Python Workflows with ArcGIS

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Esri Python API Workshop | March 26, 2019

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

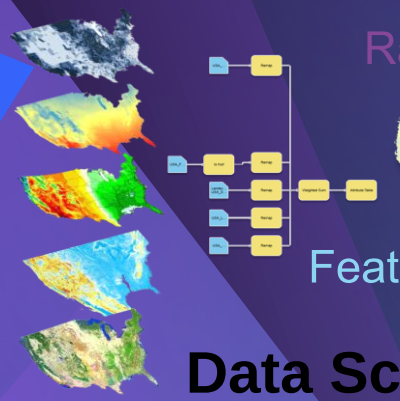
Spatial Analysis

Imagery

Location Analytics

Analysts

Big Data



Raster Analytics

Feature Analytics

Data Scientists

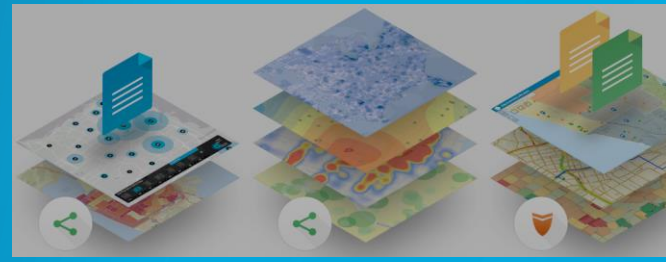
Enterprise Integration

Users, Roles & Group management

Administrators
DevOps

Your Web GIS

Content Publishers



Data Management

Script and automate your Web GIS

What can it do for you?

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

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

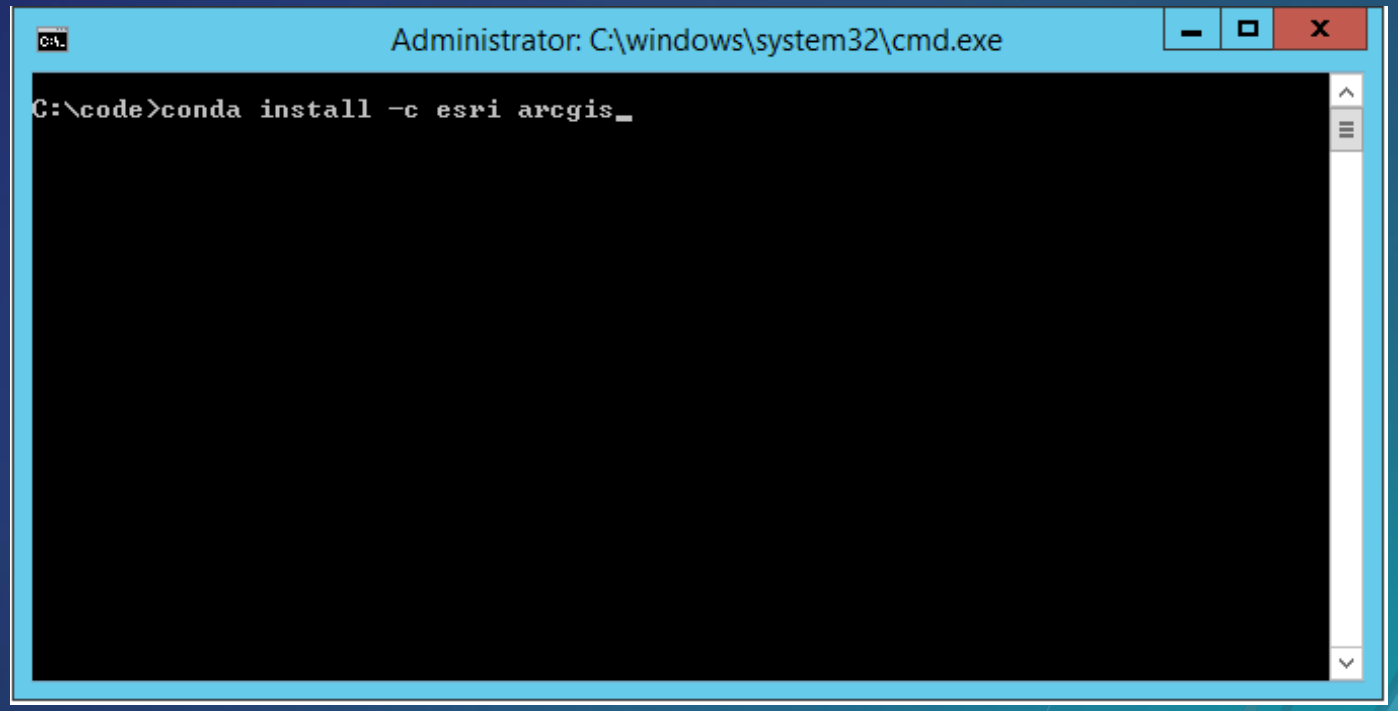
Reproducible research

- 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

How do you get this?

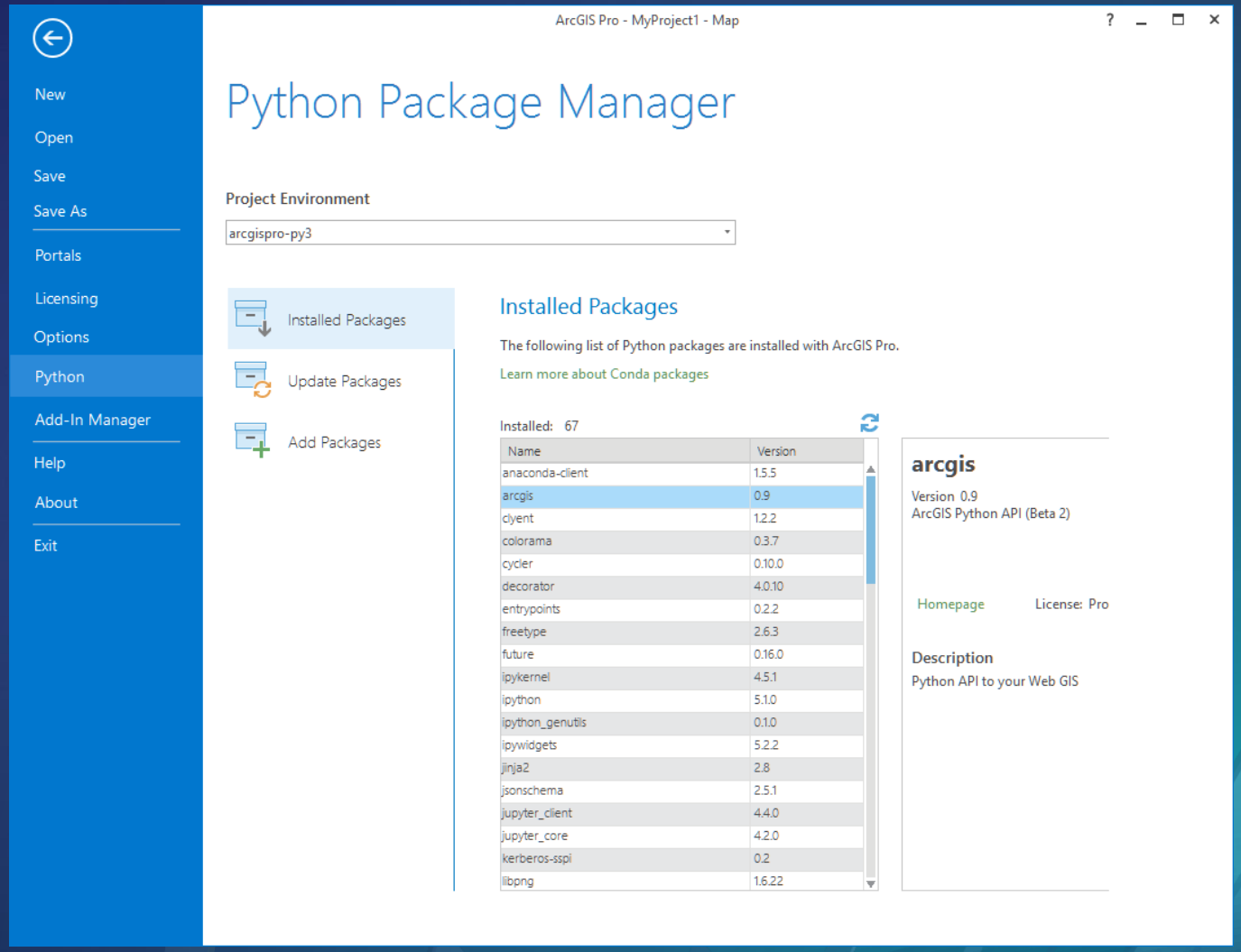
- **Distributed via Conda**
  - Simplifies installs & updates
  - Installs dependencies
  - Avoids conflicts

- **Install steps:**
  - Download Anaconda
  - `conda install -c esri arcgis`



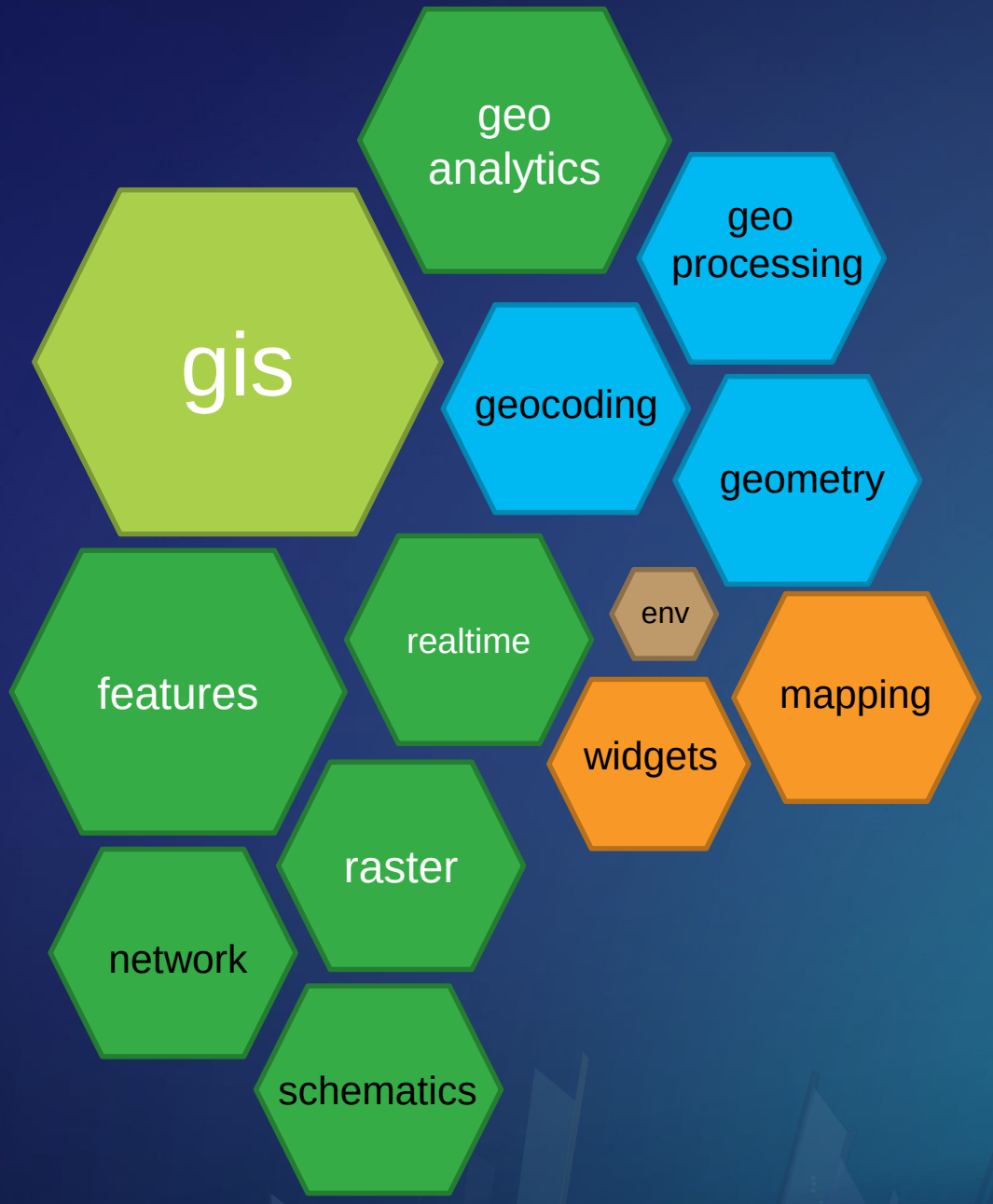
Have ArcGIS Pro?

- **ArcGIS Pro includes conda**
- **Follow steps from install guide to install `arcgis` package...**



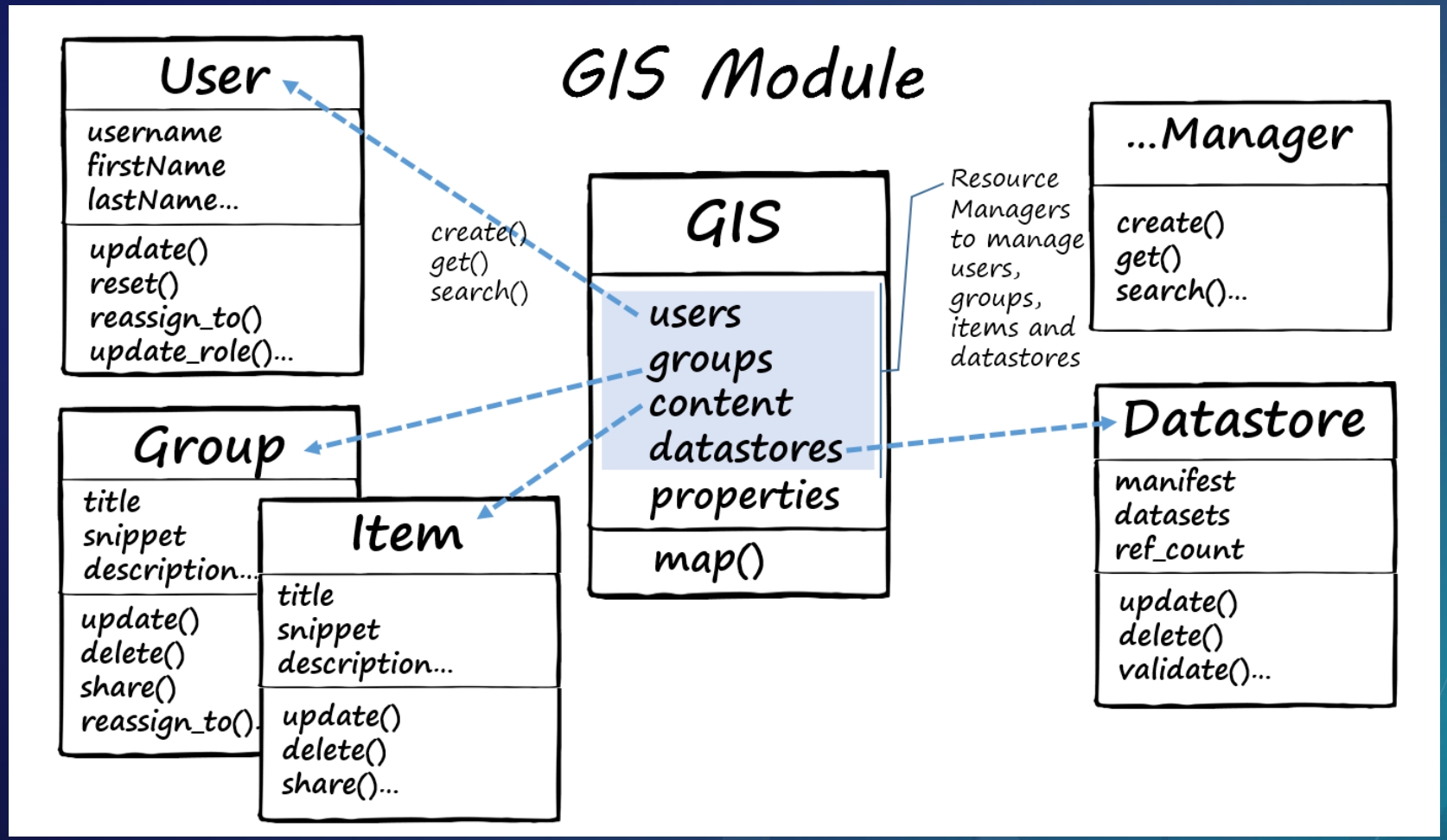
API Overview

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

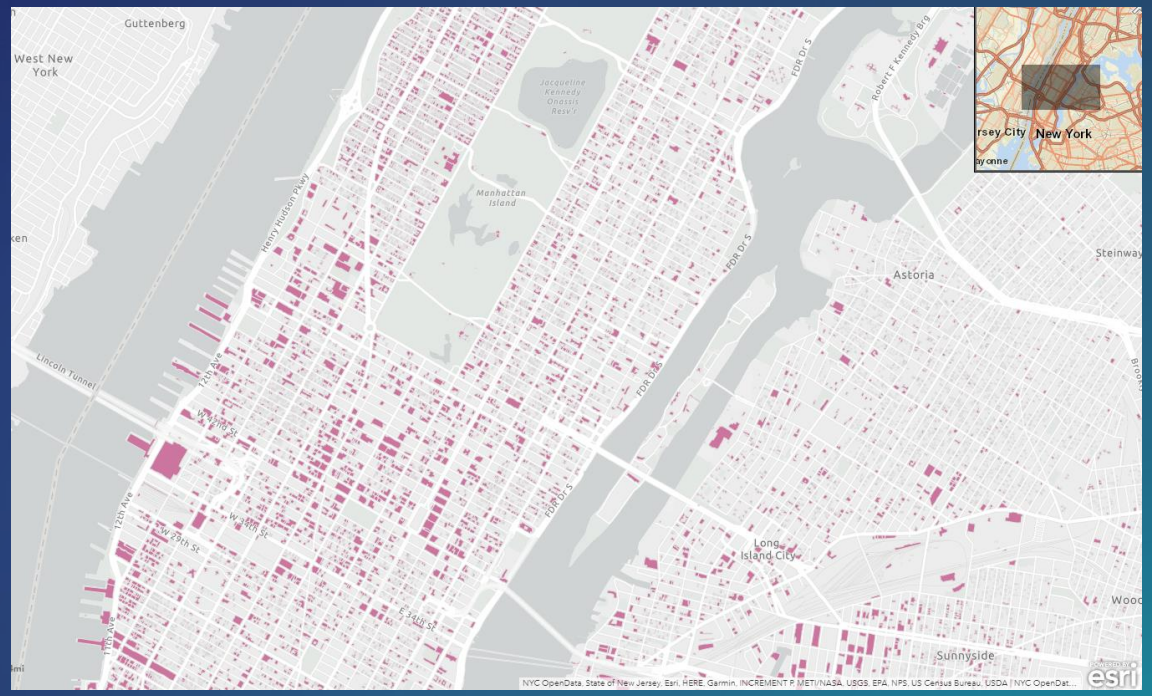
Enterprise Data Movement

- **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

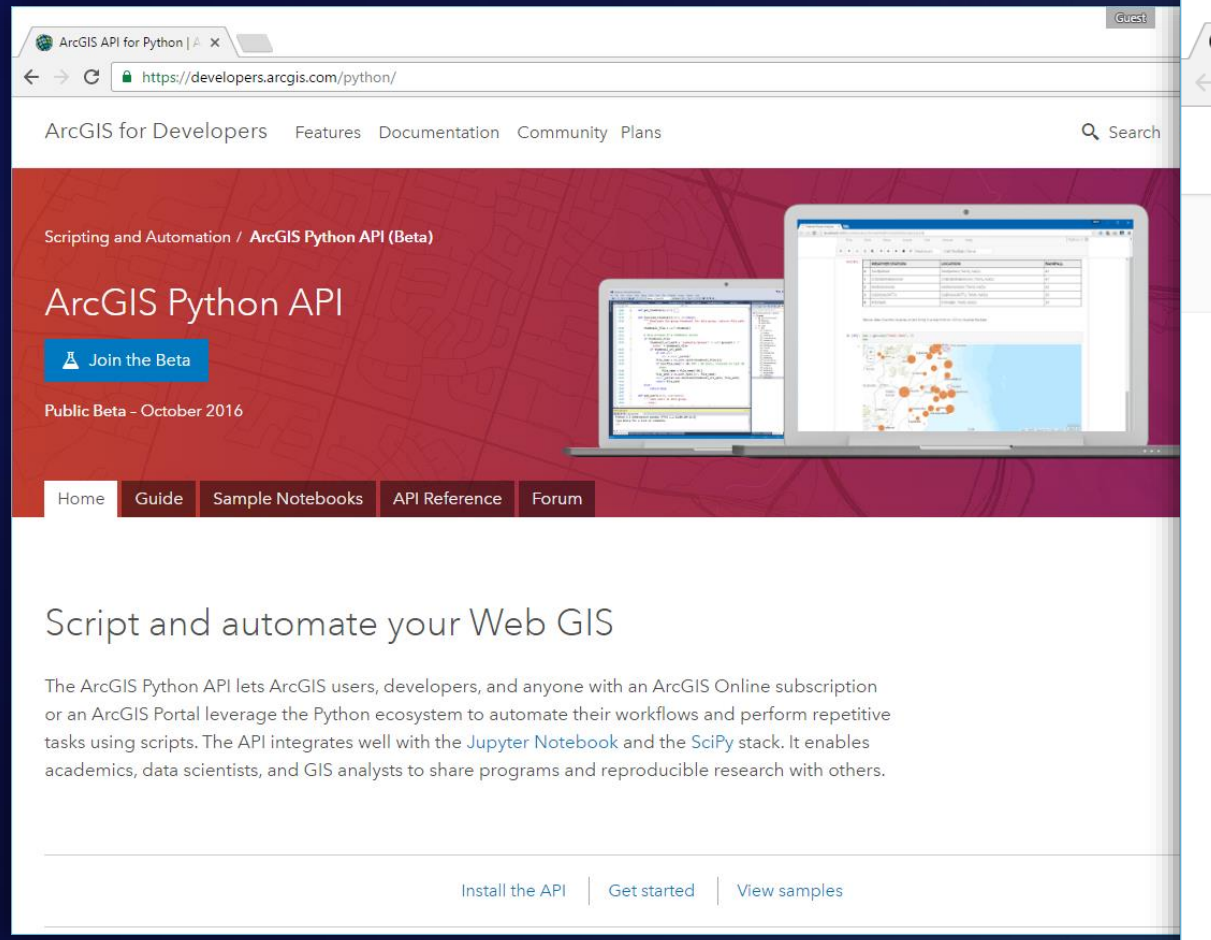
Demo 3b: Connect to Socrata

File: 3a_Socrata_Query

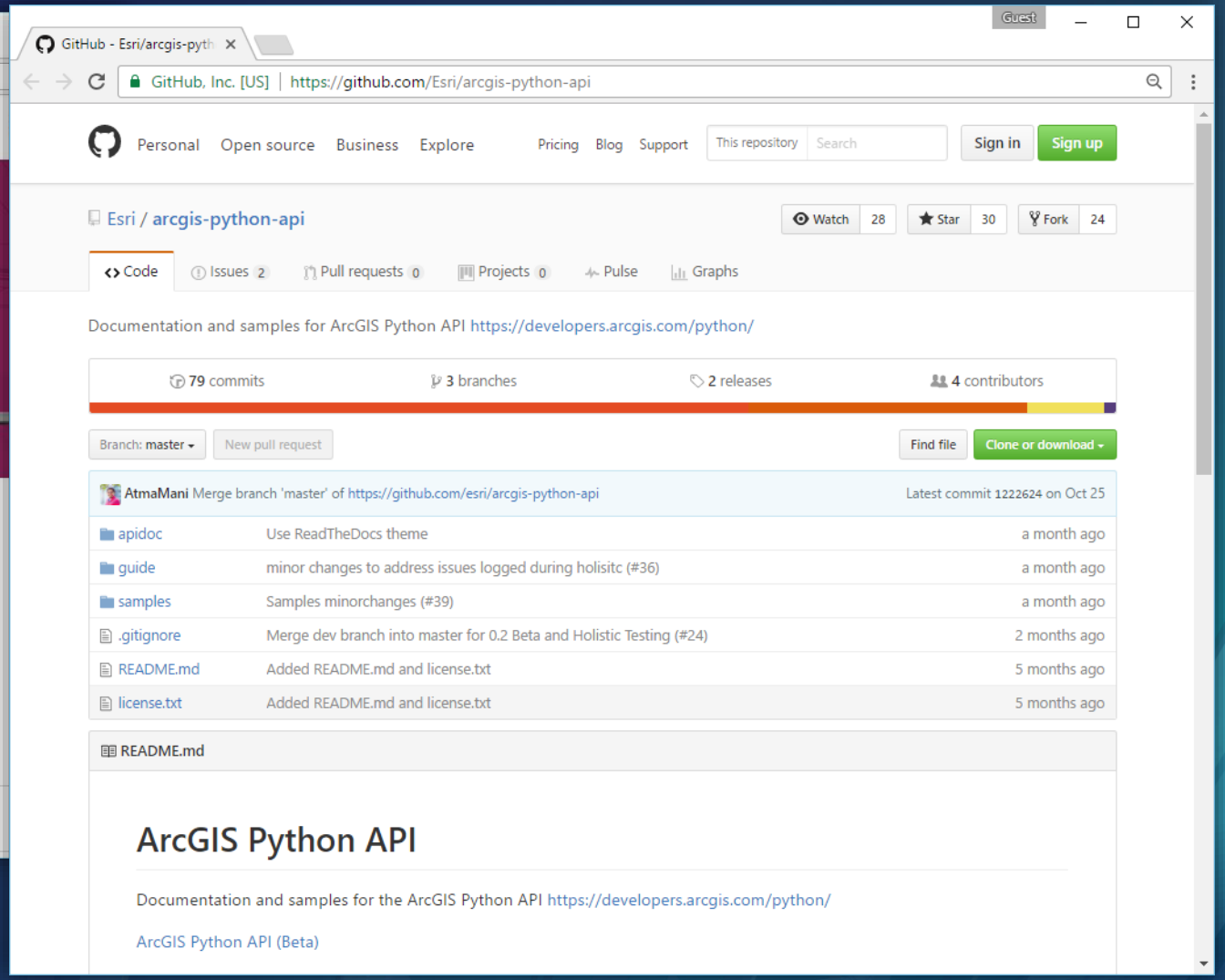
- Connect to Socrata
- Manipulate Data
- Export to CSV
- Publish Dataset

Resources

developers.arcgis.com/python



github.com/Esri/arcgis-python-api



github.com/albrownesri

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