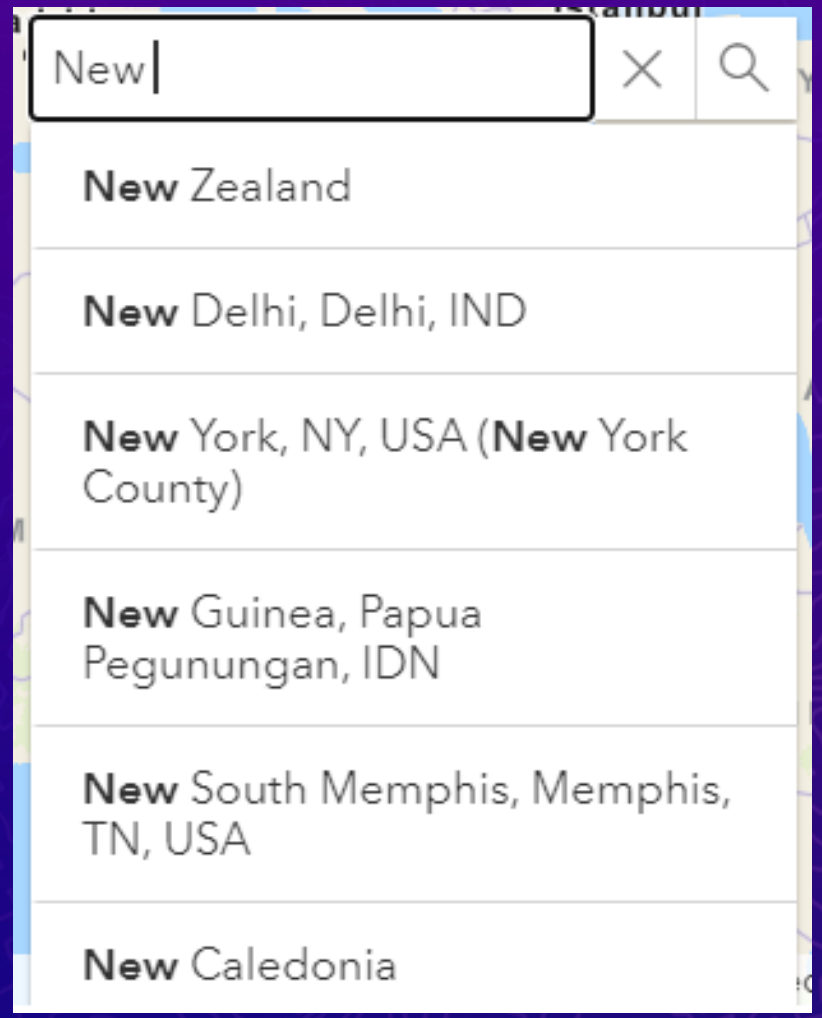
OpenLayers, Basemap styles service

Geocoding service

Match an address and coordinates

- Find a location from an address (Geocode)
- Find addresses from a location (Reverse Geocode)
- Autosuggest results

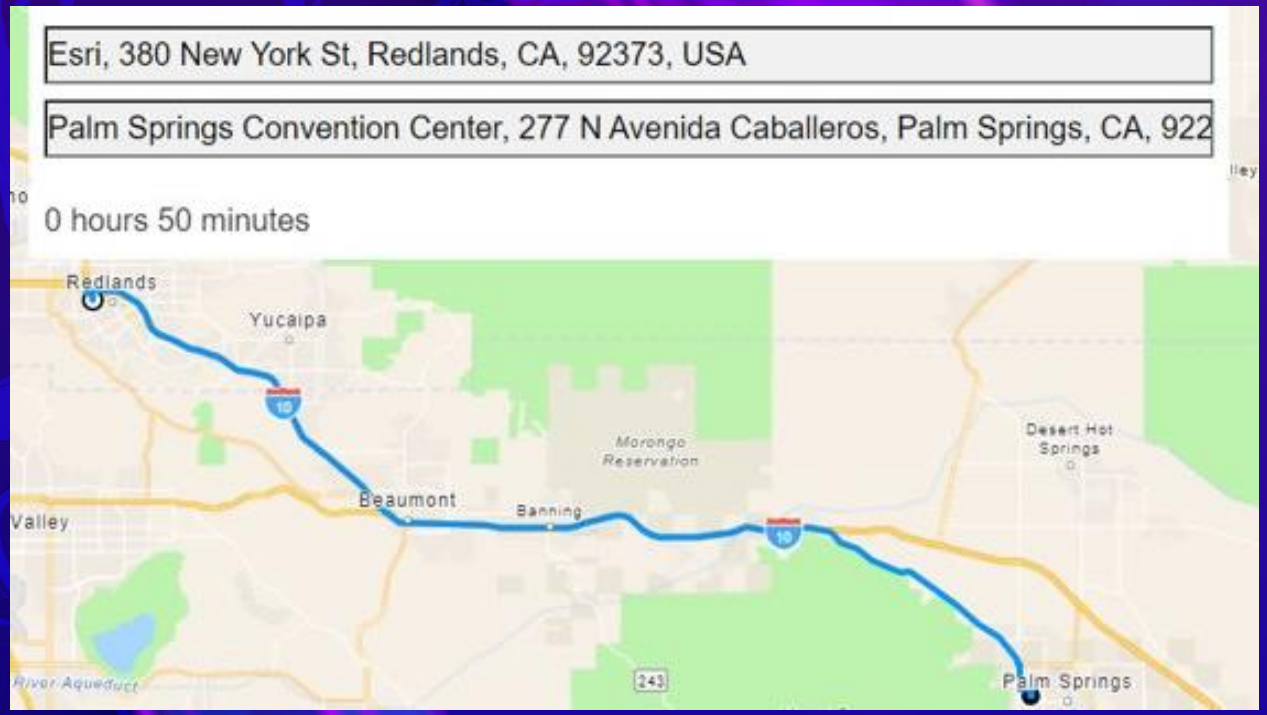




Routing service

Analyze transportation networks

- Find a walking/driving route between points
- Calculate optimized routes between many points
- Find service areas, perform fleet routing, etc



Navigation application

OpenLayers, geocoding service, routing service

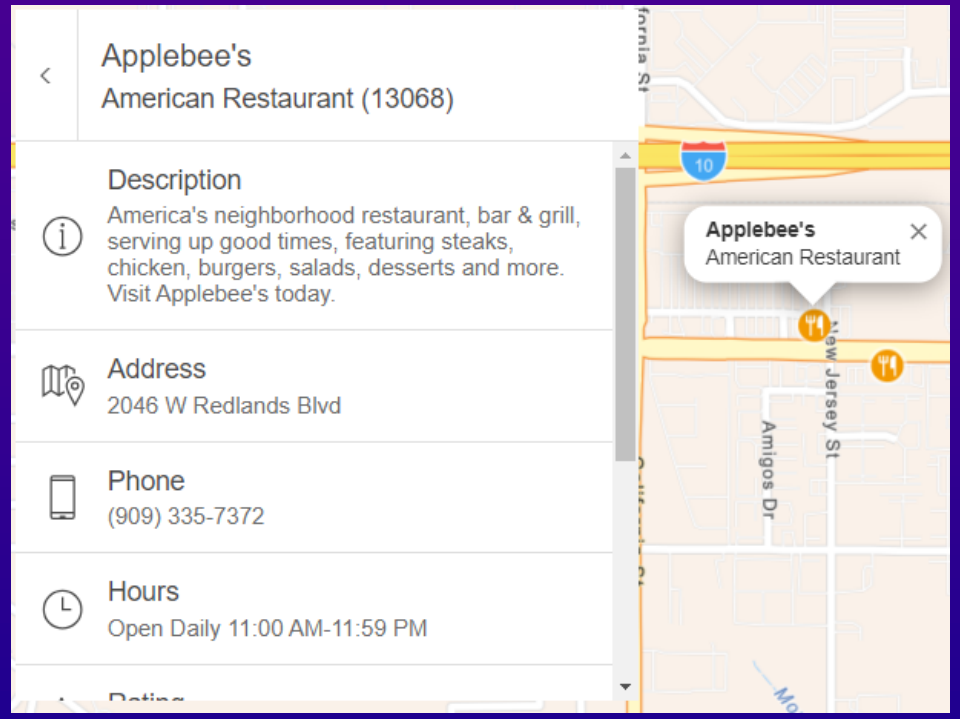
Places service (Beta)

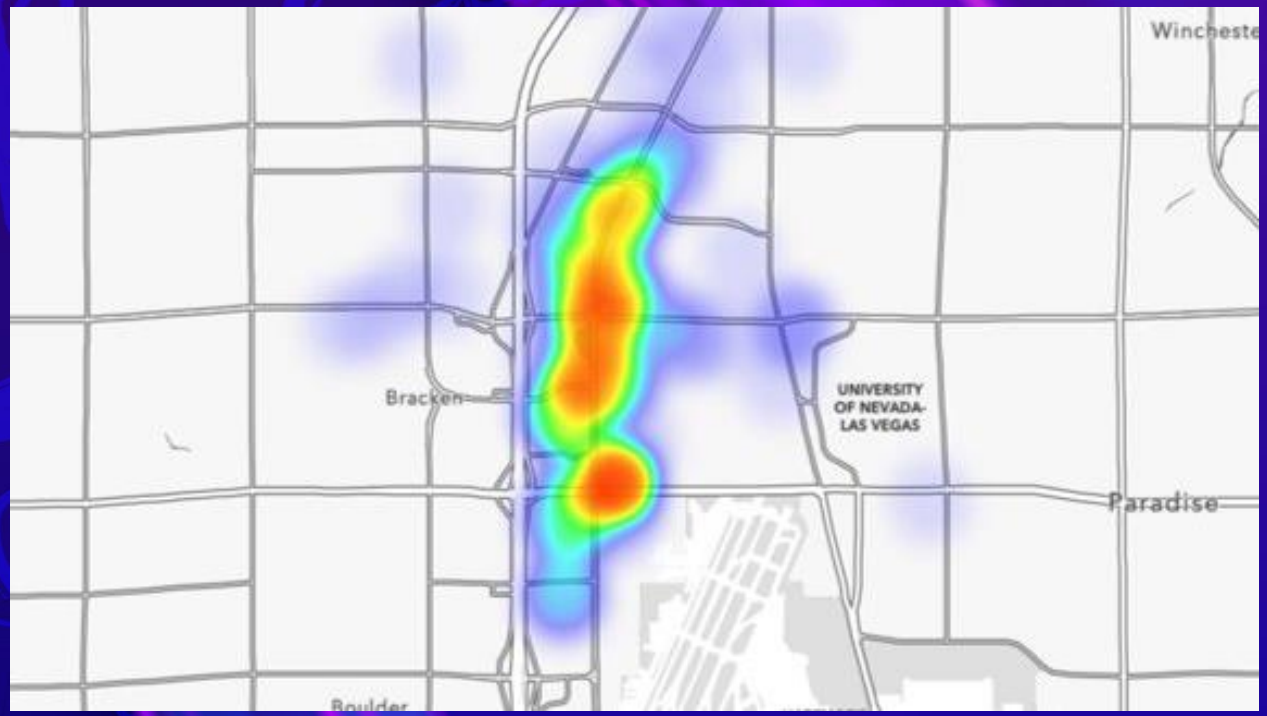
Find POI data

- Find points of interest (POI) in an area
- Get detailed information about places:

  e.g. description, hours, website, reviews, etc

- Esri Leaflet demo (beta)





Vegas nightlife

Esri Leaflet, places service

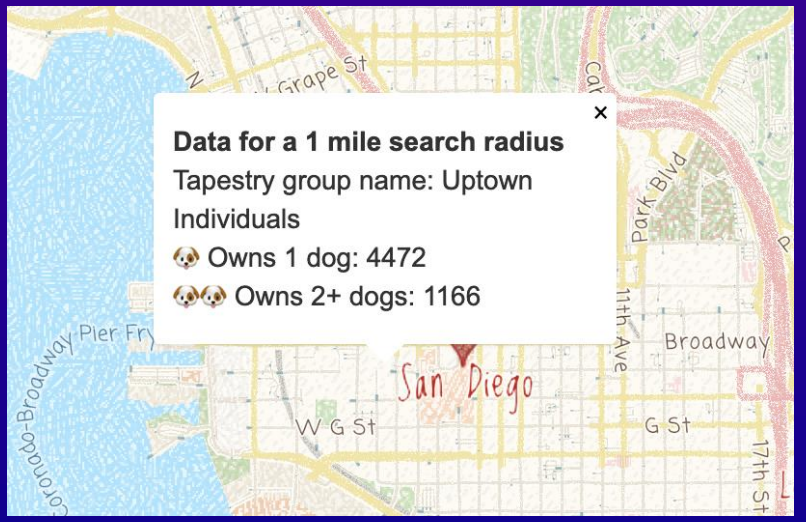
GeoEnrichment service

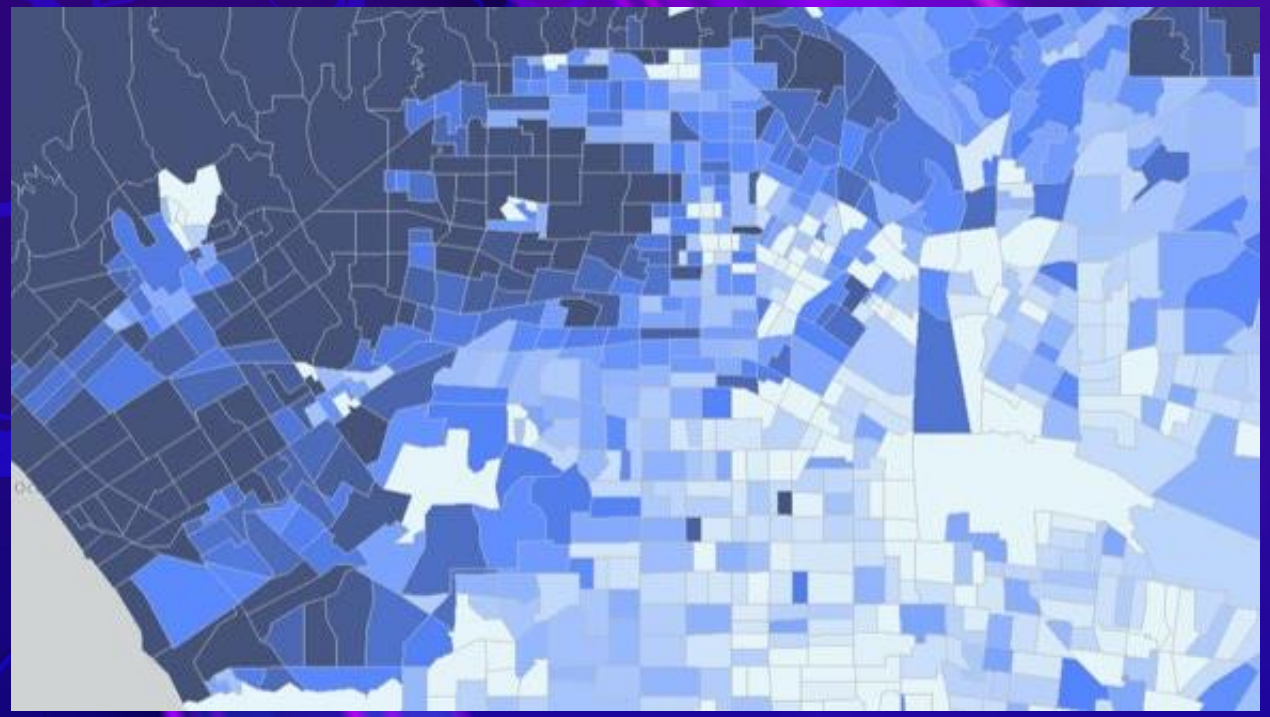
Perform data enrichment to discover information

- Get demographic data for a study area
- Key global facts available almost everywhere
- Detailed local data (over 15,000 variables) in select countries

Analysis Variable Finder

MapLibre GL JS tutorial: Get global data





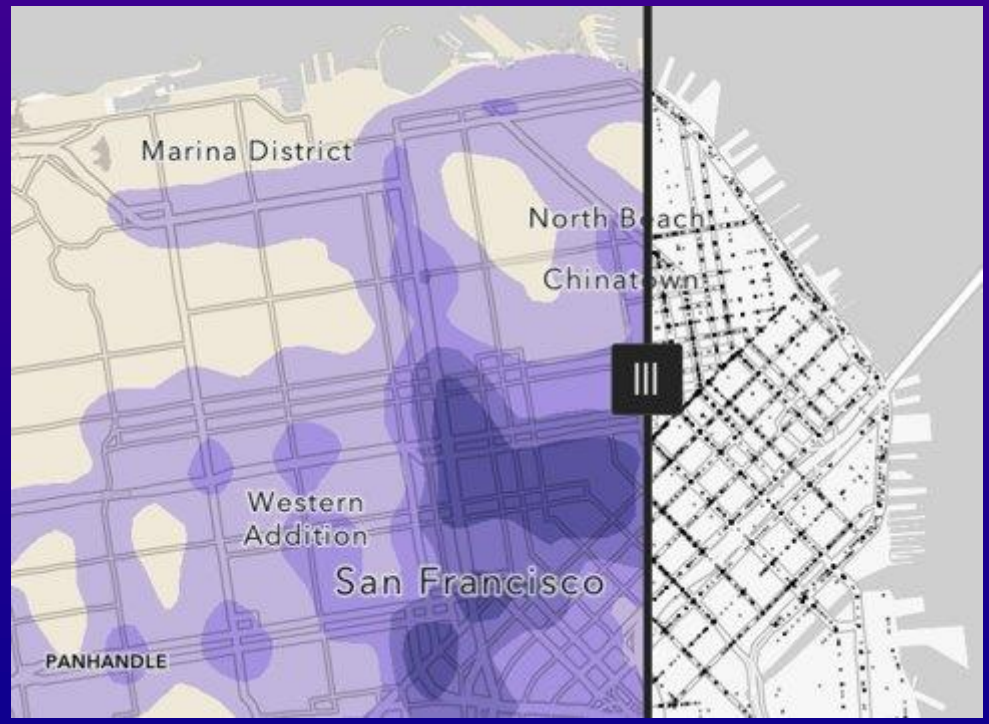
Layer enrichment

MapLibre GL JS, GeoEnrichment (Esri Advanced Demographics)

Spatial analysis service

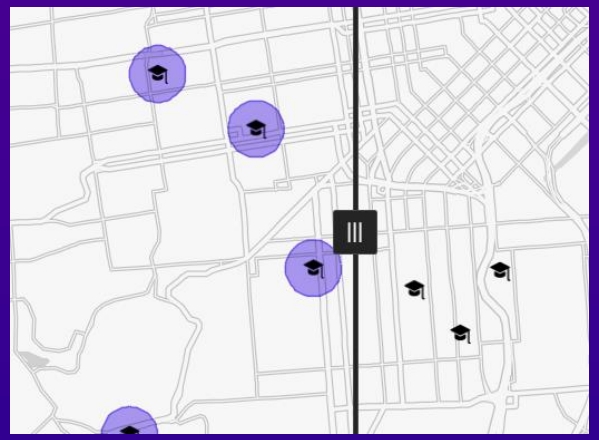
Perform analysis on feature data

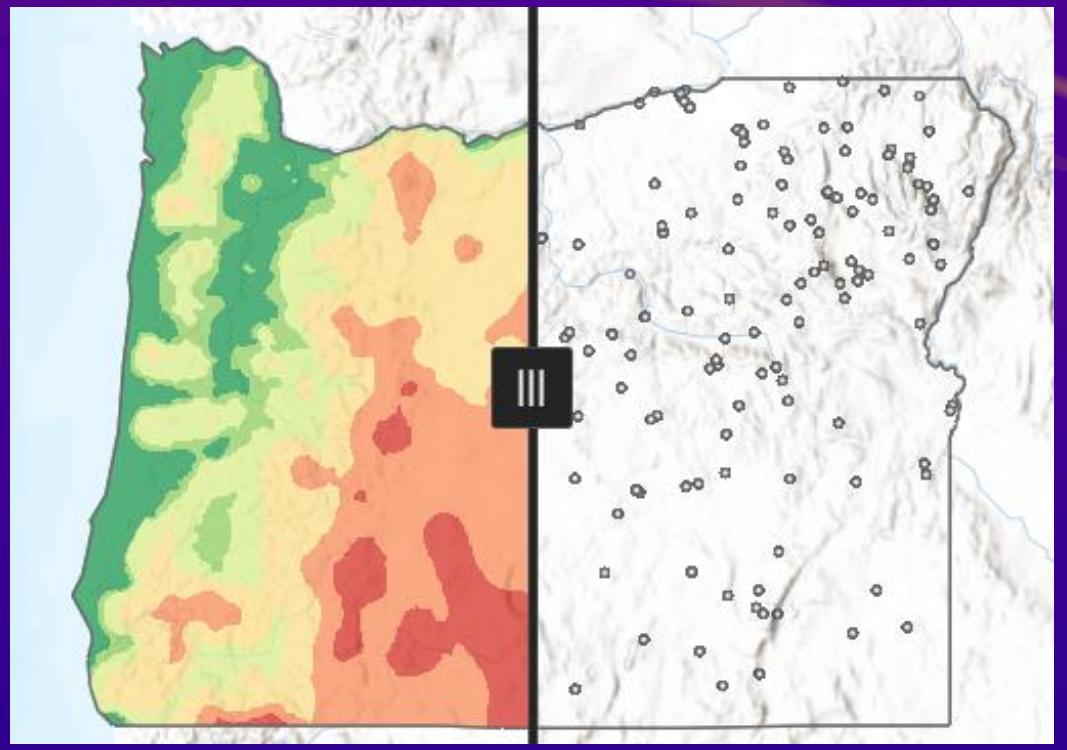
- Analyze feature layers to solve problems
- Perform many different types of involved analyses
- Only available for Online / Enterprise users

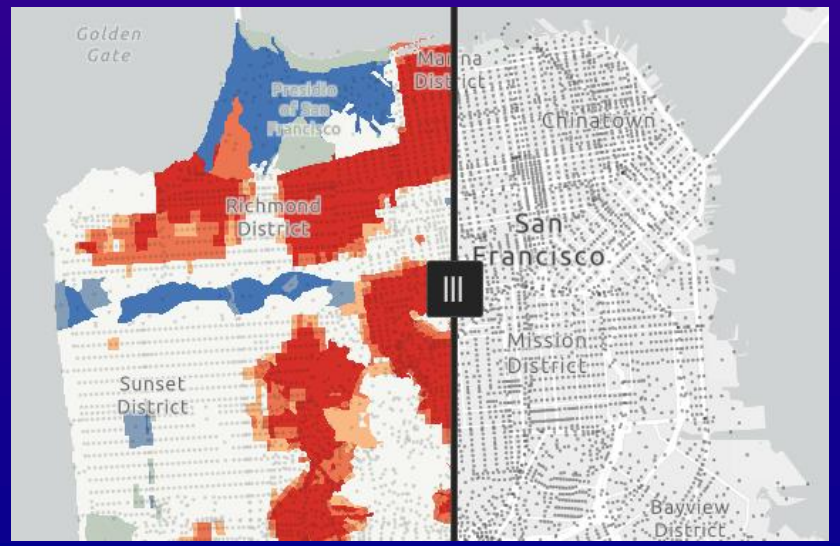


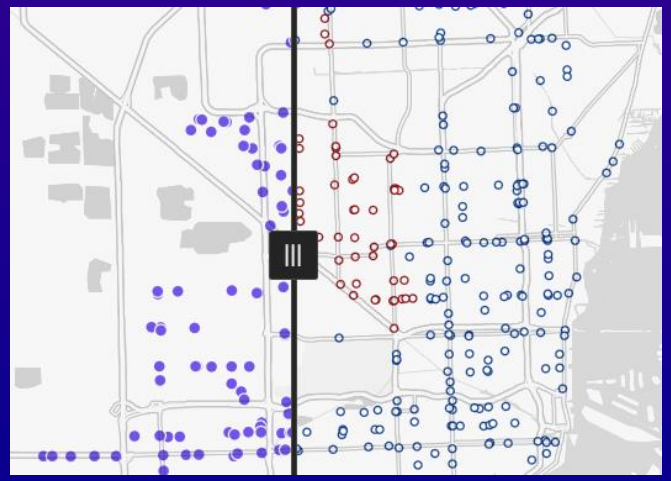
Spatial analysis service

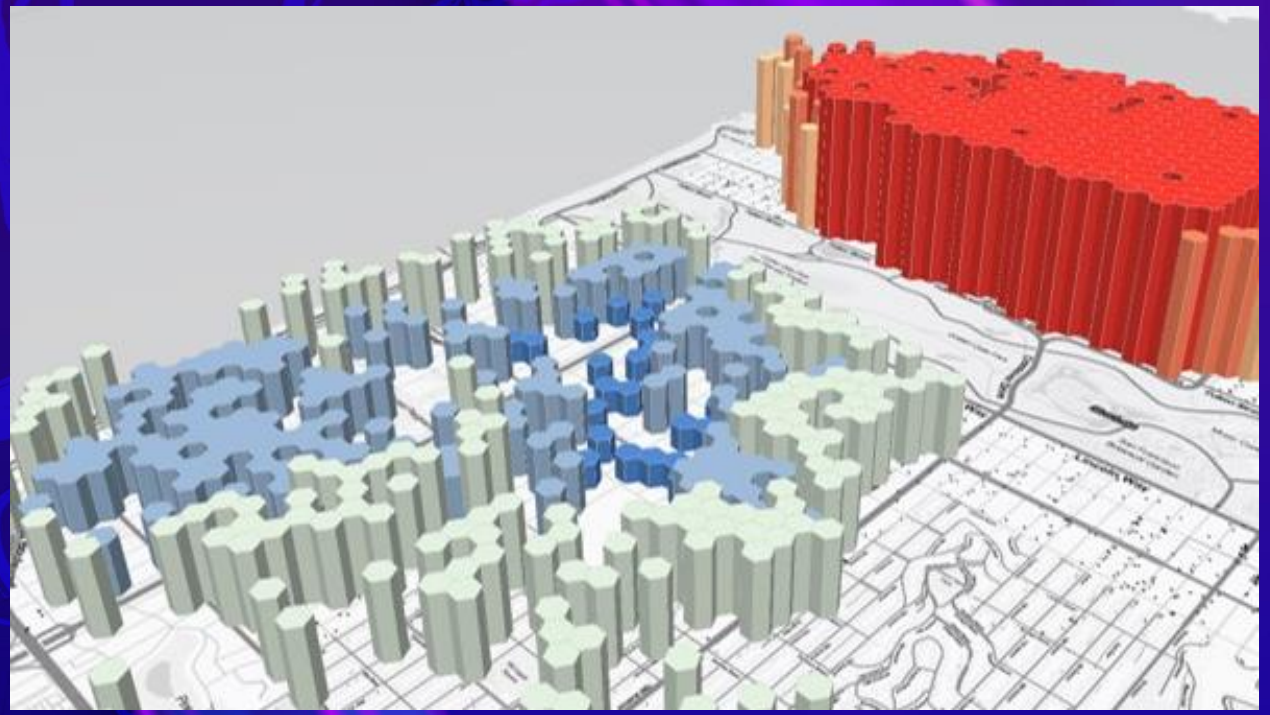
Perform analysis on feature data











Hot spot analysis

CesiumJS, spatial analysis service

Takeaways

Open Source vs Maps SDK for JavaScript

- Might use open source if:
  - Use specific parts of the open source ecosystem
  - Existing application written in an open source library
  - Have a mandate to use open source tools

- Consider Maps SDK for JavaScript if:
  - You use web maps
  - Need to display large (10k+) datasets
  - Work in non-Mercator projections
  - Integrate with ArcGIS user content

Takeaways

What have we learned today?

- Esri is committed to supporting open source!
- Use ArcGIS REST JS to access location services

- We currently support Esri Leaflet, MapLibre GL JS, OpenLayers, and CesiumJS
- Some differences between the libraries, choose based on your use case
- https://github.com/EsriDevEvents/open-source-mapping-with-location-services-2023

Questions?

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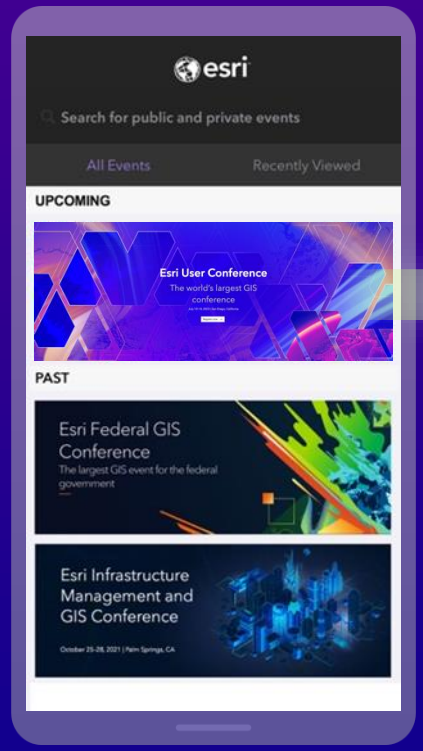
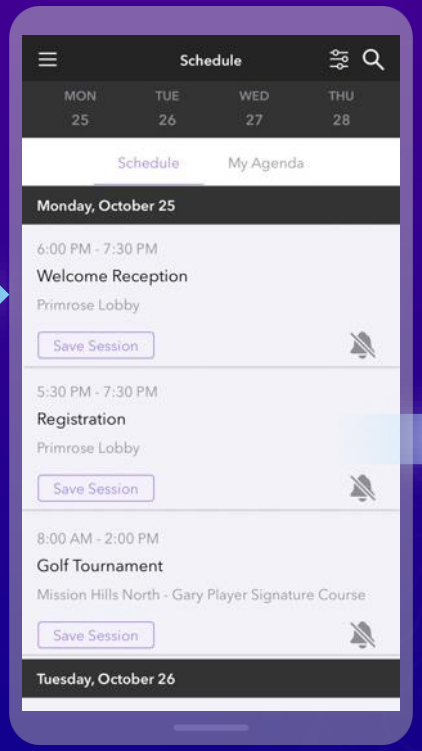


Select the session you attended



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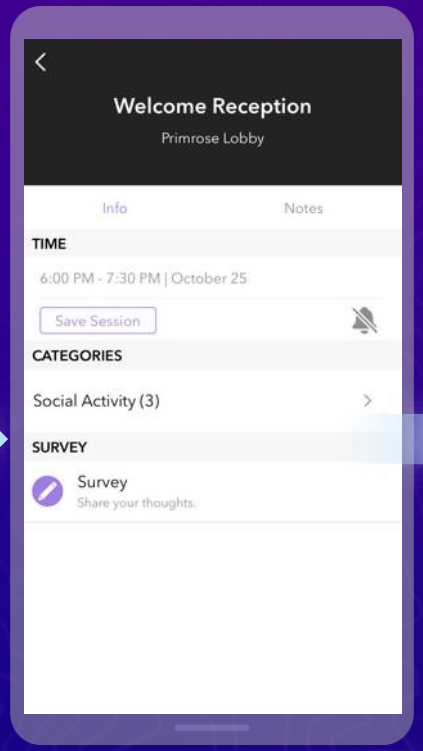
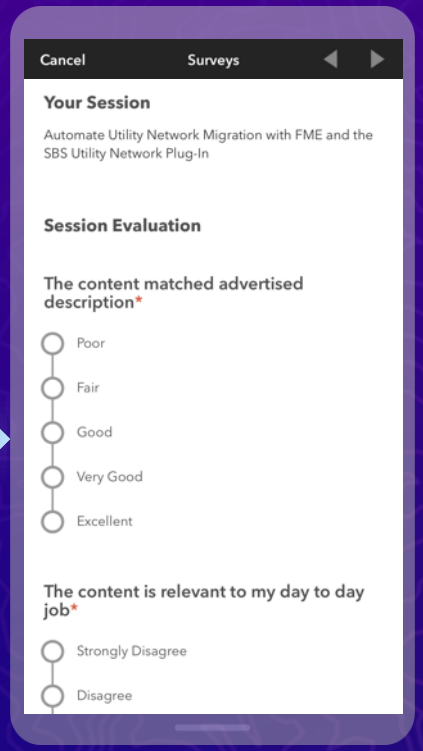
Log in to access the survey