Troubleshooting Python Issues in ArcGIS Desktop

Thomas Jensen
Andrew Johnson
Agenda

- Best Practices/How To
- Troubleshooting Tips
Best Practices
Where to start?

- Two technologies for scripting and automation
  - Arcpy
    - Desktop based for ArcGIS Pro and ArcMap
    - Windows environment
  - ArcGIS API for Python
    - Online/Portal based
    - Windows/Mac/Linux environment
IDE’s

• Use preferred IDE
  - IDLE
  - PyCharm
  - Visual Studio
    - Visual Studio Community
    - Visual Studio Code
  - Pyscripter
  - Jupyter Notebook
  - ArcMap/ArcGIS Pro Python Window
## Versions/Compatibility

<table>
<thead>
<tr>
<th>ArcMap 10.5.1</th>
<th>Background GP</th>
<th>ArcGIS Pro 2.0</th>
<th>ArcGIS Server 10.5.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.7.13</td>
<td>2.7.13</td>
<td>3.5.3</td>
<td>2.7.13</td>
</tr>
<tr>
<td>32 bit</td>
<td>64 bit</td>
<td>64 bit</td>
<td>64 bit</td>
</tr>
</tbody>
</table>
Versions/ Compatibility

What if I have multiple versions of python on the same machine?

- Run from Command line
  - `C:\Python27\ArcGIS10.x\python.exe C:\Temp\test.py`

- Batch File
  - `C:\Python27\ArcGIS10.x\python.exe C:\Temp\test.py`

- Windows File Associations
Differences between Python 2 and 3

- **Arcpy changes**
  - (mp module instead of mapping module)
  - Unsupported tools

- **Python changes**
  - Print function
  - Input() instead of raw_input()
  - Range() instead of xrange()

- **Utilities**
  - Analyze Tools for Pro
  - Python 2 to 3
  - Recommend writing scripts for Python 3
  - From __future__ import division
Demo: Python 2 to 3
Troubleshooting ArcMap and ArcGIS Pro Environments
Python Installation

- Possible corrupt python install?

ArcMap
- Rename C:\python27 and run a repair
- Python27 folder will be rebuilt

ArcGIS Pro
- C:\Program Files\ArcGIS\Pro\bin\Python\envs\arcgispro-py3
- Rename Python folder and run a repair
Error Importing arcpy

- Import Error: No module named arcpy
  - Check python version
  - Check desktop10x.pth
    - C:\Program Files (x86)\ArcGIS\Desktop10.x\bin
    - C:\Program Files (x86)\ArcGIS\Desktop10.x\ArcPy
    - C:\Program Files (x86)\ArcGIS\Desktop10.x\ArcToolbox\Scripts
  - Check environment variable
    - Path
    - PythonPath
Python Options

- C:\Python27\ArcGIS10.5\python.exe –v
  - Prints out the location of the filename or built-in module

- C:\Python27\ArcGIS10.5\python.exe –E
  - Ignores all python environment variables (PYTHONPATH, PYTHONHOME)
Demo: Path file and Python verbose
• Running into an out of memory error?
  - Run in python window in ArcMap
  - Run against 64 bit exe
Syntax Issues?

- Copy as Python Snippet via the Results window
String formatting?

- Print("your name is {0} and you are {1} years old".format(name, age))

- oracle_id = 8

- arcpy.SelectLayerByAttribute_management(in_layer_or_view="fclayer", selection_type="NEW_SELECTION", where_clause="ID = {0}".format(oracle_id))
Demo: Copy Python Snippet
ArcGIS Pro Python Environment
Python in ArcGIS Pro

- Python has a rich ecosystem of preexisting packages, but managing all of these packages can be a headache, especially when sharing code with others

- To solve this, ArcGIS Pro leverages Conda, the most popular Python package manager
  - Supports installing third-party libraries associated with a single project rather than into the base Python installation
  - Conda does this by providing isolated Python environments with only the desired packages installed
Python Package Manager

- Interface for managing installed Python packages in ArcGIS Pro’s Conda environment
Demo: Python Package Manager
Python, Conda, and ArcGIS Pro

- ArcGIS Pro installs a conda-based Python environment into Pro’s install folders
Running Python scripts for Pro

• A script that used to work now fails?
  - Use propy.bat to run the script, not the python34.exe from earlier versions of Pro
    - Use "c:\Program Files\ArcGIS\Pro\bin\Python\scripts\propy.bat" my_script.py
    - Instead of “c:\python34\python.exe” my_script.py
  - Propy.bat includes all the packages actively being used by ArcGIS Pro (those installed in the Package Manager), whereas python34.exe does not.
    - Note! Propy.bat requires Admin privileges
Stuck?

**Self help**

- Check your syntax
- Move data to local folder
- Use print statements
- Geonet, StackExchange, GitHub
- ArcScripts
  - Codesharing.arcgis.com

**Ask Esri for help**

- Simplest testable case
- Create GP package in ArcMap (for script tools)
- What error message? On what line?
Additional UC Sessions

• ArcGIS Python API: Introduction to Scripting your Web GIS - Wednesday July 12
  • 10:15am-11:30am Sapphire Ballroom M

• Python: Arcpy Tips and Tricks - Wednesday July 12
  • 1:30pm-2:15pm SDCC Demo Theater 07

• Python: An Introduction - Thursday July 13
  • 1:30pm-2:45pm SDCC Room 4

• Working with Python in ArcGIS Pro - Thursday July 13
  • 10:00am-10:30am SDCC Tech Theater 19 Exhibit Hall A