



Performing Analysis with the ArcGIS API for Python

Andrew Chapkowski



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ArcGIS API for JavaScript: Using Arcade with Your Apps
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Performing Analysis with the ArcGIS API for Python

Andrew Chapkowski

About Me

- Developer at Esri for 11+ years
- Senior Software Developer on the ArcGIS API for Python and Enterprise Team
- Open Source Advocate
 - pygeopackage
 - ArcREST
 - hermes (metadata manager for feature classes)
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ArcGIS API for Python

[Install the API](#)

Version 1.6.1 - May 16, 2019

[Home](#) [Guide](#) [Sample Notebooks](#) [API Reference](#) [Community](#)

A powerful Python library for spatial analysis, mapping and GIS

ArcGIS API for Python is a Python library for working with maps and geospatial data, powered by web GIS. It provides simple and efficient tools for sophisticated vector and raster analysis, geocoding, map making, routing and directions, as well as for organizing and managing a GIS with users, groups and information items. In addition to working with your own data, the library enables access to ready to use maps and curated geographic data from Esri and other authoritative sources. It also integrates well with the scientific Python ecosystem and includes rich support for Pandas and Jupyter notebook.

[Install the API](#) | [Get started](#) | [View samples](#)



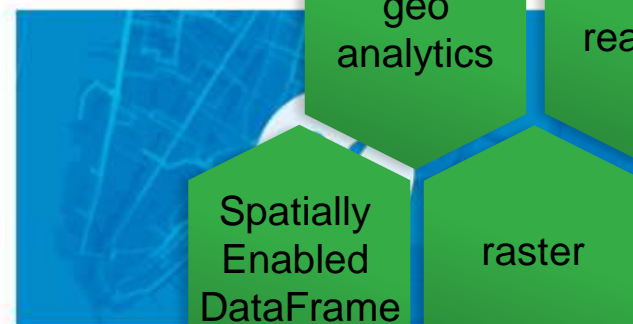
Understand your GIS

This "hello world" style notebook shows how to get started with the GIS and visualize its contents.



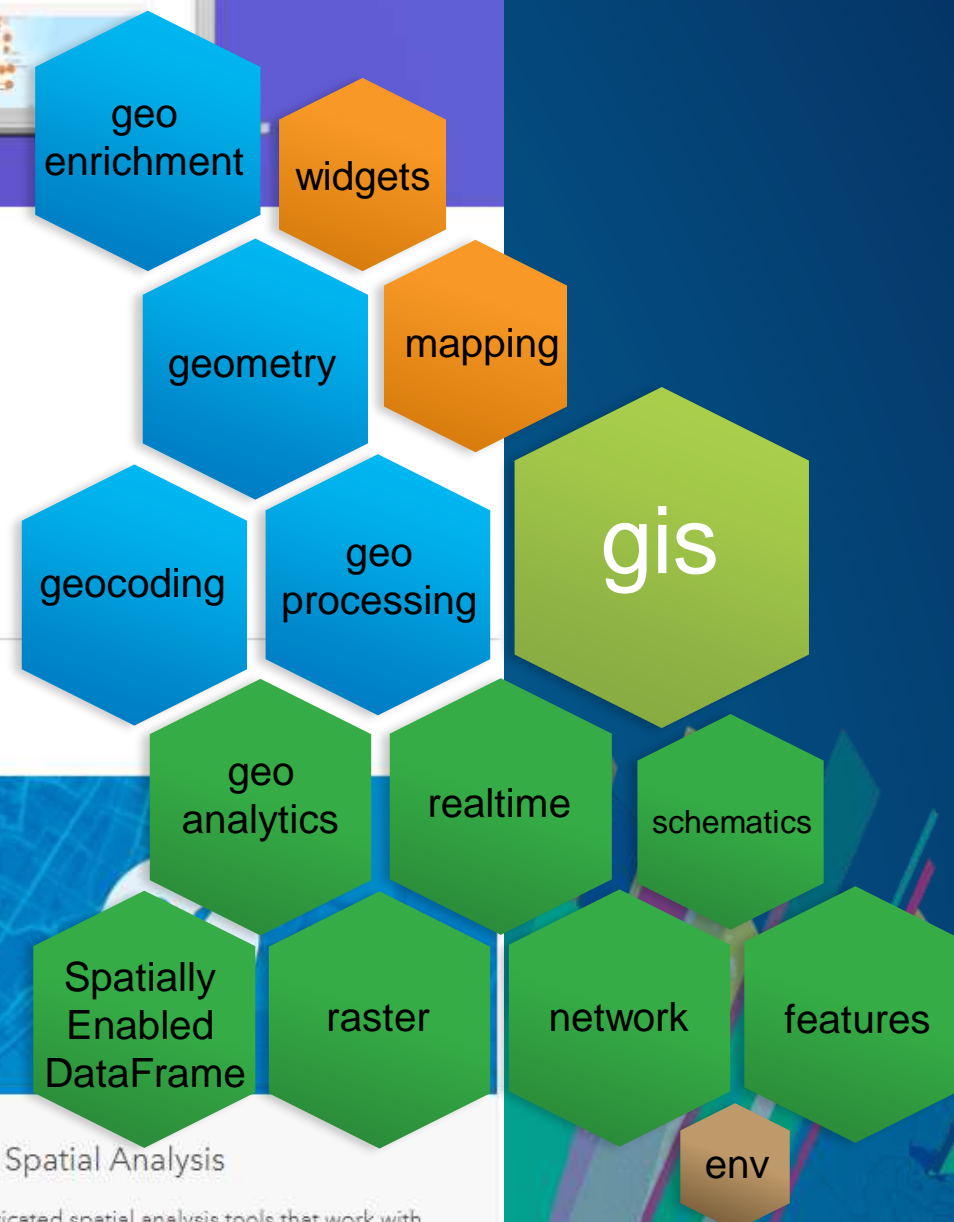
Manage your GIS

The ArcGIS API for Python provides APIs and samples for ArcGIS Online administrators to manage their online



Perform Spatial Analysis

Call sophisticated spatial analysis tools that work with online content, using a few lines of code.



ArcGIS API for Python

What can it do for you?

Platform API
**Power Users
Developers**

Enterprise Integration

Users, Roles & Group management



**Administrators
DevOps**

Analysts

Spatial Analysis

Imagery

Location Analytics

Big Data

Raster Analytics

Feature Analytics

Data Scientists

Content Publishers

Your Web GIS

A Pythonic representation of GIS

Data Management





Find, Use and Manage
Content



Perform Analysis



Handle
Authentication



Access and Manage
Users and Groups

Manage, maintain and modify your GIS

arcgis.gis.GIS class

GIS Demo



**Consume Published
Tool**



**Derive New
Products**



Perform a Task

Consume and Perform Custom Analytics

arcgis.geoprocessing module

Spatial Analysis



Summarize Data



Data Management



Find Locations



Data Enrichment



Analyze Patterns



Use Proximity

Discover relationships, pattern and trends in data

arcgis.feature submodules



Analysis and Geoprocessing Demos

Raster Analysis



Math Square Square Root Times Bitwise And Bitwise Left Bitwise Right Bitwise Not Bitwise Or Bitwise Xor Shift Shift Shift Bitwise And Boolean Not Boolean Or Boolean Xor Equal To Greater Than Greater Than Equal Is Null Less Than Less Than Equal Not Equal ArgStatistics Cell Statistics Statistics ACos ACosH ASin ASinH ATan ATan2 ATanH Cos CosH Sin SinH Tan TanH	Correction Apparent Reflectance Geometric Correction Speckle Filtering (Lee,Frost,Kuan) Data Management & Conversion Raster to Vector Vector to Raster Colormap Colormap To RGB Complex Grayscale Remap / Reclass Spectral Conversion Unit Conversion Vector Field LAS to Raster LAS Dataset to Raster Clip Composite Extract Bands Mask Mosaic Rasters Rasterize Features Reproject	Visualization & Appearance Contrast and Brightness Convolution Pansharpening Resample Statistics and Histogram Stretch Interpolation Natural Neighbor Nearest Neighbor Inverse Distance Weighted Empirical Bayesian Kriging Swath Surface Generation & Analysis Aspect Curvature Elevation Void Fill Hillshade Shaded Relief Slope Viewshed	Analysis: Density Kernel Density Analysis: Overlay Weighted Sum Weighted Overlay Analysis: Zonal Zonal Statistics	Analysis: Band Math & Indices NDVI / NDVI Colorized SAVI / MSAVI / TSAVI GEMI GVI (Landsat TM) PVI Tasseled Cap (Kauth-Thomas) Binary Thresholding	Python Custom Algorithms
Conditionals Con Set Null			Analysis: Image Segmentation & Classification Segmentation (Mean Shift) Training (ISO, ML, Support Vector Machine, Random Trees) Classification		



On-the-fly and distributed batch analysis of raster data

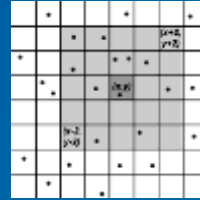
arcgis.raster module

Raster Demo

Spatially
Enabled
DataFrame



Built on Pandas



On Demand Spatial
Indexing



Interoperability



Multiple Geometry
Engine Support



Robust Spatial
Visualizations

Spatially Enabled DataFrame

`arcgis.features.GeoSeriesAccessor/GeoAccessor`



Spatially Enabled Data Frame Demo



**Find Facts About a
Location**



Discover New Insights



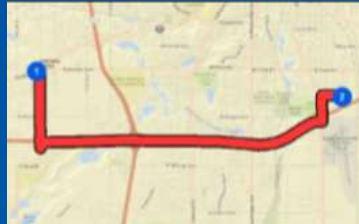
Reporting

Enrich your analysis with demographic and business data

`arcgis.geoenrichment` module



Demo



Routing



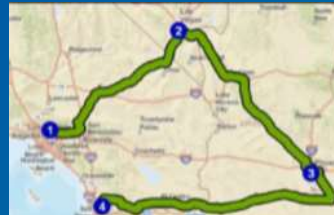
Service Areas



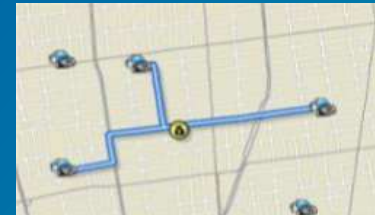
Location Allocation



Vehicle Routing Problem



Optimized Routing



Closest Facility

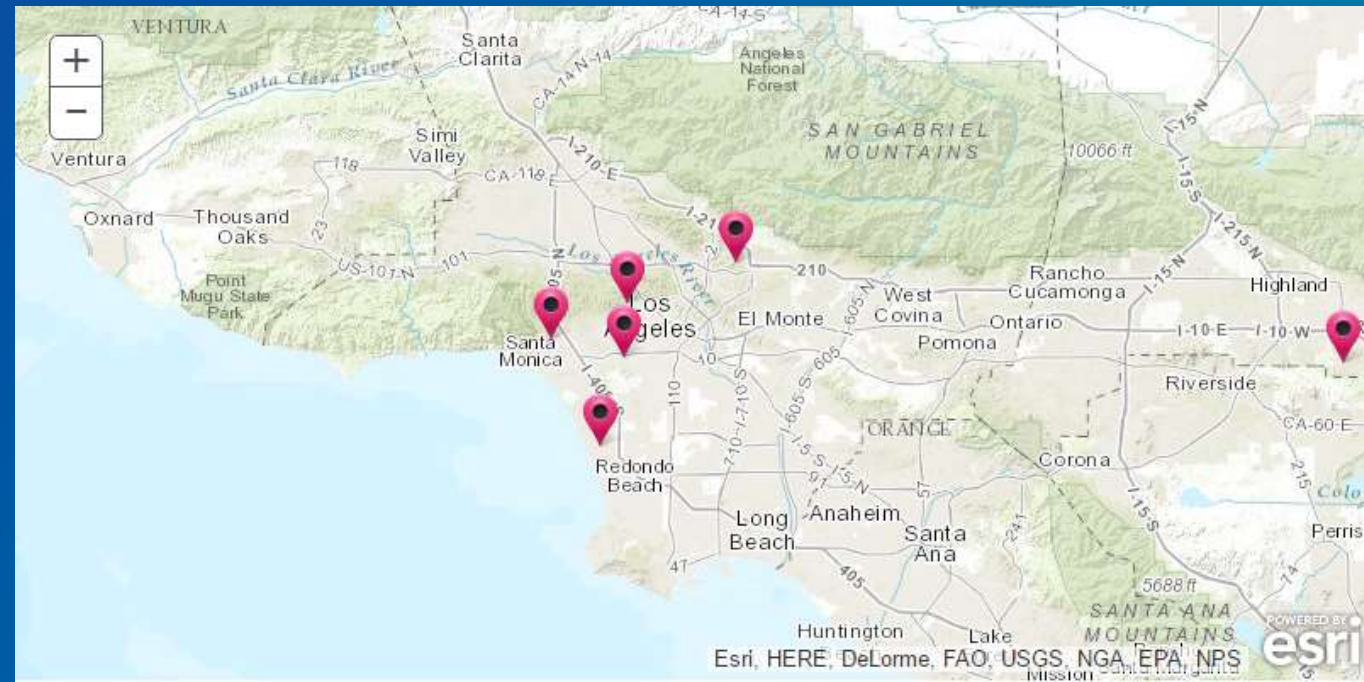


Origin-Destination Cost Matrix

Routing, location allocation, service areas...

arcgis.network module

Geocoding



```
addresses = ["380 New York St, Redlands, CA",  
            "1 World Way, Los Angeles, CA",  
            "1200 Getty Center Drive, Los Angeles, CA",  
            "5905 Wilshire Boulevard, Los Angeles, CA",  
            "100 Universal City Plaza, Universal City, CA 91608",  
            "4800 Oak Grove Dr, Pasadena, CA 91109"]
```

```
results = batch_geocode(addresses)
```

Single/Multiline, batch, reverse geocoding

arcgis.geocoding module



Demo

Where to go from here!

- **Webinar Recording:** <https://www.esri.com/en-us/landing-page/product/2018/geodev-webinar-series/performing-analysis-with-the-arcgis-api-for-python>
- **Post Webinar Q&A:** <https://community.esri.com/groups/geodev>
- **Samples, talks and more!** - <https://github.com/Esri/arcgis-python-api>
- **Documentation** - <https://developers.arcgis.com/python/>
- **Forums** - <https://community.esri.com/groups/arcgis-python-api/>
- **Videos** - <https://www.esri.com/videos/search?text=arcgis%20api%20for%20python>

Questions?



esri

THE
SCIENCE
OF
WHERE