



# Building Web Apps with Open Source Mapping APIs

*#EsriFedGIS23*

2023 ESRI FEDERAL GIS CONFERENCE



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# Agenda

- Open source mapping APIs
- Location services demos
- Resources & questions

# Open source mapping APIs

*Options and support*

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# MapLibre GL JS

 [maplibre.org](https://maplibre.org)



[developers.arcgis.com/maplibre-gl-js](https://developers.arcgis.com/maplibre-gl-js)



[github.com/maplibre](https://github.com/maplibre)

- MapLibre GL JS is an open source fork of Mapbox GL JS 1.x
  - *actively maintained*
- Mapbox GL JS 1.x is open source
  - *no active development*
- Mapbox GL JS 2.x is not open source

# OpenLayers

 [openlayers.org](https://openlayers.org)



[developers.arcgis.com/openlayers](https://developers.arcgis.com/openlayers)



[github.com/openlayers](https://github.com/openlayers)

- A JS library for displaying map visualizations and analyzing geographical data.
  - Bigger learning curve but very powerful.
- Native support for vector tile layers but the Open Layers Mapbox style plugin is required.

# Leaflet

 [leafletjs.com](https://leafletjs.com)

 [github.com/Leaflet/Leaflet](https://github.com/Leaflet/Leaflet)

- Lightweight API (JS code is ~42 KB)
- Development is mainly plug-in based
- Good for general mapping applications
- Esri Leaflet provides added functionality

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# Esri Leaflet



[developers.arcgis.com/esri-leaflet](https://developers.arcgis.com/esri-leaflet)



[github.com/Esri/esri-leaflet](https://github.com/Esri/esri-leaflet)

- A set of plugins for Leaflet making it easy to integrate ArcGIS location services.
- Plugins include:
  - Vector Basemap Layer
  - Cluster Feature Layer
  - Vector Layer
  - Geosearch Control

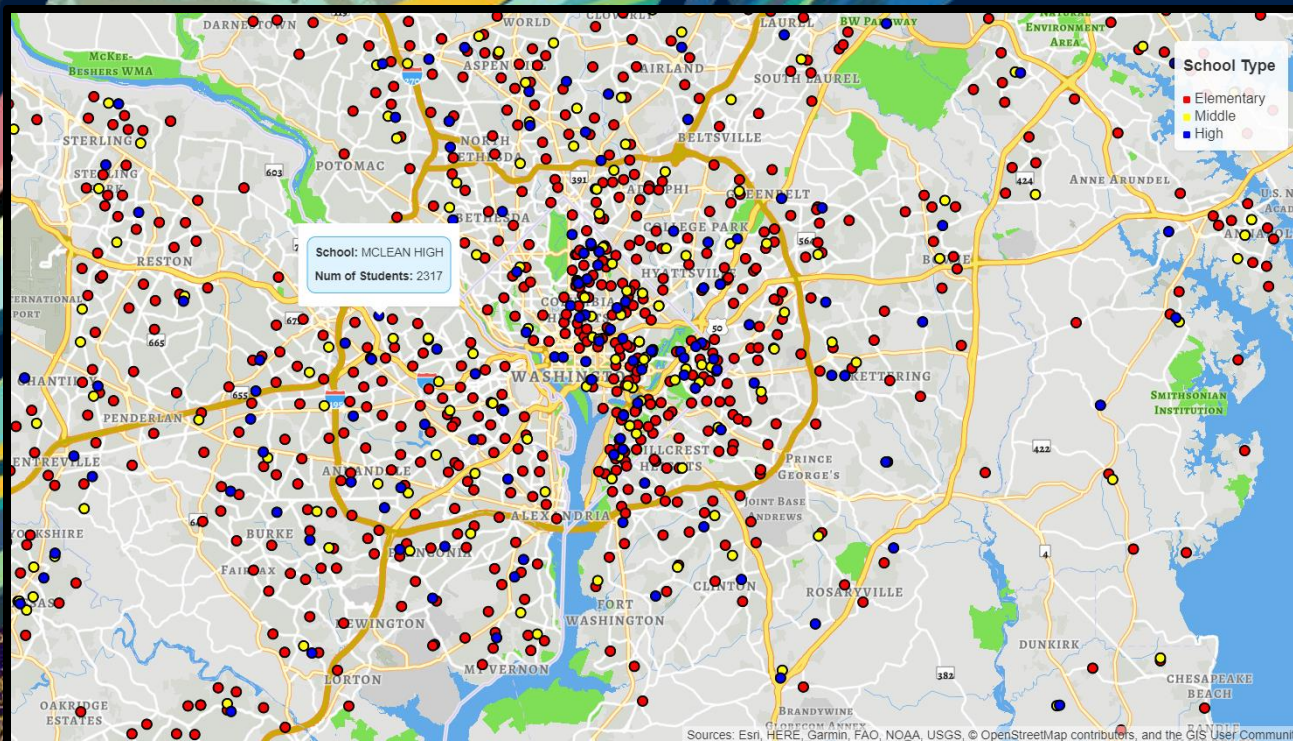
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# Access location services

*Explore ready-to-use and data hosting services*

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# MapLibre GL JS Demo 1

Explore basemap layer styles  
and vector tile layers

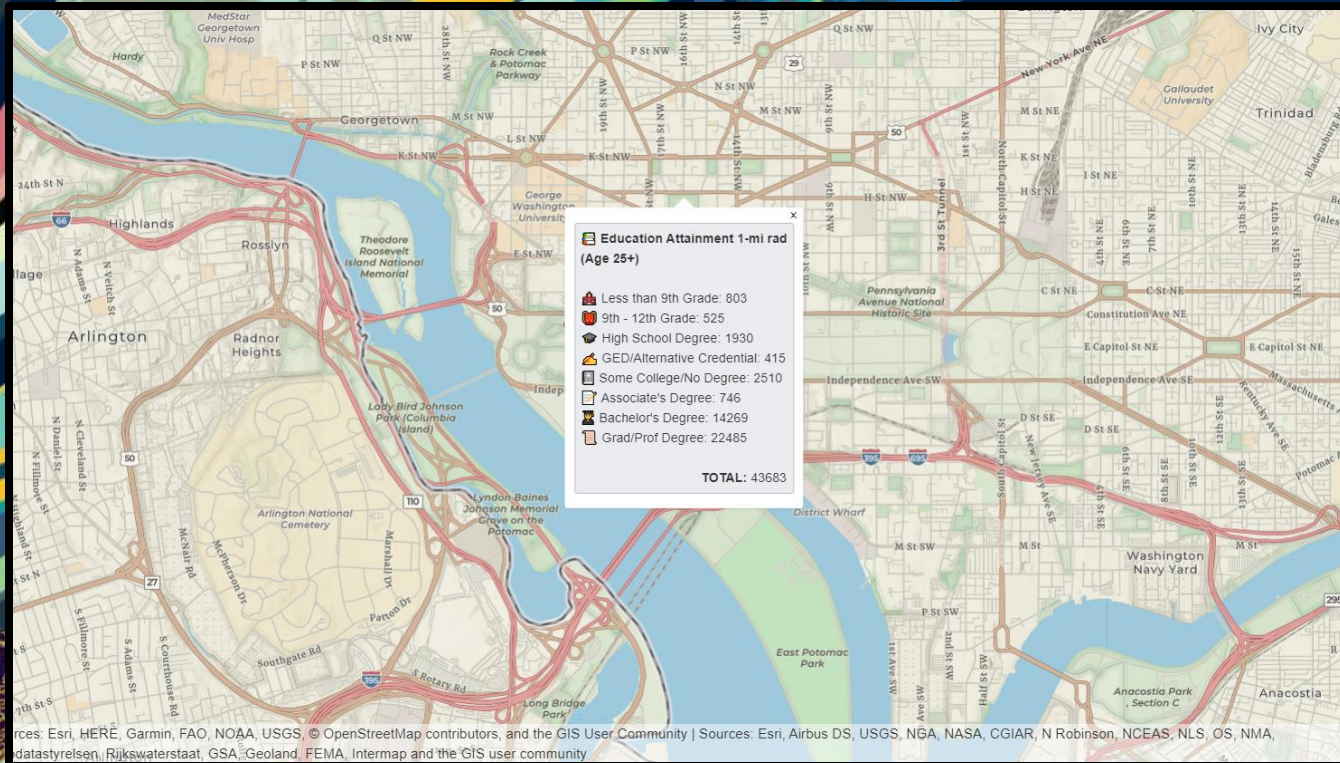
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# Key Points

*For the MapLibre GL JS demo 1*

- Easy switch between MapLibre services and ArcGIS location services
- The style URL must include type=style to return Mapbox JSON specification
- Large datasets are better handled as vector tile layers



# MapLibre GL JS Demo 2

Query demographic data

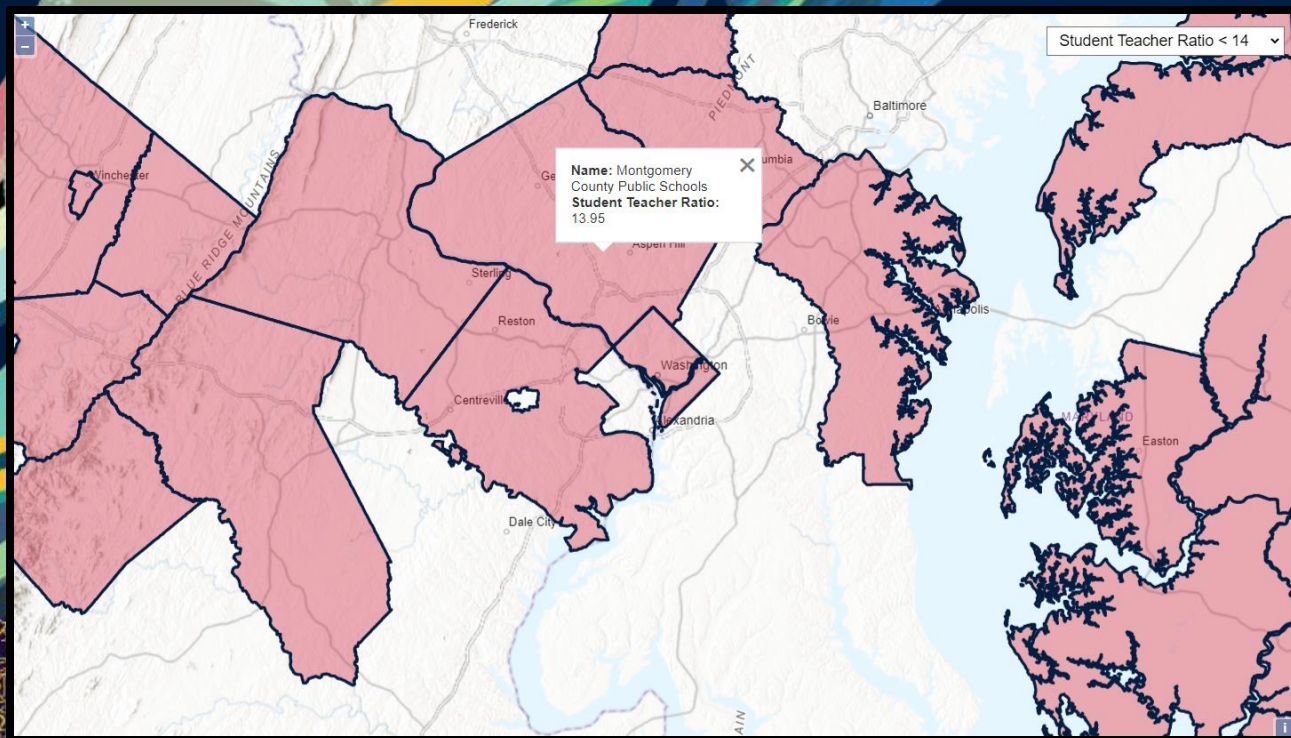
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# Key Points

*For the MapLibre GL JS demo 2*

- The GeoEnrichment service can be accessed through ArcGIS REST JS
- Defaults values are:
  - 1 mi radius study area
  - Key global facts are total (male & female) populations, total households, average household size
- Data collections and analysis variables give other values





# OpenLayers Demo 1

Perform a SQL query of a feature service

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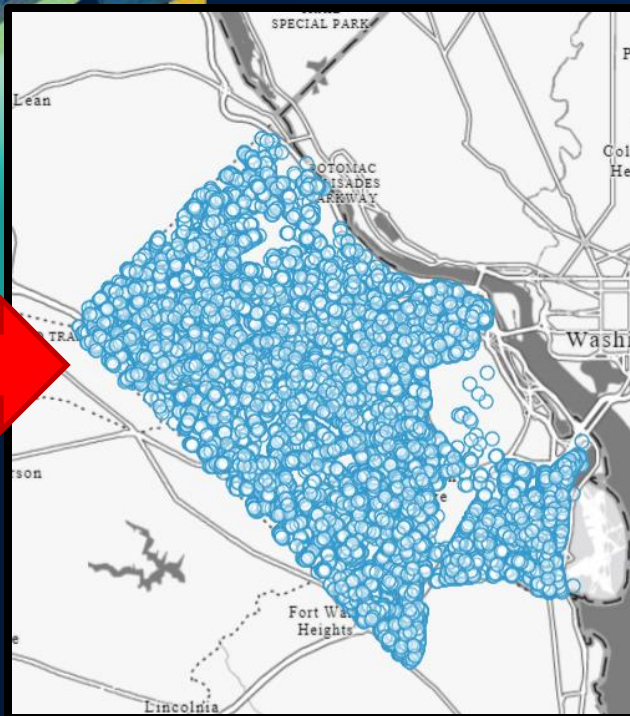
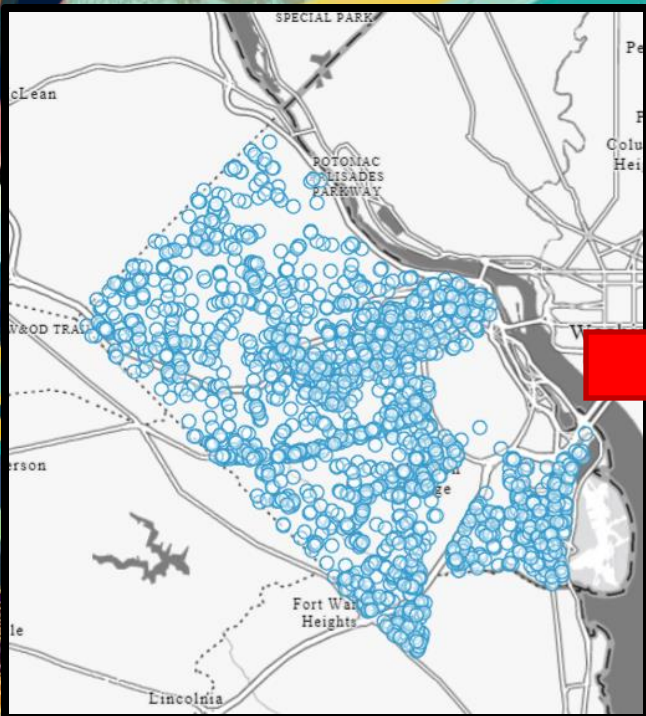




# OpenLayers Demo 2

Perform a spatial query of a feature service

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# OpenLayers Demo 3

Query feature layer data exceeding limit

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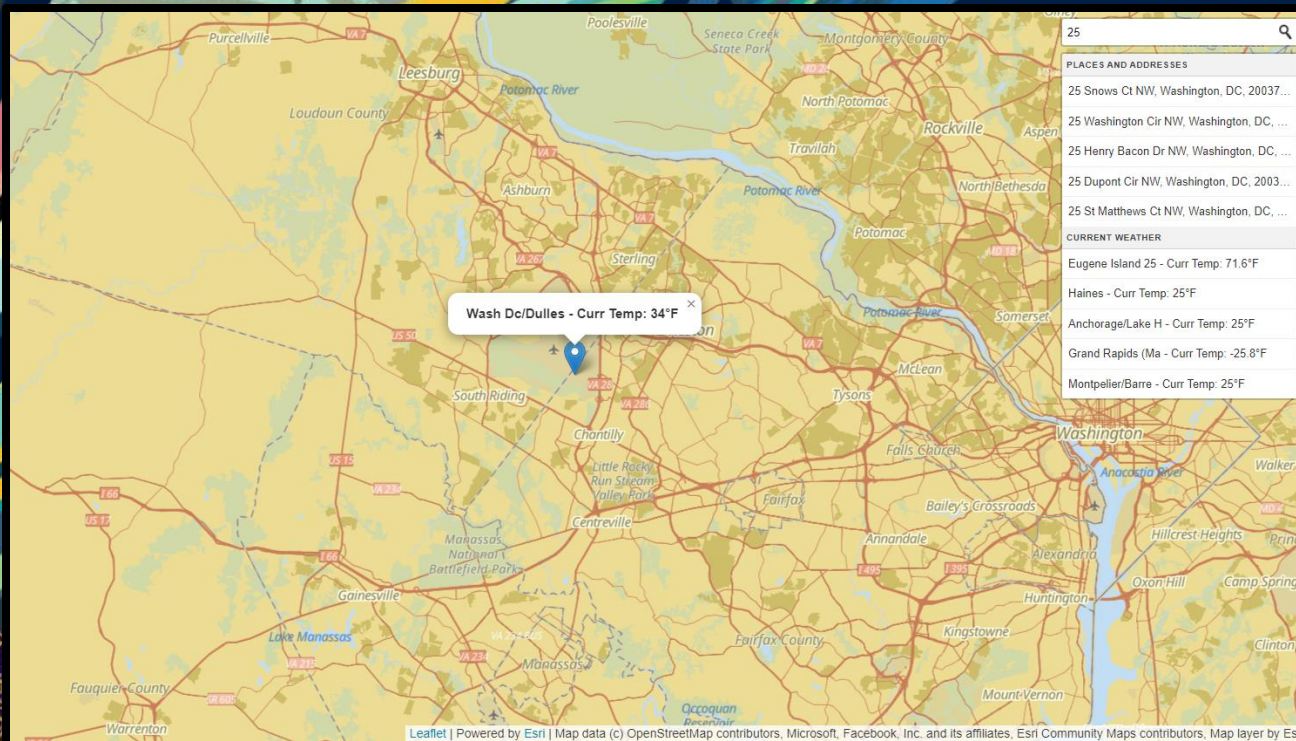


# Key Points

*For the OpenLayers demos*

- Subsets of feature data can be queried using SQL or spatial queries through ArcGIS REST JS
  - Results can be attributes, geometry, or both
- Queries are limited to a max of 2000 features from a hosted feature layer
  - To overcome this, exceededTransferLimit and resultOffset may be used

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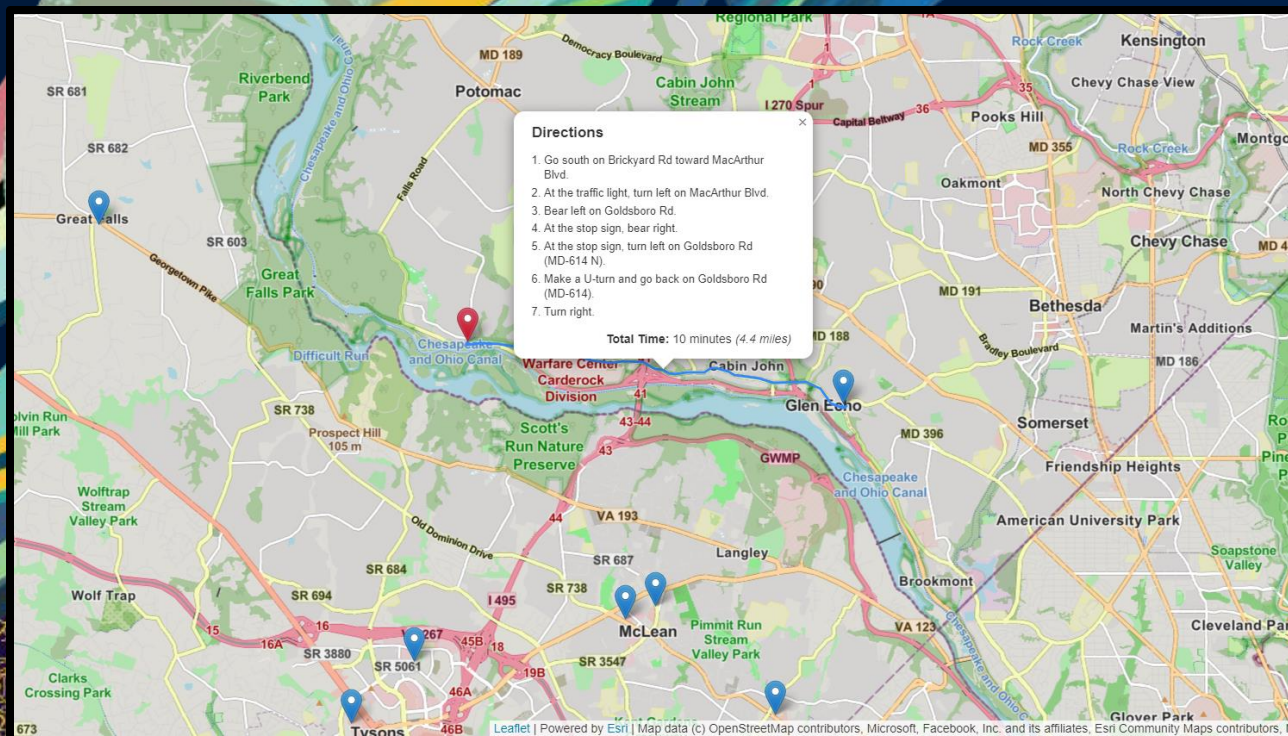


# Esri Leaflet Demo 1

GeoSearch control with multiple services

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# Esri Leaflet Demo 2

Routing to closest facility

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# Key Points

*For the Esri Leaflet demos*

- Esri Leaflet has additional features to access location services like the Geosearch control
- ArcGIS REST JS may be used for even more functionality



# Final Thoughts

Considerations, resources, social, etc.

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# Important things to know

*Aspects that haven't been implemented (nor expected to be)*

- No web map support
- Not optimized like our JS Maps SDK to load feature services
- No feature layer optimization
- No direct REST API integration (must use ArcGIS REST JS)

# Resources

- Code samples from this session:  
<https://github.com/EsriDevEvents>
- Esri community forums:  
<https://community.esri.com/t5/developers/ct-p/developers>
- Previous Esri event videos about open source APIs:  
<http://bit.ly/3X6MbBB>

# Connect with us on social

*Join the conversation with #EsriFedGIS23*



<https://twitter.com/ArcGISDevs>



<https://twitter.com/EsriDevEvents>



<https://youtube.com/c/ArcGISDevelopers>



<https://mediaspace.esri.com/>



<https://github.com/Esri>



<https://github.com/EsriDevEvents>

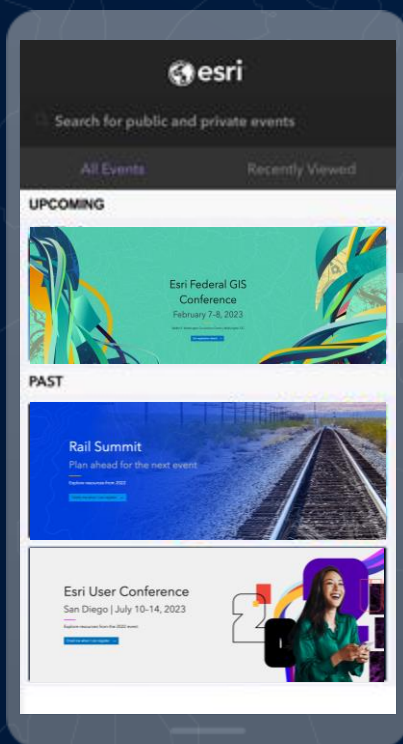


<https://links.esri.com/EsriDevCommunity>

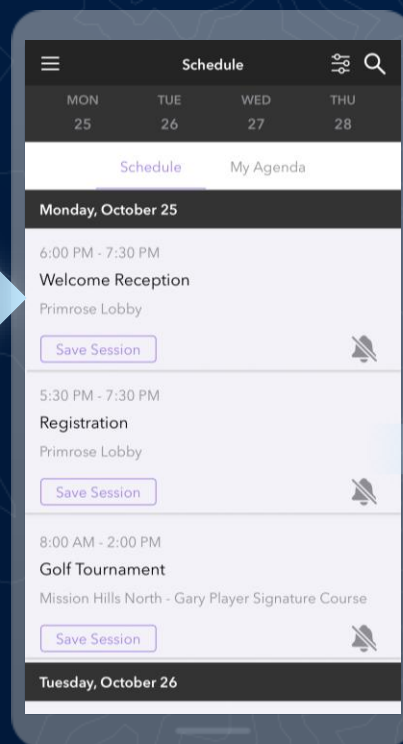
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# Please Share Your Feedback in the App

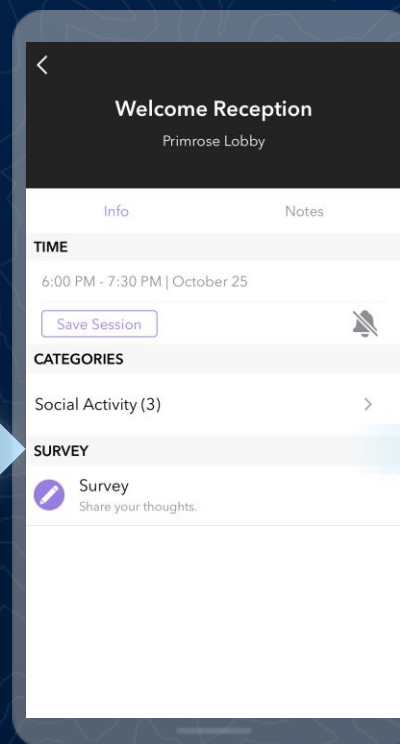
Download the Esri Events app and find your event



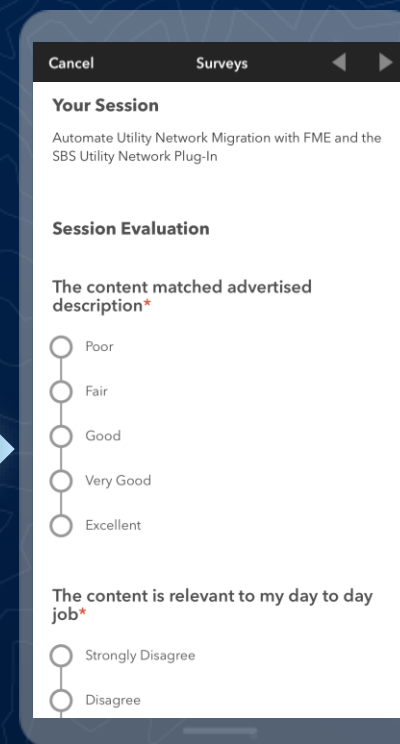
Select the session you attended



Scroll down to "Survey"



Log in to access the survey



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# Questions?

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