

# Data Science in ArcGIS Notebooks

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# About the Presenters



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Senior Solution Engineer,  
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# Key Takeaways

- ArcGIS Notebooks key component of the ArcGIS Platform
  - Desktop
  - Online
  - Enterprise
- Allows for more expansive workflows
  - Python / 3<sup>rd</sup> Party Libraries
  - Diverse Use Cases



# Agenda

- Overview of ArcGIS Notebooks
- Demo: ArcGIS Notebooks in ArcGIS Pro
- Demo: Analysis in ArcGIS Notebooks
- Demo: Spatial Analysis using ArcGIS and 3<sup>rd</sup> Party Libraries
- Conclusion / Q&A

# Python



- Python is one of the most widely used programming languages.
- Contains a wide set of libraries for conducting Data Science and Analysis

Python + GIS use cases



Web GIS  
Administration



Content  
Management



Analysis and  
Data Science

# ArcPy

## Desktop GIS Functionality

- Tools
- Functions
- Classes
- Modules
  - Mapping – arcpy.mp
    - Manipulate contents of ArcGIS Pro projects and layer files
    - Upgraded from arcpy.mapping
    - Leverages Python 3.x

```
import arcpy
aprx = arcpy.mp.ArcGISProject(r"C:\Projects\YosemiteNP\Yosemite.aprx")
mp = aprx.listMaps('Yosemite National Park')[0]
for lyr in mp.listLayers():
    if lyr.name == 'Roads':
        if lyr.maxThreshold == 10000:
            lyr.visible = True
        if lyr.maxThreshold == 100000:
            lyr.visible = False
aprx.save()
del aprx
```

### arcpy.mp functions

ArcGISProject(aprx\_path)

ColorRamp(color\_ramp\_name, {index})

ConvertLayoutFileToLayout(layout\_file)

ConvertWebMapToArcGISProject(webmap\_json, {template\_pagx}, {mapframe\_name}, {notes\_gdb})

CreateWebLayerSDDraft(map\_or\_layers, out\_sddraft, service\_name, {server\_type}, {service\_type}, {folder\_name}, {overwrite\_existing\_service}, {copy\_data\_to\_server}, {enable\_editing}, {allow\_exporting}, {enable\_sync}, {summary}, {tags}, {description}, {credits}, {use\_limitations})

LayerFile(layer\_file\_path)

PDFDocumentCreate(pdf\_path)

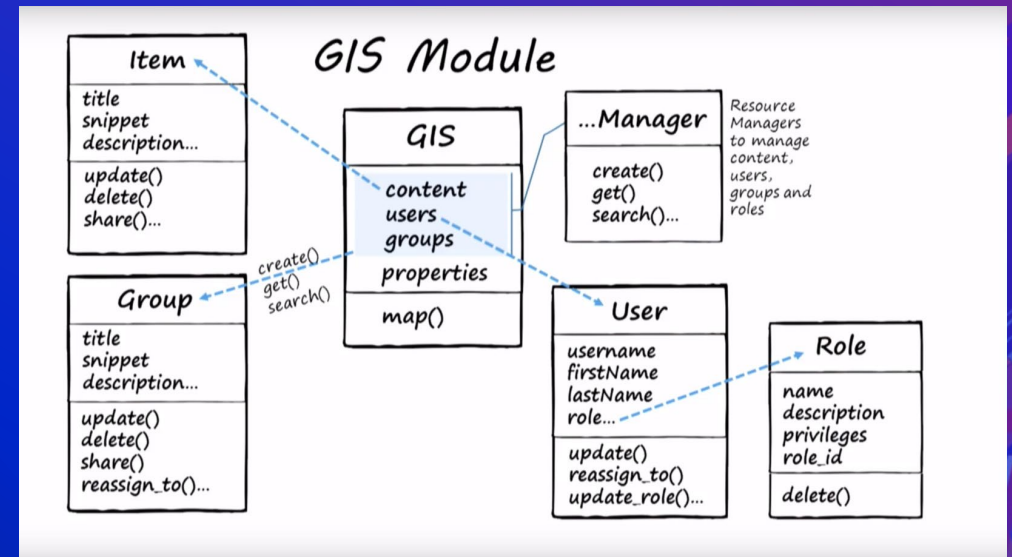
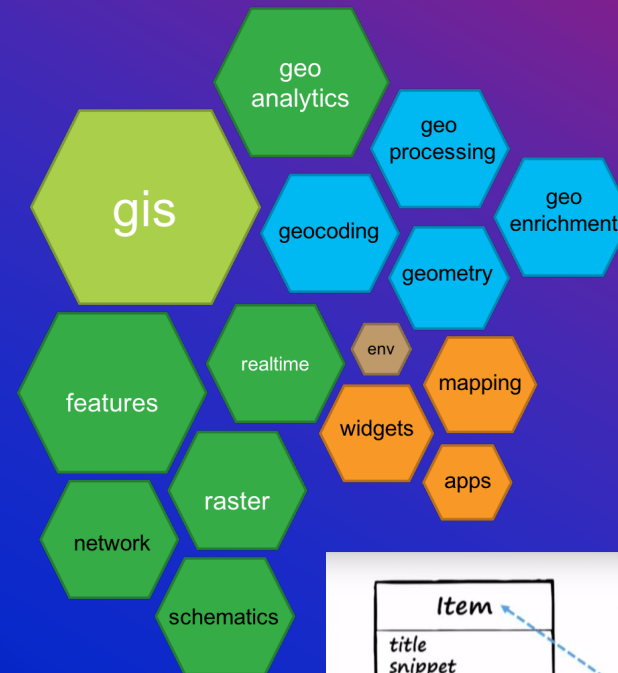
PDFDocumentOpen(pdf\_path, {user\_password}, {master\_password})

Table(table\_data\_source)

# ArcGIS API for Python

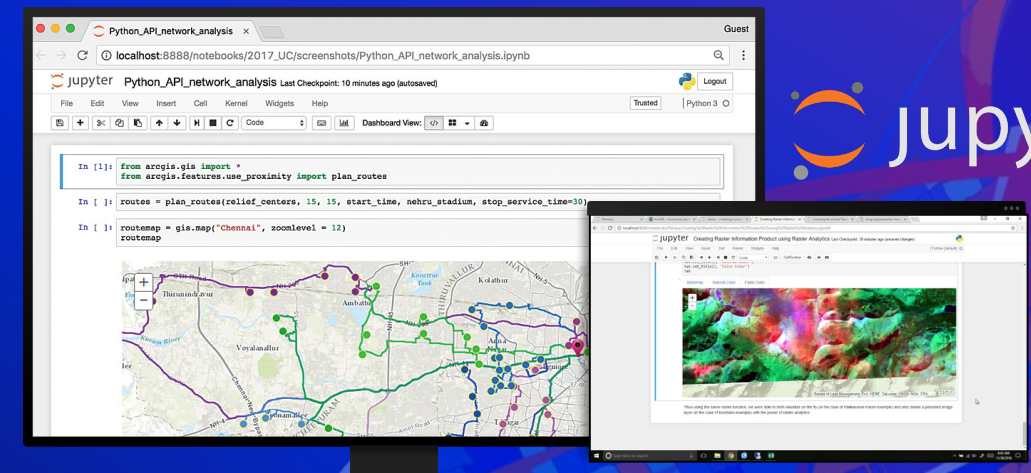
## Web GIS Python Functionality

- On your **Web GIS** perform:
  - GIS visualization
  - Analysis
  - Spatial data management
- Leverage SciPy ecosystem for
  - Automating workflows
  - Performing repetitive tasks
- Integrate with notebooks for **interactive scripting and visualization**



# Python Notebook / Jupyter


- Jupyter is open source software designed to support interactive data science and scientific computing.
- It is browser based and lets you write, run, and document your code all in one place.
- Esri has included Jupyter alongside ArcGIS Pro for several years and the ArcGIS API for Python was developed to make the most of Jupyter's functionality.



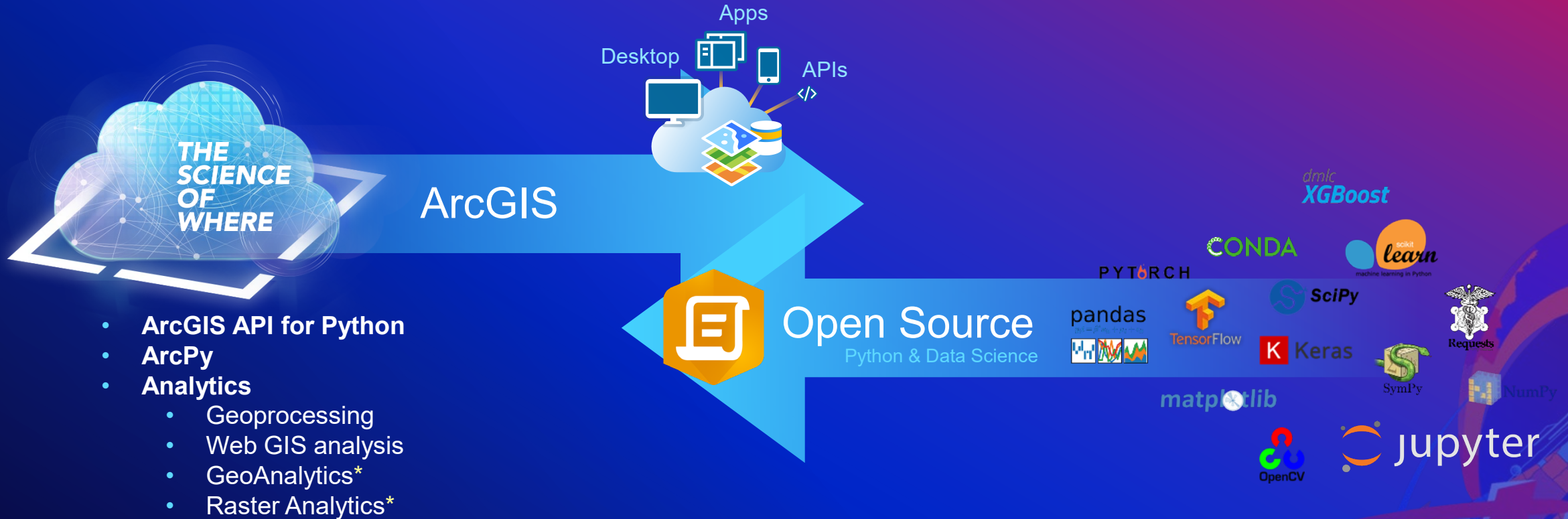
 jupyter



# Why Use Notebooks

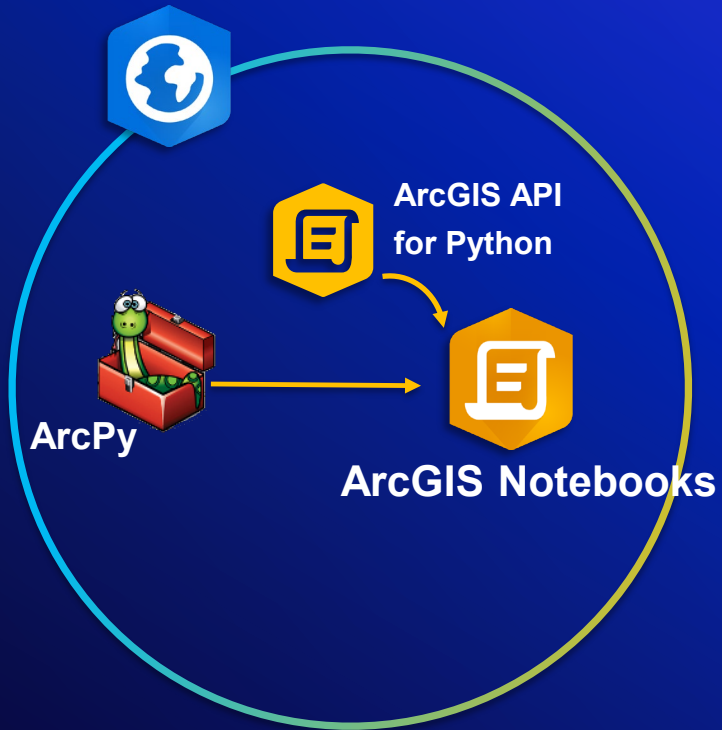
- **Storytelling: transparency and reproducibility**
  - **Interactive / Provide Feedback on a cell by cell basis**
  - **Access to our Python libraries: ArcPy and the ArcGIS API for Python**
  - **Integration with ArcGIS, to promote collaboration and sharing**
- 

# Expanding your workflow...



# How does ArcGIS Support Notebooks?

## ArcGIS Pro



## User Managed Environment



## ArcGIS Notebooks



Integrated experience  
within the Web GIS

# Licensing – ArcGIS Notebook Server



ArcGIS API for Python +  
3<sup>rd</sup> party Python libraries



Standard + ArcPy libraries

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Standard + ArcPy libraries



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