ArcGIS Pro:
Your Spatial Data Science Workstation

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Spatial Data Science is…

Data
Engineering

Visualization
& Exploration

Spatial
Analysis

Machine
Learning & AI

Big Data
Analytics

Modeling
& Scripting

Sharing
& Collaboration

ArcGIS Pro is a powerful spatial data science workstation

Data Engineering

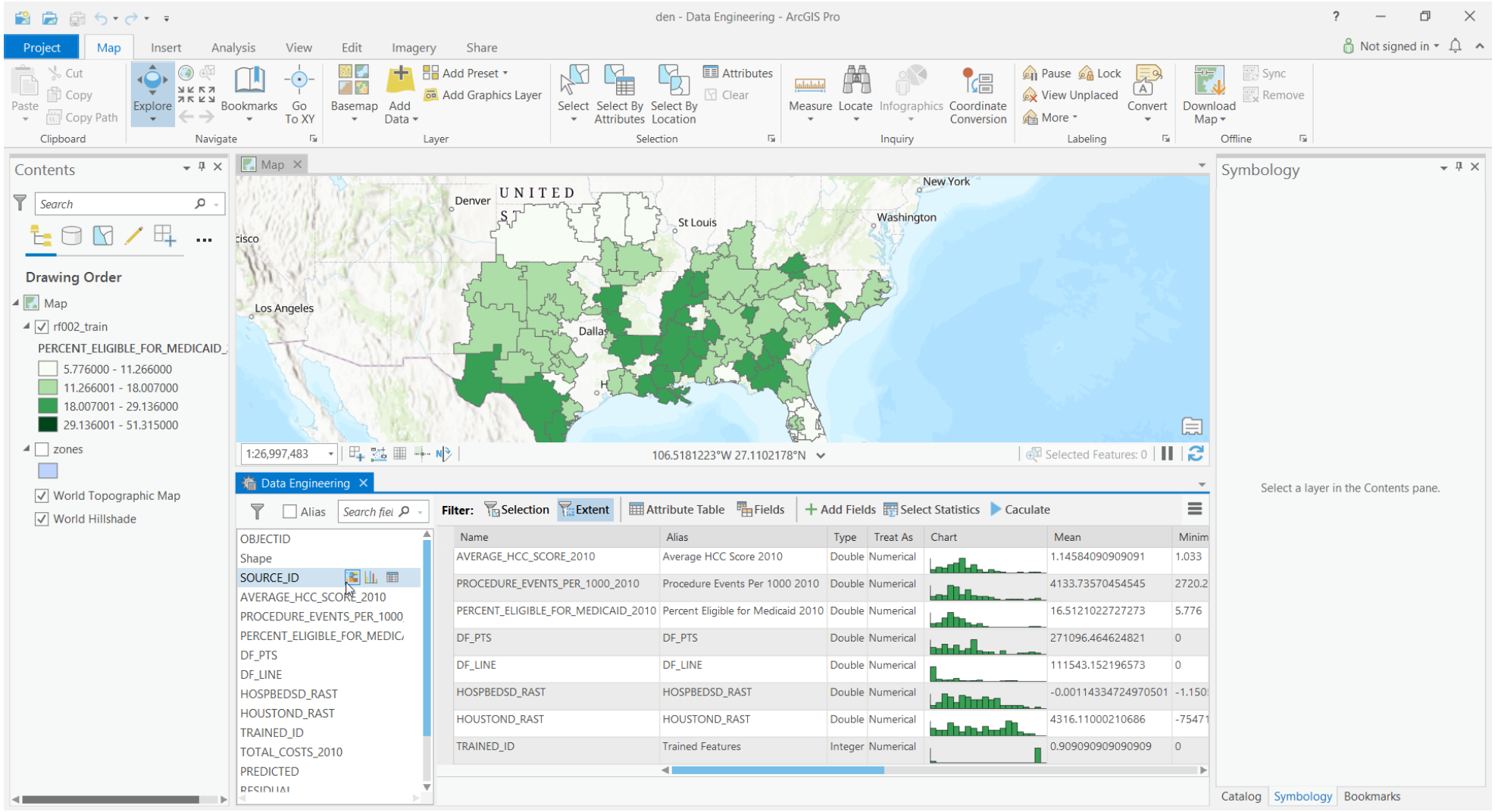
Transform your data with geography

Data Engineering

- Getting your data ready for analysis
  - What's missing?
  - What's wrong?
  - What can you add?
  - What should you transform?

Data Engineering Experience

Sneak Peak



Data Engineering

Transform your data with geography

Visualization and Exploration

Make sense of your data

Spatial Analysis

Spatial problem solving

Spatial Data Science is…

Data Engineering

Visualization & Exploration

Spatial Analysis

Machine Learning & AI

Big Data Analytics

Modeling & Scripting

Sharing & Collaboration

Spatial Data Science is…

Data
Engineering

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Focus on the problem

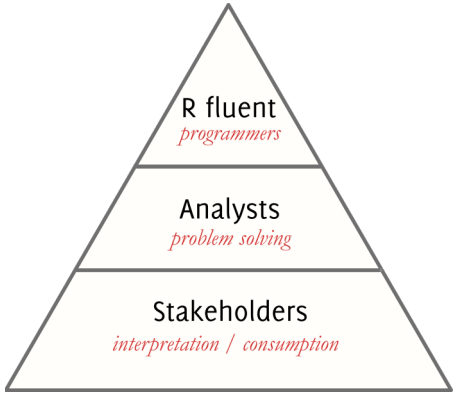
Spatial Analysis

Demo: Advanced Analysis in Pro

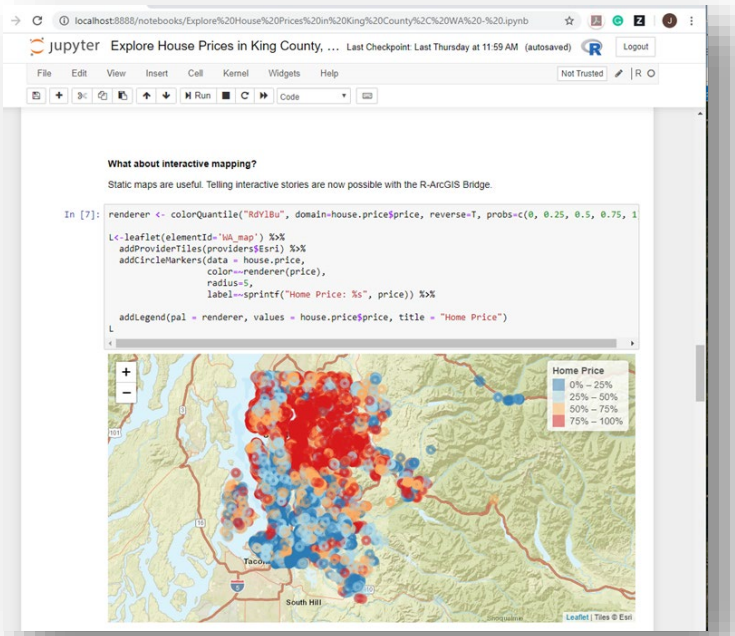
Spatial Analysis

Demo: R-ArcGIS Bridge

R-ArcGIS Bridge



- R Statistical Programming Language
  - Powerful core data structures for analysis
  - Unparalleled breath of statistical routines
  - CRAN: 17000+ packages for solving problems
- Esri: Integration with R-ArcGIS Bridge
  - Access local and remote data
  - Transform to native R spatial data types: `sf`, `sp`, `raster` package
  - Selection and filtering to minimize memory footprint
  - Ways to use:
    - Use in R Studio / R
    - Make GP tools which can call R
    - Jupyter Notebooks with R: `conda install r-arcgis-essentials`



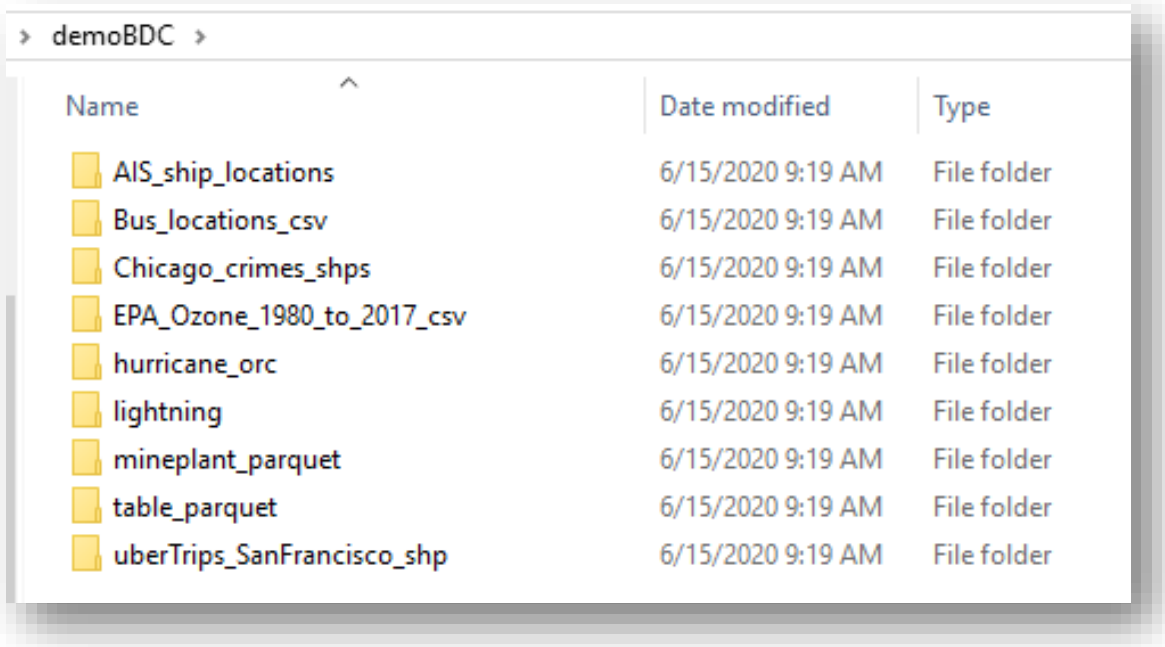
R Notebooks with Esri Leaflet and ArcPy

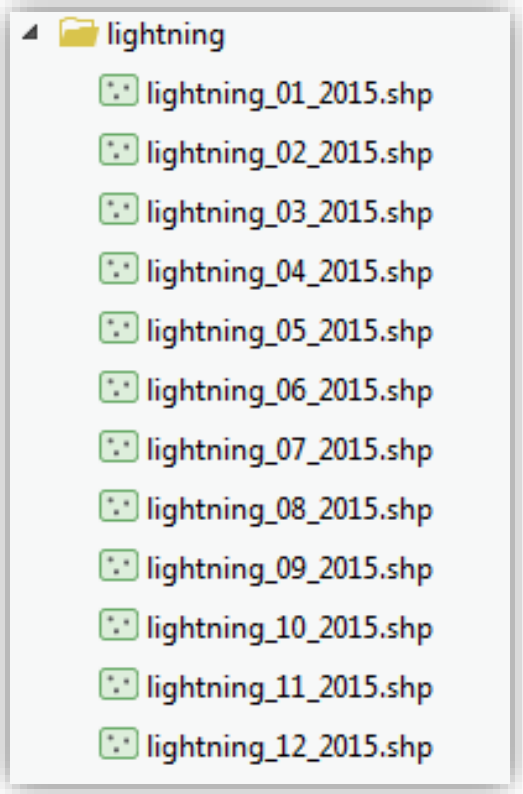
Big Data Analytics

Powered by distributed computing

Big Data Connections

- Read directly from collections of datasets in a directory
  - Delimited files
  - Shapefiles
  - Parquet
  - ORC





Project Geode

Sneak Peak

- Bringing spatial analysis and data engineering tools for vector and tabular datasets to cloud infrastructure that leverages Apache Spark
  - Google Cloud
  - Azure
  - AWS

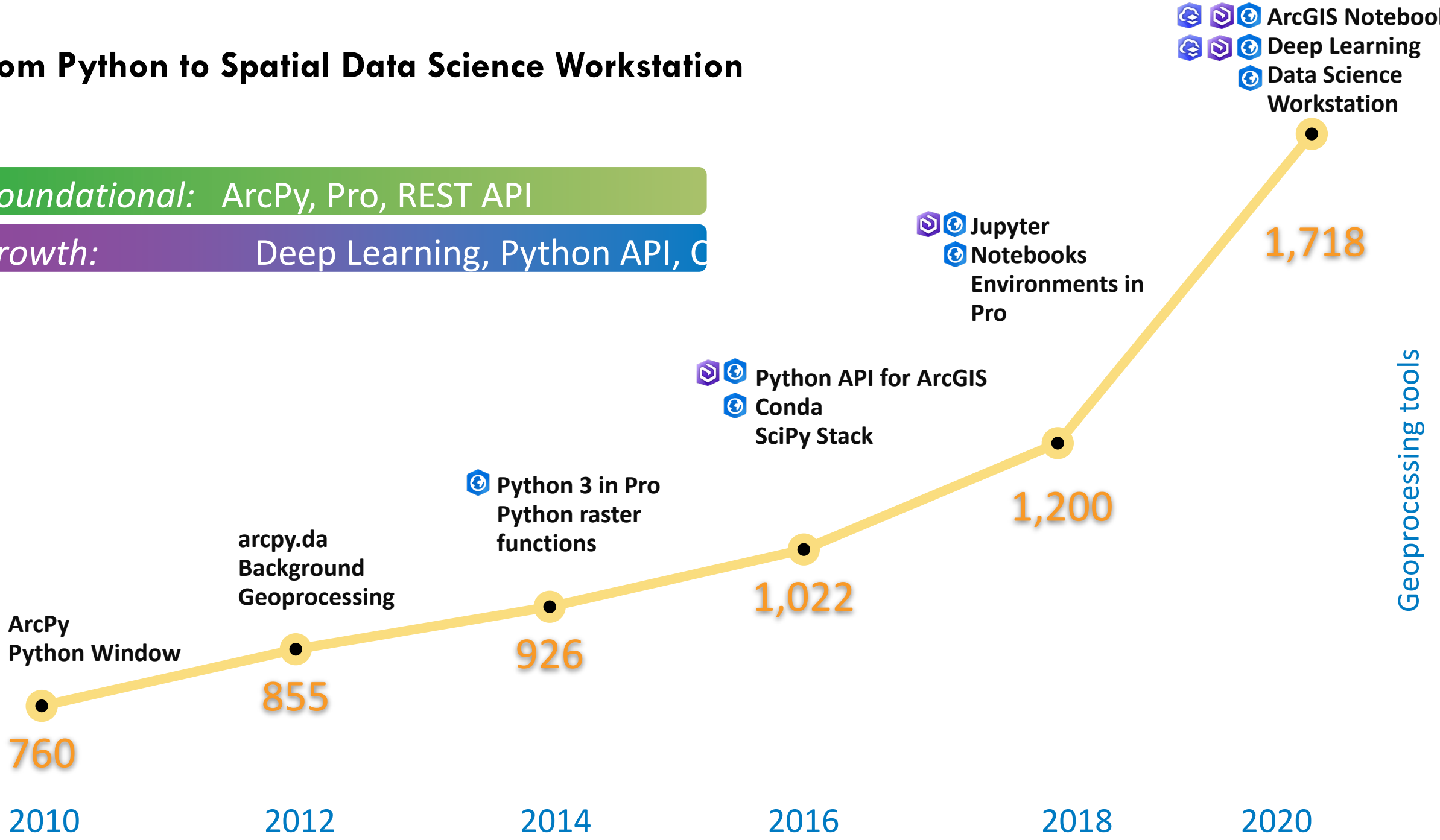
Modeling and Scripting

Automate and extend functionality

From Python to Spatial Data Science Workstation

Foundational: ArcPy, Pro, REST API

Growth: Deep Learning, Python API, C

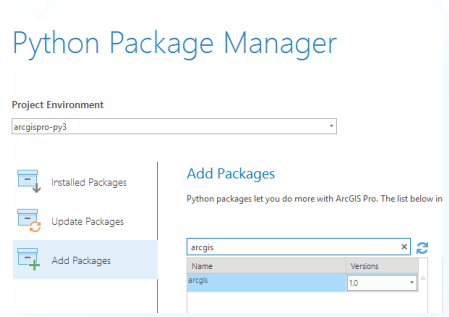


Modeling and Scripting

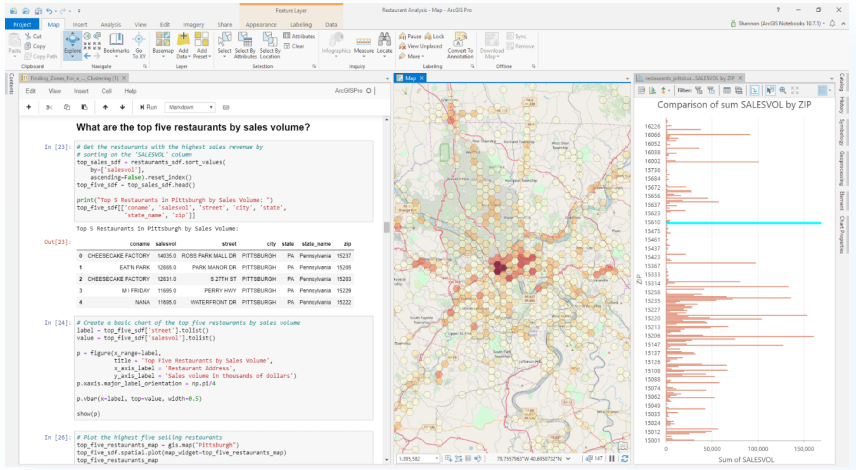
A comprehensive environment for automating, modeling and scripting your workflows and code

Pro components to help you:

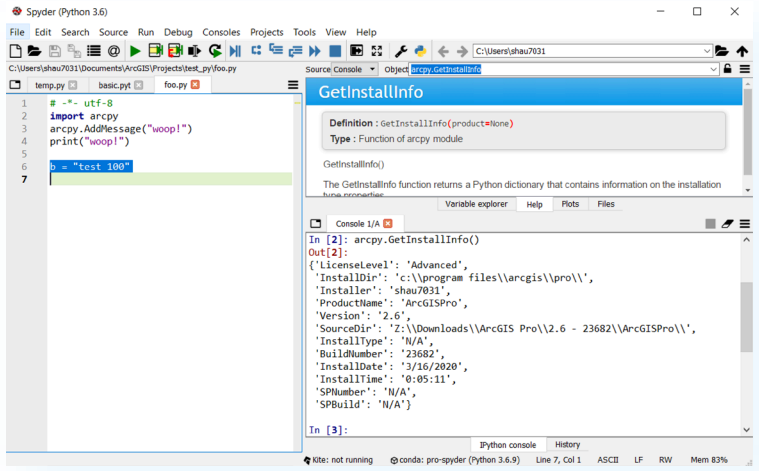
- **Notebooks**
- **ModelBuilder**
- **Python and R script tools**
- **ArcGIS Python distribution**
- **Conda Environments**



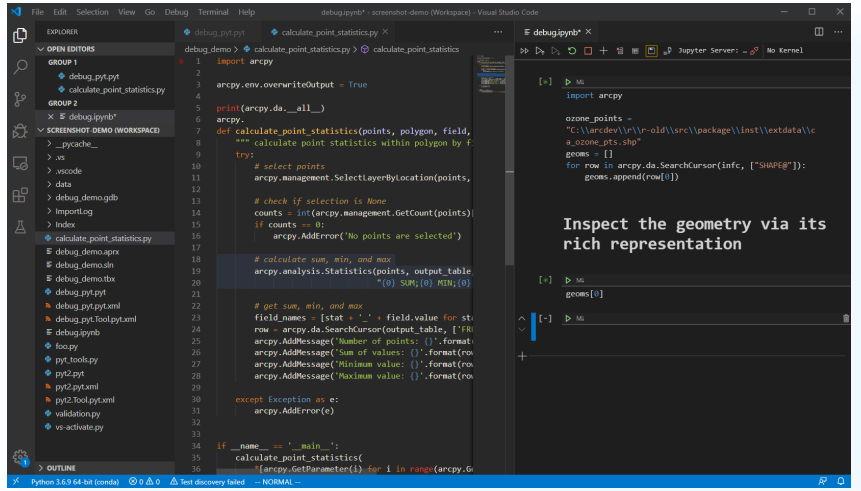
Conda



ArcGIS Pro with Notebooks + Charts



Spyder



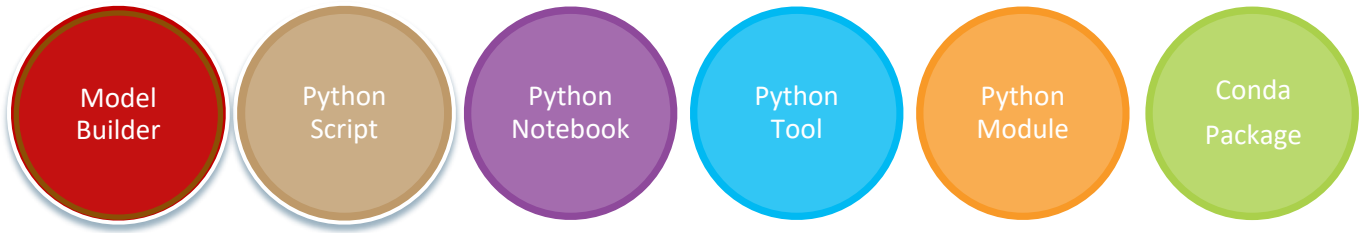
Visual Studio Code

Building tools and the Python Ecosystem

Once you've built a tool or notebook, you can deploy it:

- To a colleague's machine
- As a web tool, creating a service hosted in your enterprise or ArcGIS Online
- As a notebook to be run in hosted notebooks or ArcGIS Online

Start with what's available to you directly, in simple scripts and notebooks. Build up to more sophisticated models and tools to be kind to future you, and share your work with others



Extending Beyond

Deep Learning Frameworks Installer

Standalone installer with 98 packages

GPU optimized, use with GP tools, arcgis.learn models, and use the frameworks with your own code

https://github.com/esri/deep-learning-frameworks

Tie together with the Anaconda ecosystem

ArcPy is now conda installable – just add a product for it to access for licensing

```
conda install -c esri arcpy
```

Use in conjunction with existing data science workflows

https://anaconda.org/esri

Sharing and Collaboration

The power of working together

http://esriurl.com/SpatialDataScienceMOOC

https://learn.arcgis.com/en/

http://esriurl.com/spatialstats

Please fill out a survey below