

# ESRI DEV SUMMIT

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NC DOT

# PLENARY SESSION

- JavaScript API
- Analytics
  - ArcGIS Insights
    - <https://www.esri.com/en-us/arcgis/products/insights-for-arcgis/overview>
  - Jupyter Notebooks and the ArcGIS Python API
- Developer Experience
  - ArcGIS for Developers: [developers.arcgis.com](https://developers.arcgis.com)
  - ArcGIS Developer Program
    - Example Apps
    - Dev Labs – 15 minutes or less (<https://developers.arcgis.com/labs/>)

Start building an app in 15 minutes.

ArcGIS DevLabs guide you through the three phases of building geospatial apps: Data, Design, Develop

How to ArcGIS?  
Getting started with ArcGIS? Start here!

Browse Labs  
Search labs by type, topic and product.

 <b>Get driving directions</b> JS Build an app with the Directions widget to find a route and display turn-by-turn directions. ⌚ 10 minutes Start Lab	 <b>Display a web map</b> JS Build an app that loads and displays a web map. ⌚ 10 minutes Start Lab	 <b>Create a 2D map with a layer</b> JS Build an app that displays a basemap and a feature layer. ⌚ 10 minutes Start Lab
 <b>Create a 3D scene with a layer</b> JS Build an app that displays a basemap and a feature layer in 3D. ⌚ 10 minutes Start Lab	 <b>Style a feature layer</b> JS Apply symbol colors and styles based on attribute values. ⌚ 10 minutes Start Lab	 <b>Configure a pop-up</b> JS Format and style pop-ups for feature layers. ⌚ 10 minutes Start Lab

# PLENARY SESSION (CONTINUED)

## The Power of Python in ArcGIS Pro

- Debugging for python in Pro
- Adding the ability to encrypt python toolboxes
- Python “Backstage” – allows you to install imports (like pip or npm)
- You can attach Visual Studio to your python process in pro for debugging



## Automation for ArcGIS Enterprise

- AGOL Collaboration – adds the ability for organizations to work together as “hosts” and “participants”. This can be powerful for emergency response.
- AGOL Solution Templates – you can clone these into your org

# ARCGIS API FOR PYTHON

Allows you to use Python against the REST API. It contains a collection of classes that are set up to work with REST end points.

ArcGIS API	ArcPy
Script against a portal <ul style="list-style-type: none"><li>• Python 3.x</li></ul>	For desktop GIS <ul style="list-style-type: none"><li>• ArcMap 2.x</li><li>• ArcPro 3.x</li></ul>
<ul style="list-style-type: none"><li>• Analysis, portal administration, content creation, Big Data Analysis</li></ul>	<ul style="list-style-type: none"><li>• Geoprocessing</li><li>• Some map automation</li></ul>

# JUPYTER NOTEBOOKS

[NOTEBOOKS.ESRI.COM](https://notebooks.esri.com)

esri THE SCIENCE OF WHERE using\_geometry\_functions (unsaved changes) Python 3

File Edit View Insert Cell Kernel Widgets Help Not Trusted Python 3

Dashboard View: </>

## Using geometry functions

This notebook uses the `arcgis.geometry` module to compute the length of a path that the user draws on the map.


The particular scenario is of a jogger who runs in the Central Park in New York (without gizmos like GPS watches to distract him), and wants a rough estimate of his daily runs based on the path he takes. The notebook starts out with a satellite map of Central Park in New York:

```
In [1]: from arcgis.gis import GIS
        from arcgis.geocoding import geocode
        from arcgis.geometry import lengths
```

```
In [2]: gis = GIS()
```

```
In [3]: map1 = gis.map()
        map1.basemap = "satellite"
```

```
In [4]: map1
```



New York State, USDA FSA esri

# ARCADE

[HTTPS://DEVELOPERS.ARCGIS.COM/ARCADE/](https://developers.arcgis.com/arcade/)

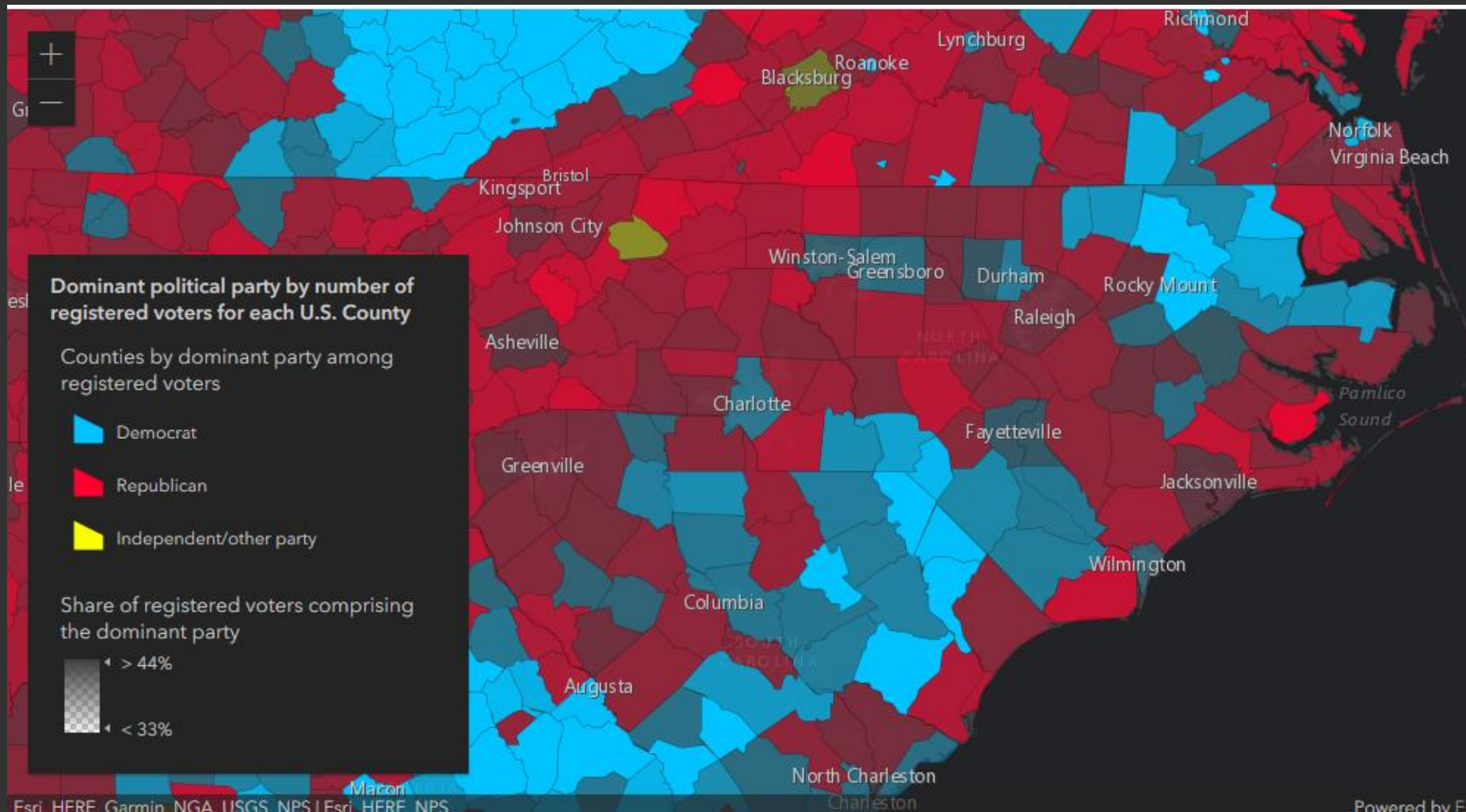
- Lightweight Scripting Language that can be used in the ArcGIS JavaScript API, ArcGIS Online, ArcGIS Runtime and ArcGIS Pro
- Can be used for dynamic labeling, rendering and pop-up content
- Includes Feature and Geometry Types



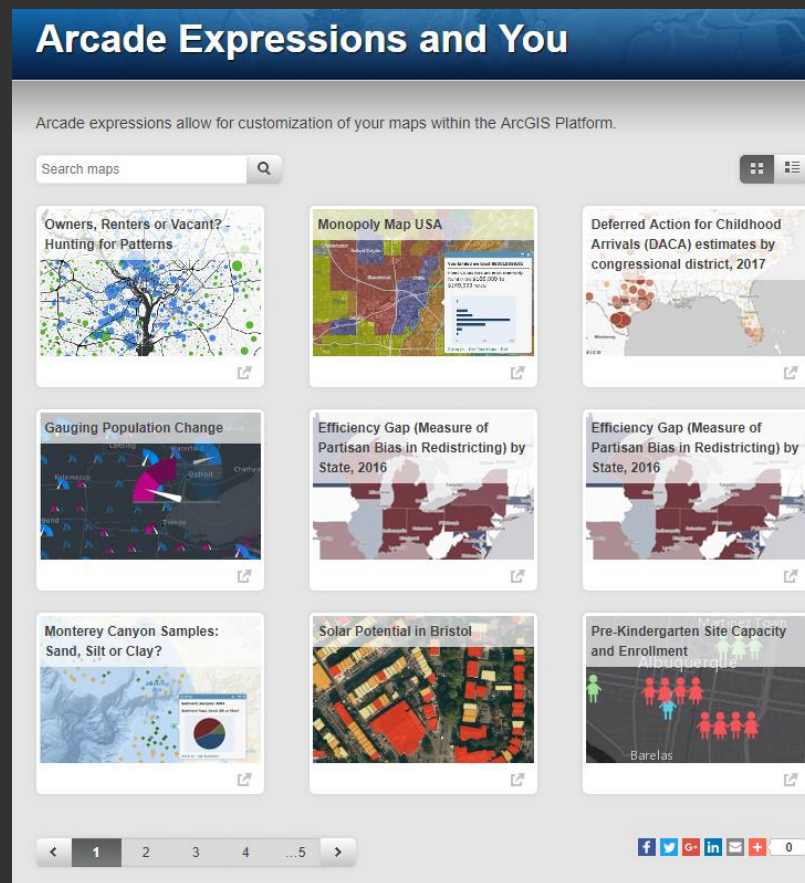


# EXAMPLE:

[HTTPS://DEVELOPERS.ARCGIS.COM/JAVASCRIPT/LATEST/SAMPLE-CODE/VISUALIZATION-ARCADE/INDEX.HTML](https://developers.arcgis.com/javascript/latest/sample-code/visualization-arcade/index.html)



# ADDITIONAL RESOURCES



- Sample Gallery
  - <https://github.com/Esri/arcade-expressions>
- Arcade Expressions and You
  - <http://arcgis-content.maps.arcgis.com/apps/PublicGallery/index.html?appid=8951b538362b492cada7f7ede1b85c21>



# GEOEVENT SERVER

## Real-time GIS:

- Moving objects, stationary with changing attributes, or discrete.

## Six Key Capabilities

1. Ingest real time, high velocity data
2. Perform continuous analysis
3. Store observations in a *spatiotemporal big data store*
  - *Can accept 4000 events per second - 5 to 10 attributes (RDBMS capped at 300 records per second)*
4. Visualize high velocity and volume data
5. Notify about patterns of interest (real time push notifications)
6. Adjust behavior of things through automation (close a valve, activate a sprinkler system, adjust the thermostat....)

# GEOEVENT SERVER (CONTINUED)

## Visualizing Real Time Data

<https://gEOEVENTSAMPLE1.ESRI.COM:6443/arcgis/rest/services>

## Stream Layers

- For moving assets
- Push data directly to clients
- Does not require storage

## Polling Model

- Poll to get data and write to an enterprise geodatabase or spatiotemporal big data store
- Update 6 second refresh rate

### Services:

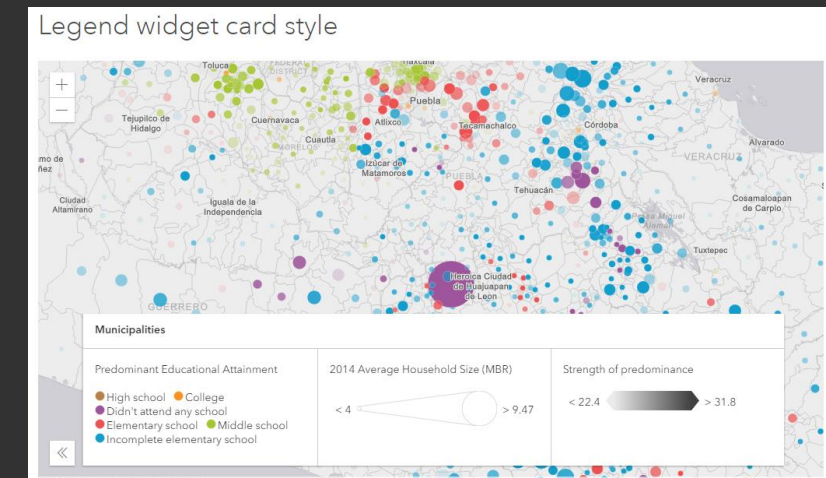
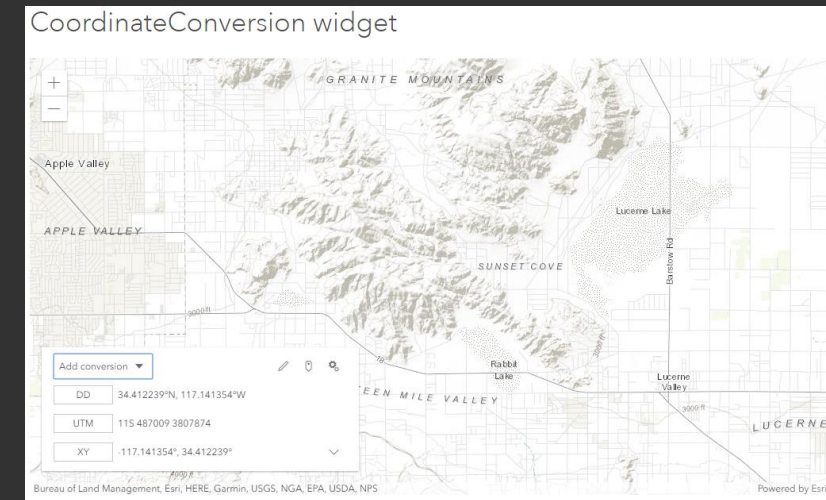
- [AirportTrafficsFS](#) (FeatureServer)
- [AirportTrafficsFSHist](#) (FeatureServer)
- [AirportTrafficsFSHist](#) (MapServer)
- [AirportTrafficsFS](#) (MapServer)
- [AirportTraffics](#) (StreamServer)
- [FAAStream](#) (StreamServer)
- [LABus](#) (StreamServer)
- [NYCMonitoredVehicleJourney](#) (StreamServer)
- [PanamaAIS](#) (StreamServer)
- [PanamaTugBoatServiceLog](#) (StreamServer)
- [PanamaTugBoat](#) (StreamServer)
- [PanamaTugBuffer](#) (StreamServer)
- [SeattleBus](#) (StreamServer)
- [WashingtonMetroBuses](#) (StreamServer)
- [WorldSatellites](#) (StreamServer)

# JAVASCRIPT API

## Version 3.x vs 4.x

### New in 4.x

- 3D
  - Direct Line Measurement Tool
  - Area measurements and perimeter (any 3D space, not just vertical)
  - Edge rendering for scene layers
- Widgets
  - Coordinate Conversion (projection engine)
  - Layer List – added panels – allows you to display the legend within the layer list
  - Legend – new card style legend with new display options
- Visualization
  - Point Clustering – quantitative and thematic
  - Smart Mapping
  - Point cloud unique values
  - Type renderer creation – generate unique value renderers



# JAVASCRIPT API CONTINUED

- WebGL – faster, with more feature capacity than SVG (hosted feature layer only)
  - <https://www.esri.com/arcgis-blog/products/js-api-arcgis/uncategorized/featurelayer-rendering-taking-advantage-of-webgl-in-2d>
- Custom Widgets
  - New widget architecture – view model that separates logic from the view.
  - Custom Widget Tutorial
    - <https://developers.arcgis.com/javascript/latest/sample-code/widgets-custom-widget/index.html>
- Coding Patterns (Guide – working with the API)
  - <https://developers.arcgis.com/javascript/latest/guide/index.html>
  - Autocasting
  - Promises
  - Loadable Pattern (Get, Set and Watch)

## Before

```
require([
  "esri/Color",
  "esri/symbols/SimpleLineSymbol",
  "esri/symbols/SimpleMarkerSymbol",
  "esri/renderers/SimpleRenderer",
  "esri/layers/FeatureLayer",
], function (
  Color, SimpleLineSymbol, SimpleMarkerSymbol, SimpleRenderer, FeatureLayer
) {
```

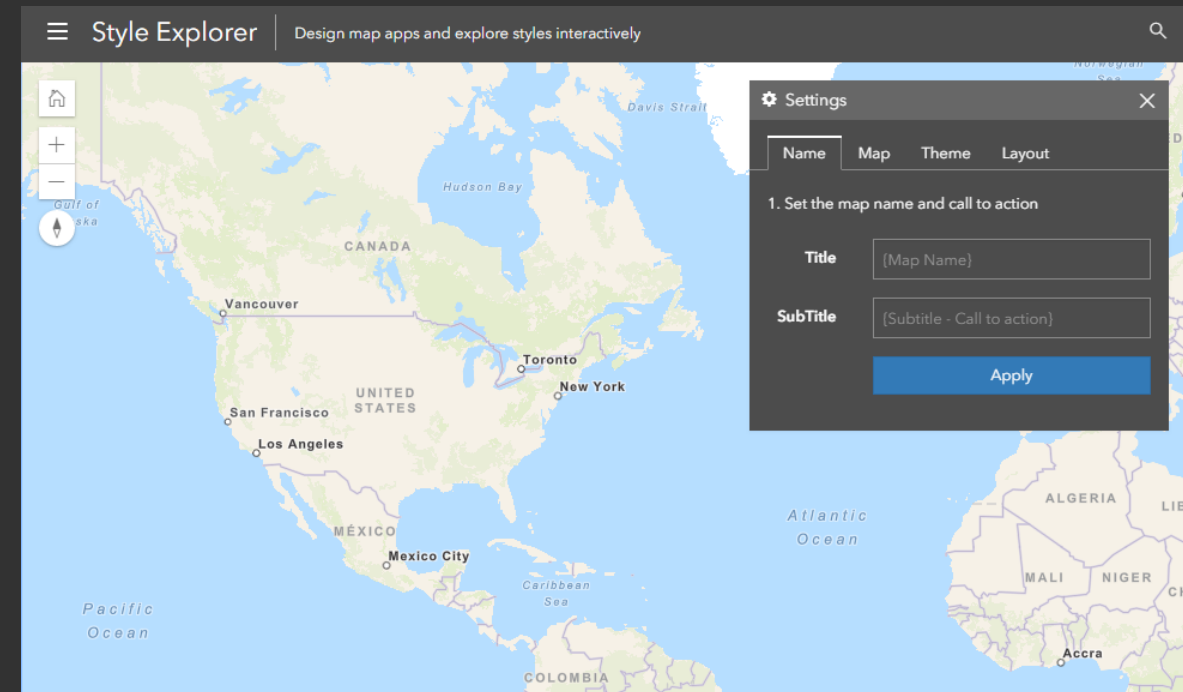
## After

```
require([
  "esri/layers/FeatureLayer"
], function (
  FeatureLayer
) {
```

# RESOURCES FOR BUILDING A CUSTOM WEB MAP

- Maps App for JavaScript
  - <https://developers.arcgis.com/example-apps/maps-app-javascript/>

- Calcite Maps (3.x, 4.x and Leaflet!)
  - <https://esri.github.io/calcite-maps/samples/index.html>



# WHAT THE “COOL KIDS” ARE DOING

Chrome Dev Tools (<https://developers.google.com/web/tools/chrome-devtools/>)

- Mobile Emulator
- Break on Event listener
- Pause on caught exceptions
- Connect to a local workspace and edit your code directly

Lighthouse (<https://developers.google.com/web/tools/lighthouse/>)

- Audit your “progressive web app”

Visual Studio Code (<https://code.visualstudio.com/>)

- Free text editor with intellisense and many helpful extensions



# MORE COOL STUFF

TypeScript (<https://www.typescriptlang.org/>)

- Typed superset of JavaScript that compiles to plain javascript
- Setting things up for ESRI:  
<https://developers.arcgis.com/javascript/latest/guide/typescript-setup/index.html>

ESRI JSAPI Resources (<https://github.com/esri/jsapi-resources>)

- JSHint file used by ESRI
- Resources for creating custom builds
- Webpack (<https://developers.arcgis.com/javascript/latest/guide/using-webpack/index.html>)

# QUESTIONS?

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