



# Python Workflows with ArcGIS

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An abstract graphic on the right side of the slide, composed of various colored geometric shapes (triangles, rectangles, lines) in shades of blue, orange, and green, creating a sense of depth and movement.

**GIS  
INSPIRING  
WHAT'S  
NEXT**

# Agenda

- **Introduction**
  - Querying using the Python API
- **Overwriting Content Using CSV**
- **Enterprise Workflows**
  - Add/Delete/Update
  - Truncate & Append
  - Overwriting Content with Service Definitions
- **Conclusion**

# ArcGIS Python API

What is it?

- **Python API to your Web GIS**
- **Powerful, modern and easy to use**
- **Implemented using REST**

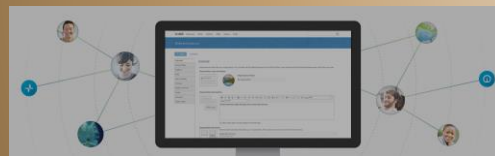
# ArcGIS Python API

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

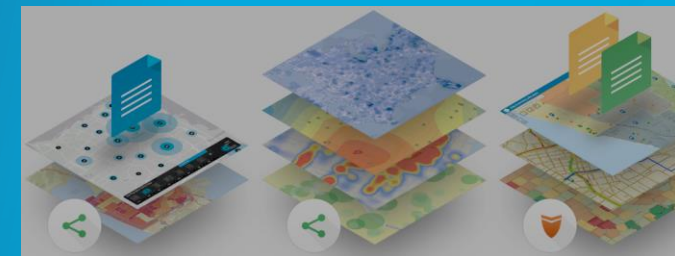
**Data Scientists**

**Content Publishers**

**Your Web GIS**

***Script and automate your Web GIS***

Data Management





### **Automate WebGIS management**

- Populate portal with users, groups
- Clone portals
- Reassign user content
- Perform comprehensive content search
- Determine item relationship
- Create reports of users, their items

## **What can it do for you?**

### **Automate content creation**

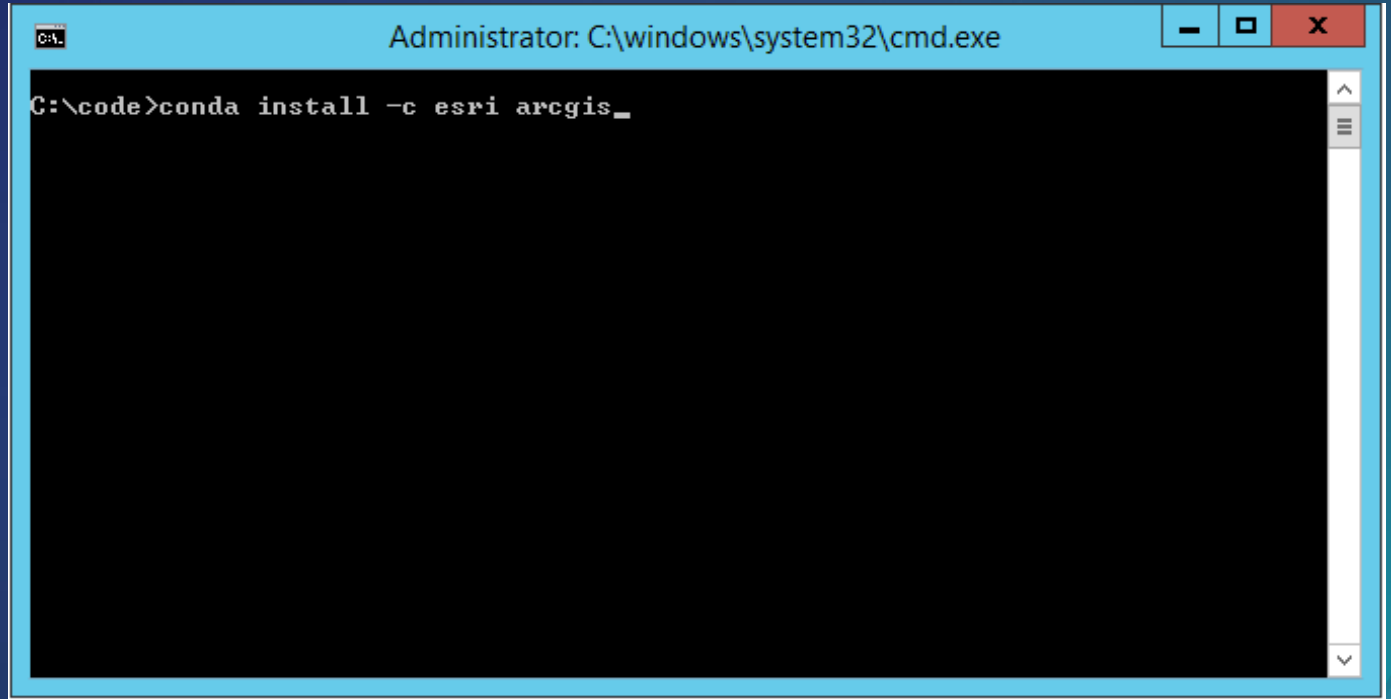
- Automate content publishing during off peak hours
- Update tiles and features from a known database
- Replicate development environment content to production
- Inspect and update items with broken service links

### **Reproducible research**

- Access big data tools programmatically
- Utilize rich 3<sup>rd</sup> 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

# How do you get this?

- **Distributed via Conda**
  - Simplifies installs & updates
  - Installs dependencies
  - Avoids conflicts
- **Install steps:**
  - Download Anaconda
  - `conda install -c esri arcgis`

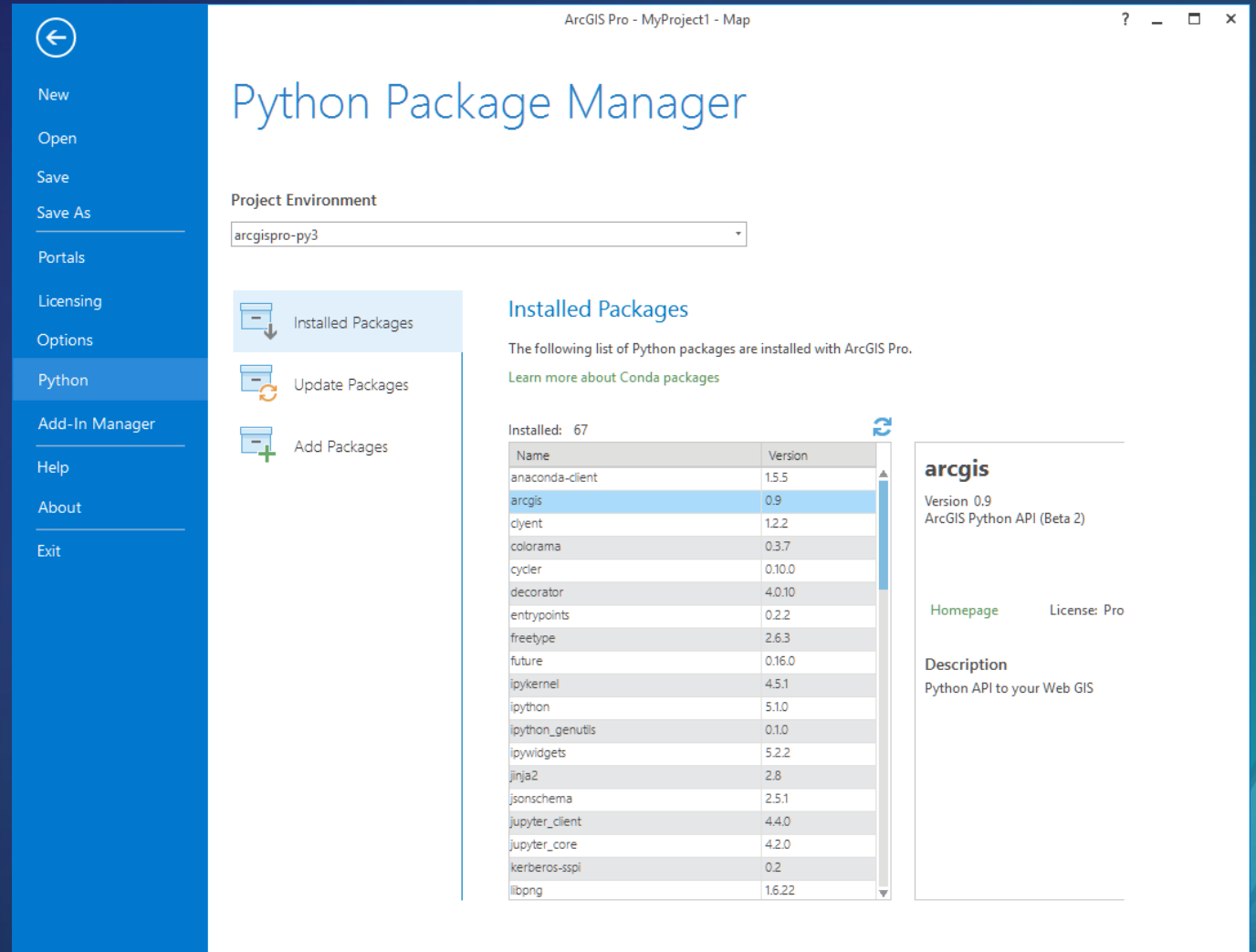


A screenshot of a Windows command prompt window titled "Administrator: C:\windows\system32\cmd.exe". The window has a blue title bar with standard Windows window controls (minimize, maximize, close). The command prompt shows the current directory as "C:\code" and the command "conda install -c esri arcgis\_" being entered. The text is white on a black background. There are also small icons for "CAL" and a list icon on the right side of the window.

```
Administrator: C:\windows\system32\cmd.exe
C:\code>conda install -c esri arcgis_
```

# Have ArcGIS Pro?

- ArcGIS Pro includes conda
- Follow steps from [install guide](#) to install arcgis package...



The screenshot shows the ArcGIS Pro Python Package Manager window. The left sidebar contains navigation options: New, Open, Save, Save As, Portals, Licensing, Options, Python (selected), Add-In Manager, Help, About, and Exit. The main area is titled 'Python Package Manager' and shows the 'Project Environment' set to 'arcgispro-py3'. Below this are three buttons: 'Installed Packages', 'Update Packages', and 'Add Packages'. The 'Installed Packages' section displays a list of 67 installed packages. The 'arcgis' package is highlighted in blue. To the right of the list, details for the 'arcgis' package are shown, including its version (0.9) and license (Pro).

ArcGIS Pro - MyProject1 - Map

## Python Package Manager

Project Environment: arcgispro-py3

**Installed Packages**

The following list of Python packages are installed with ArcGIS Pro.  
[Learn more about Conda packages](#)

Installed: 67

Name	Version
anaconda-client	1.5.5
<b>arcgis</b>	<b>0.9</b>
clyent	1.2.2
colorama	0.3.7
cycler	0.10.0
decorator	4.0.10
entrypoints	0.2.2
freetype	2.6.3
future	0.16.0
ipykernel	4.5.1
ipython	5.1.0
ipython_genutils	0.1.0
ipywidgets	5.2.2
jinja2	2.8
jsonschema	2.5.1
jupyter_client	4.4.0
jupyter_core	4.2.0
kerberos-sspi	0.2
libpng	1.6.22

**arcgis**

Version 0.9  
ArcGIS Python API (Beta 2)

[Homepage](#) License: Pro

**Description**  
Python API to your Web GIS

# API Overview

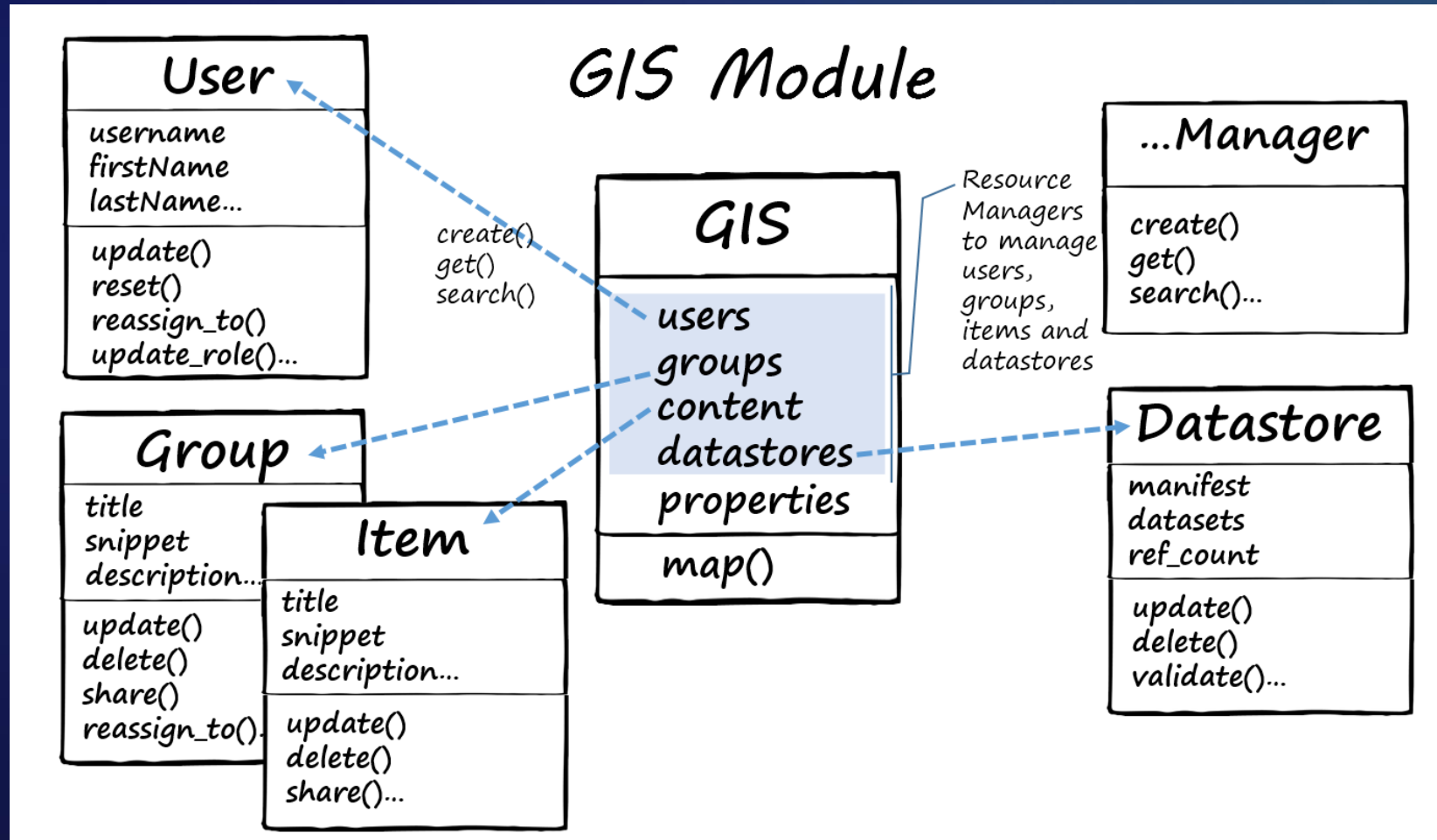
Pythonic GIS API





# The GIS Module

A GIS represented using Python



# Demo 1: Introduction to the ArcGIS Python API & Jupyter Notebook

File: 1\_Introduction

- **Connect to the GIS**
- **View item information**
- **Visualize items in a map**
- **Work with Spatially Enabled Data Frames**

# Practical Workflows for Overwriting Content

## Enterprise Data Movement

- **Enterprise Workflows**

- **Add/Delete/Update**

- Relevant for smaller datasets
    - Feature or groups of Features
    - JSON Syntax

- **Truncate & Append**

- Small, medium datasets (30K : 600K or less)
    - Groups of Features
    - FGDB, Shapefiles, CSV, GeoJSON

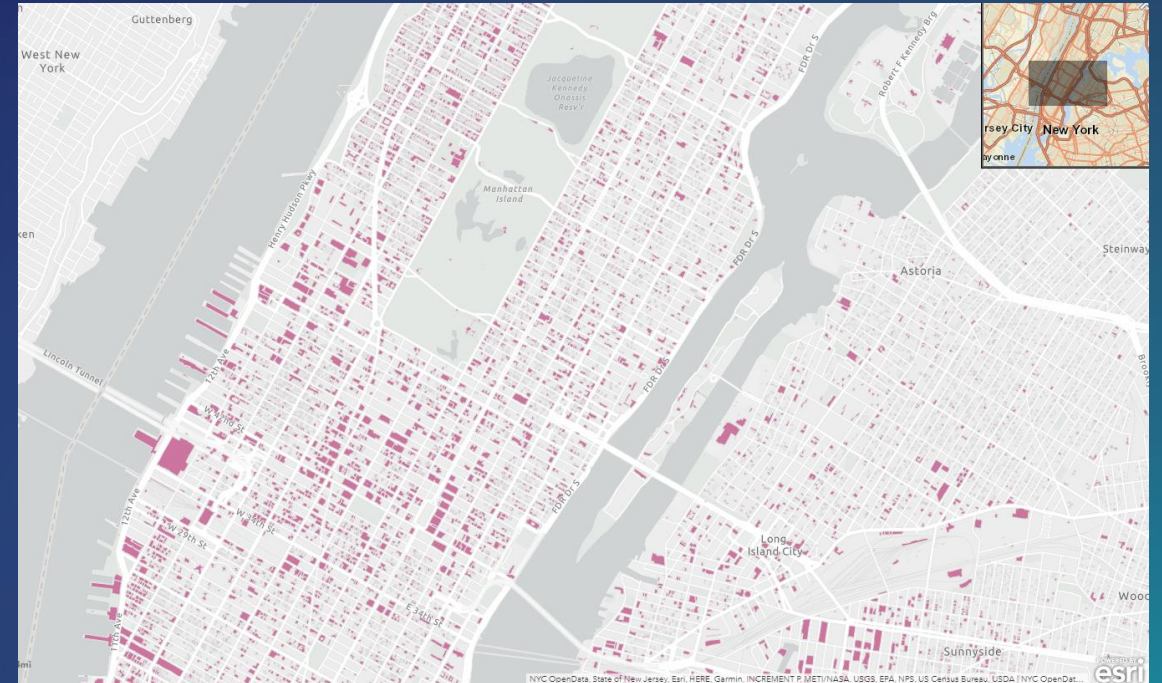
- **Overwriting Content with Service Definitions**

- Best for largest datasets (600K or greater), also works well for small/medium
    - Entire datasets
    - Service Definition files utilizing ArcGIS Pro or ArcMap

# Practical Workflows for Overwriting Content

## Enterprise Example

- NYC Building Footprints – ArcGIS Online
- 1.08 million complex Polygons
  - Add/Delete/Update
    - 700 Records at a time
    - 3 Hours 15 mins
      - 544K features written (50%) of dataset
  - Truncate & Append
    - 200K Record Sets
    - FGDB (no schema matching programmatically)
    - 1 hour 5 Minutes
  - Overwriting Content with Service Definitions
    - 30 minutes
    - Premium Data Stores in ArcGIS Online reduce total publishing time; i.e M1 = 12 minutes



## Demo 2: Connect to native Database publish data

File: 2\_Overwrite\_NYC\_csv

- Query SQL Server database table
- Export to csv
- Connect to GIS
- Publish Dataset



# Demo 3a: Connect to Socrata

File: 3a\_Socrata\_Query

- Connect to Socrata
- Manipulate Data
- Export to CSV
- Publish Dataset



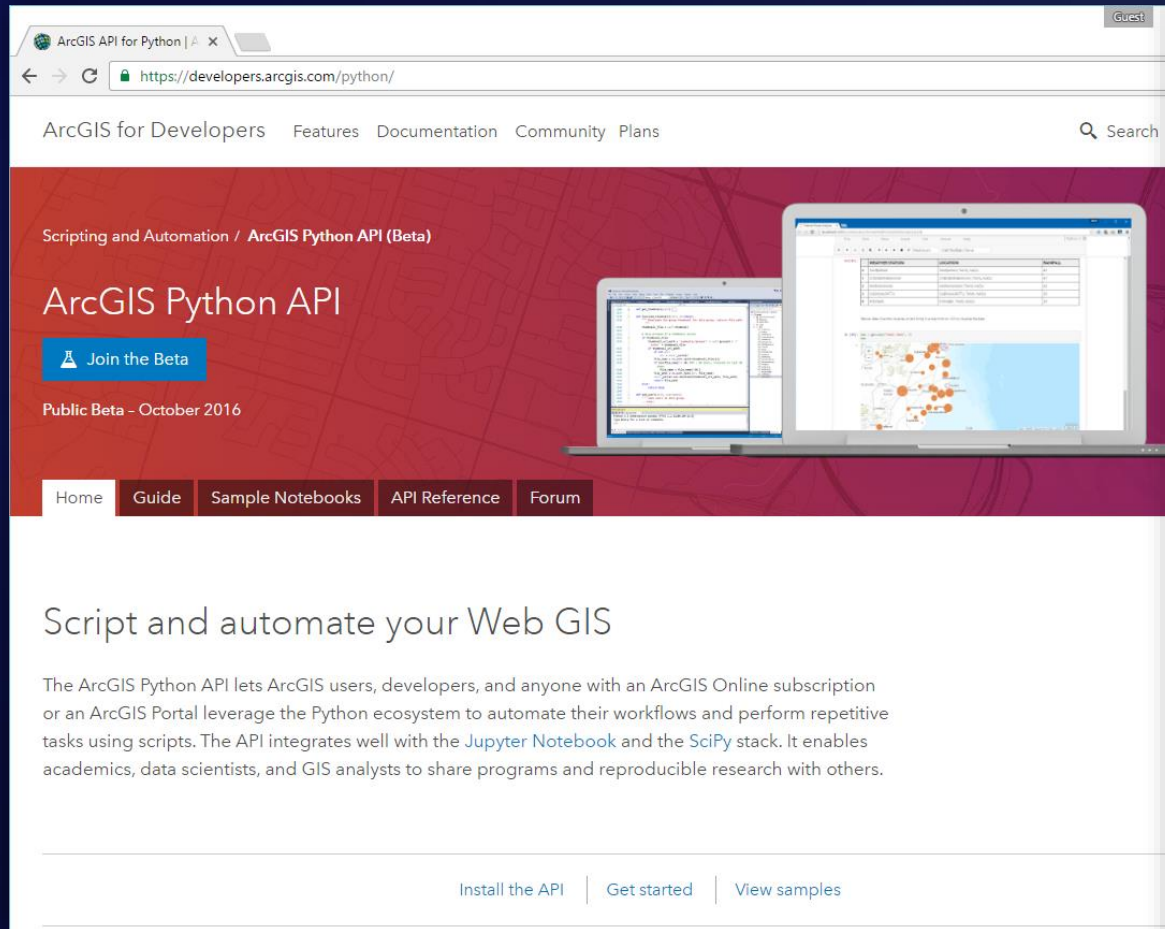
# Demo 3b: Connect to Socrata

File: 3a\_Socrata\_Query

- Connect to Socrata
- Manipulate Data
- Export to CSV
- Publish Dataset

# Resources

developers.arcgis.com/python



ArcGIS for Developers Features Documentation Community Plans

Scripting and Automation / ArcGIS Python API (Beta)

## ArcGIS Python API

[Join the Beta](#)

Public Beta - October 2016

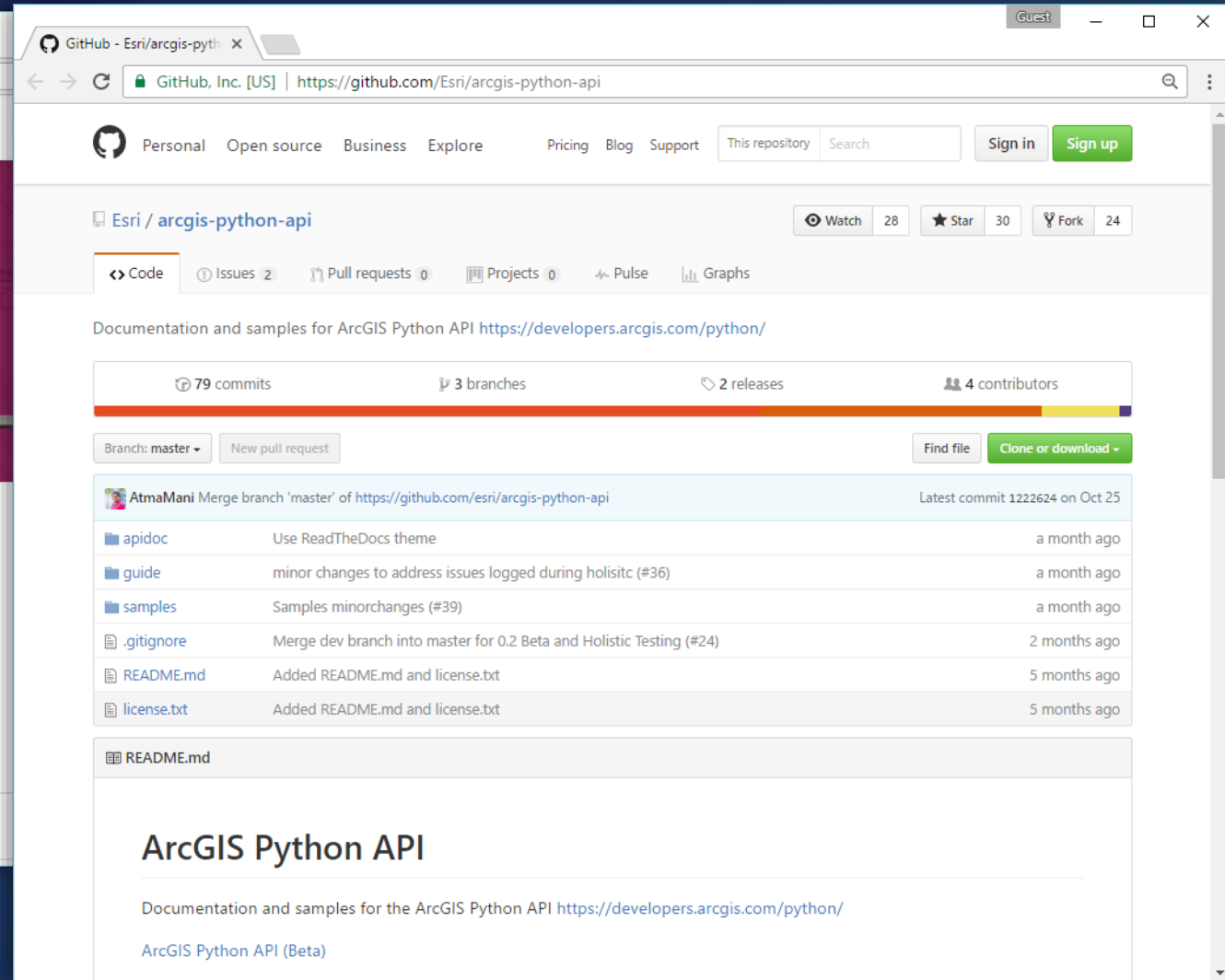
Home Guide Sample Notebooks API Reference Forum

Script and automate your Web GIS

The ArcGIS Python API lets ArcGIS users, developers, and anyone with an ArcGIS Online subscription or an ArcGIS Portal leverage the Python ecosystem to automate their workflows and perform repetitive tasks using scripts. The API integrates well with the [Jupyter Notebook](#) and the [SciPy](#) stack. It enables academics, data scientists, and GIS analysts to share programs and reproducible research with others.

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

github.com/Esri/arcgis-python-api



GitHub - Esri/arcgis-python-api

Personal Open source Business Explore Pricing Blog Support This repository Search Sign in Sign up

Esri / arcgis-python-api

Watch 28 Star 30 Fork 24

Code Issues 2 Pull requests 0 Projects 0 Pulse Graphs

Documentation and samples for ArcGIS Python API <https://developers.arcgis.com/python/>

79 commits 3 branches 2 releases 4 contributors

Branch: master New pull request Find file Clone or download

AtmaMani Merge branch 'master' of <https://github.com/esri/arcgis-python-api> Latest commit 1222624 on Oct 25

apidoc	Use ReadTheDocs theme	a month ago
guide	minor changes to address issues logged during holisitc (#36)	a month ago
samples	Samples minorchanges (#39)	a month ago
.gitignore	Merge dev branch into master for 0.2 Beta and Holistic Testing (#24)	2 months ago
README.md	Added README.md and license.txt	5 months ago
license.txt	Added README.md and license.txt	5 months ago

README.md

## ArcGIS Python API

Documentation and samples for the ArcGIS Python API <https://developers.arcgis.com/python/>

ArcGIS Python API (Beta)

github.com/albrownesri



esri

THE  
SCIENCE  
OF  
WHERE