ArcGIS API for Python: An Introduction

John Yaist
David Martinez
What is the ArcGIS API for Python

ArcGIS REST API

- My Content
- Organization’s Content
- Community Content
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 notebooks.
ArcGIS API for Python
- Script against a portal
  - ArcGIS Online or ArcGIS Enterprise
  - Python 3.x
- Analysis, Portal Admin, Content Creation, Big Data Analysis

ArcPy
- ArcGIS Desktop
  - ArcMap – Python 2.x
  - ArcGIS Pro – 3.x
- Mostly geoprocessing
- Some map automation
Four different groups working with the ArcGIS API for Python

- Org Administrators
- Content Publishers
- GIS Analysts and Data Scientists
- Power Users/Developers
Whom is it for?

Desktop Apps

GIS Analysis

Interactive Exploration

Big Data GeoAnalytics

Content Publishing

Developers

ArcGIS

Org administration

Desktop Apps

GIS Analysis
Automate Web GIS management
• Populate portal with users, groups
• Clone portals
• Reassign user content
• Perform comprehensive content search
• Determine item relationship
• Create reports of users, their items

Automate content creation
• Automate content publishing during off peak hours
• Update tiles and features from a known database
• Replicate development environment content to production
• Inspect and update items with broken service links

Reproducible research
• Access big data tools programmatically
• Utilize rich 3rd party Python packages for data analysis
• Create rich charts, graphs, embed 2D and 3D maps in Jupyter Notebook environment
• Share your research with data and notes with peers
ArcGIS + Jupyter = ❤️
It all starts with your GIS

In [1]: `from arcgis.gis import GIS`

In [2]: `gis = GIS('https://deldev.maps.arcgis.com', 'demo_deldev')`

In [3]: `enterprise = GIS('https://python.playground.esri.com/portal', 'arcgis_python',`
rest_content = gis.content.search("DC Restaurants", item_type= "Feature Layer", max_items=10)

restaurants = rest_content
for item in restaurants:
    display(item)

Restaurants (Washington DC) HeatMap
Feature Layer Collection by cgbabis_blueraster
Last Modified: October 23, 2017
0 comments, 1,167 views

DC_TapIt
Tap It is a DC program identifying restaurants and other establishments that allow individuals to refill their water bottles for free.
Feature Layer Collection by mbass6_GISandData
Last Modified: October 26, 2014
0 comments, 112 views

Sidewalk Cafe
This data is used for the planning and management of Washington, D.C. by local government agencies.
Feature Layer Collection by DCGISopendata
Last Modified: January 29, 2018
0 comments, 150 views
Visualize layers on map widget

```python
In [44]: mapgis.map("Washington, DC, USA")
map

In [51]: rest=rest_content[2]
map.add_layer(rest)
```
GIS Module

**Item**
- title
- snippet
- description...
- update()
- delete()
- share()...

**Group**
- title
- snippet
- description...
- update()
- delete()
- share()
- reassign_to()...

**GIS**
- content
- users
- groups
- properties
- map()

**Manager**
- create()
- get()
- search()...

**User**
- username
- firstName
- lastName
- role...
- update()
- reassign_to()
- update_role()...

**Role**
- name
- description
- privileges
- role_id
- delete()

Resource Managers to manage content, users, groups and roles
How do I get it?

- Try it Live! – [https://notebooks.esri.com](https://notebooks.esri.com)
- ArcGIS Pro 2.4— included
- `pip` install arcgis
- `conda install -c esri arcgis`
- `docker pull esridocker/arcgis-api-python-notebook`
hello-map
Different authentication schemes

- anonymous users
- built-in users
- users using LDAP, via
  - Basic authentication
  - Portal tier authentication
- users using Integrated Windows Authentication (IWA) through NTLM or Kerberos
- smart card users / PKI authentication using certificate and key files
- users connected to an ArcGIS Enterprise instance using ArcGIS Pro
Workflows for Org Administrators
Workflows for Content Publishers
Workflows for Analysts
Resources

- Website - https://developers.arcgis.com/python/
- GitHub repo - https://github.com/Esri/arcgis-python-api
- Try it Live! - https://notebooks.esri.com
- Community - https://community.esri.com/groups/arcgis-python-api/
Questions?
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

Complete the survey and select “Submit”