Working with Python in ArcGIS Pro

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Focusing on changes with ArcGIS Pro 2.1 and 2.2

- conda
- arcpy.sharing
- Debugging
- arcpy.EnvManager
- ArcGIS API for Python
- Jupyter notebooks
Misc.

• Many new geoprocessing tools added
  - See “What’s new in ArcGIS Pro 2.2” and “What’s new in ArcGIS Pro 2.1” and toolbox history topics for more information

• Describe and da.Describe now include a datatype argument
  - Deal with conflicts in naming (Feature Class vs. Feature Dataset for example)

  \[d = \text{arcpy.da.Describe}(\text{data, “FeatureClass”})\]
Conda – Why Packages?

- Software is composed of many smaller components, often called packages or libraries
- It’s often better to reuse code that solves a problem well rather than recreating it
- But, sharing code is a hard problem
  - Do you have the same packages of the same versions as the developer did?
Package Management for Python

• Why not pip, wheels, virtualenvs?

• Don’t handle the harder problem of system dependencies, considered out of scope by Python packagers – does it end up in site-packages?
Why Conda?

• Scientific Python community identified that there was a gap not being addressed by the core Python infrastructure, limiting their ability to get packages into the hands of users

• Industry standard built by people who care about this space — Continuum Analytics
Why Conda?

• It solves the hard problem:
  - Handles dependencies for many languages
  - Built for Python first, but it really solves a much broader infrastructural issue.

• Gateway to data science — scientific, analytics, integrated software ecosystem for organizations
conda

At Pro 2.1
- Can manage conda environments from within ArcGIS Pro
- Can create, clone or delete environments
- Can change the active Python environment

At Pro 2.2
- The default environment (arcgispro-py3) is now read-only
- New environments are created in your user profile (for all install types)
- No longer need administrative access to be created or modified
Warnings

• After uninstalling Pro, remove any pre-existing conda updates and additions
  - Can cause interference, leading to missing libraries, etc.
  - If you don’t, run ‘conda upgrade python’ from conda with elevated permissions

• When creating (or cloning a new environment), wait for it to complete
  - The first time will be the longest
  - Exiting Pro prematurely will result in an incomplete environment
conda
arcpy.sharing

- The new arcpy.sharing module allows you to create a sharing draft from a Pro map
  - Can be then shared to ArcGIS Enterprise or ArcGIS Online

- At 2.2, includes 3 functions:
  - FeatureSharingDraft
  - TileSharingDraft
  - MapImageSharingDraft
arcpy.sharing
Debugging in ArcGIS Pro

• Debugging of script tools has historically been awkward

• In particular, debugging validation required some creativity
  - My personal ‘favorites’ include:
    - Abusing parameter messaging
    - Temporary parameters to send information to
Debugging Python in Pro – prerequisites VS

- Visual Studio 2017 (Community version or up).
  - Visual Studio 2015 doesn’t support debugging for Python 3.6, so it can’t be used to attach ArcGIS Pro 2.1 which has been upgraded to Python 3.6.2.

- Python Development Tools package: https://github.com/Microsoft/PTVS
- Python code you want to debug must be in a .py file
Debugging Python in Pro – getting started

• If not already, ensure Python is initialized in Pro
  - Open Python-based tool or Python window
• In Visual Studio, under Debug menu, click Attach to Process…
• Select Python as code type
• In process list, click Attach
• Once the status bar is orange, you’re ready to go
Debugging
ArcGIS Python API

- v1.0 was released Dec 2016

- Included with ArcGIS Pro at 2.1
  - Previously had to be added separately

- As a secondary benefit of including ArcGIS Python API, Jupyter notebook is now also included in Pro
Managing geoprocessing environments

- EnvManager is a new class for managing geoprocessing environments
  - also in 10.6.1

- Used as a context manager, environments are set for the duration of a with block

```python
with arcpy.EnvManager(cellSize=20):
    arcpy.Tool(arg1, arg2)
```

- Set one or more environments
- At end of with statement, environments are restored to their previous values

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