R-ArcGIS Bridge and the Microsoft DSVM

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https://github.com/scw/r-ms-uc-2017

High Quality PDF (2MB)

Related Sessions

- Data Science Made Easy in ArcGIS Using Python and R
  - Tomorrow, 8:30–9:45a, Room 07 A
  - ArcGIS + Python + R + Jupyter Notebooks for analysis
- Bridging the Gap: Integrating R and ArcGIS for Advanced Analysis
  - Tomorrow, 10:00–10:30a, Tech Theater 17
  - **Deeper dive** into using R with ArcGIS

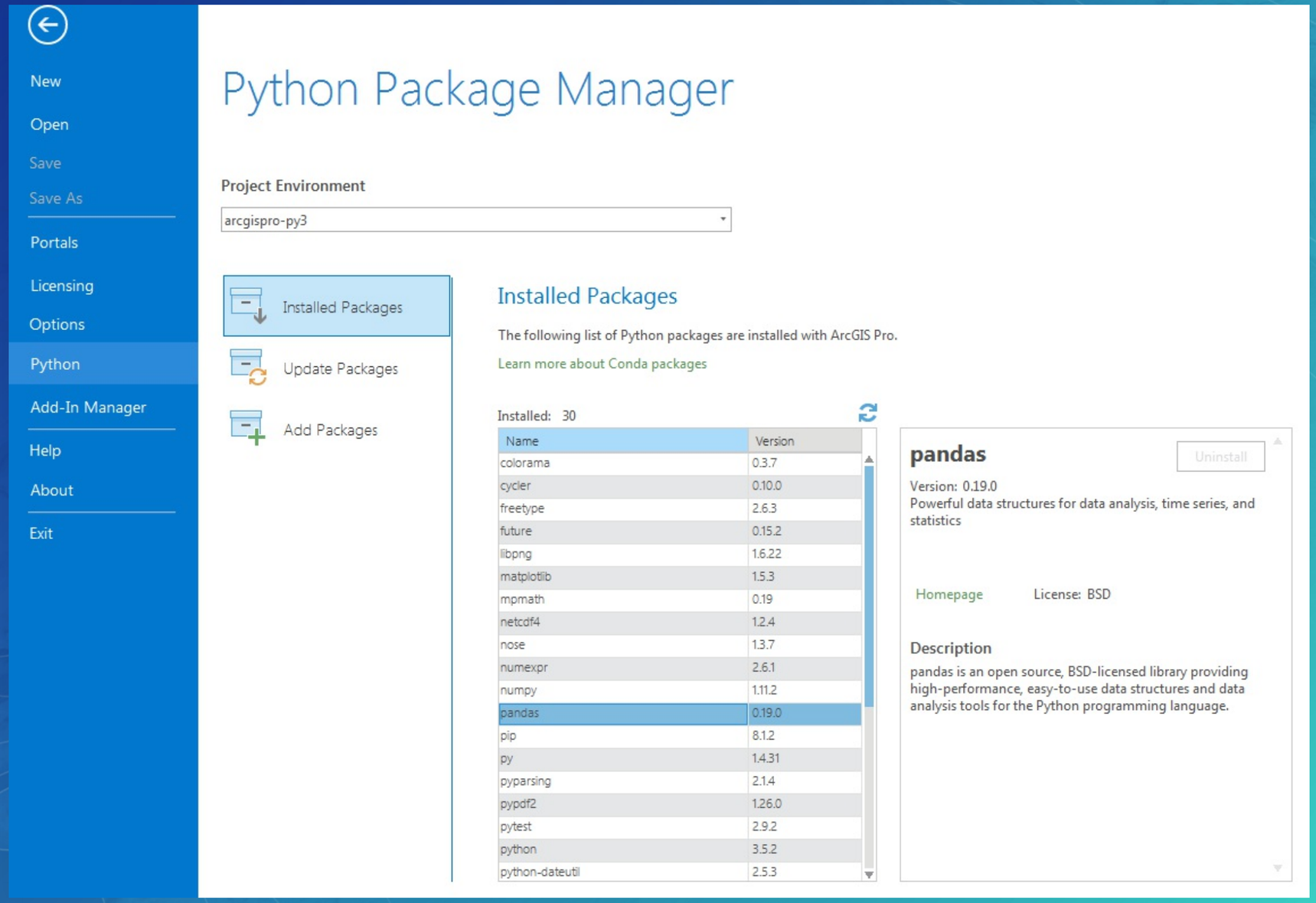
Data Science

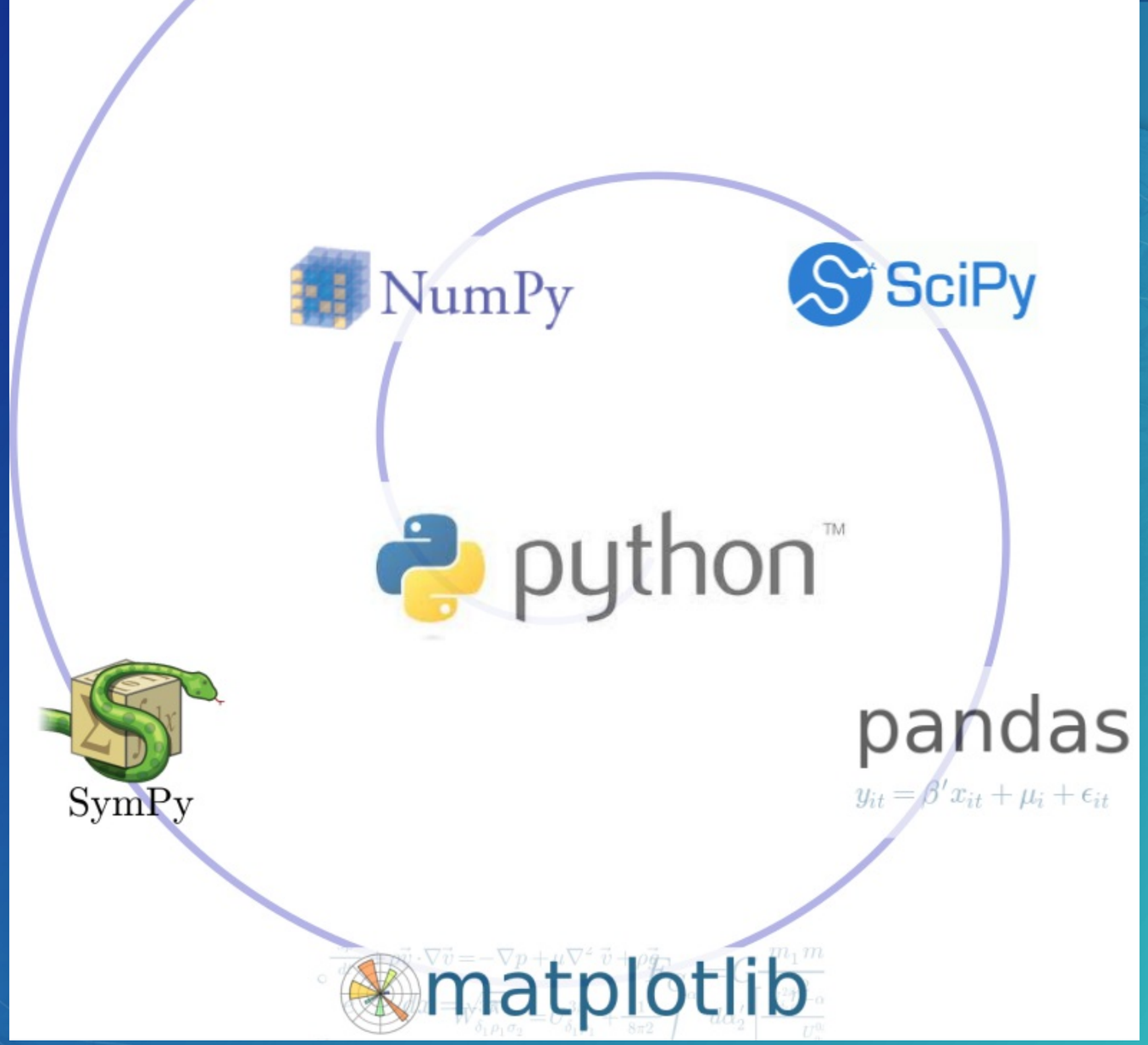
Data Science Languages

-  Python (SciPy stack, Jupyter, scikit-learn, …)
- C++ (CNTK, Tensorflow)
-  **R** (AI task view)
- Many workflows require combining components from multiple environments

- Continuum Analtyics — open data science company
- Initially Python — expanded to many languages
- Supported in:
  - ArcGIS Pro 1.3+
  - Microsoft DSVM

Conda in ArcGIS Pro




NumPy
SciPy
python™
SymPy
pandas
$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$
matplotlib

ArcPy

- Python module for accessing all the capabilities of ArcGIS Pro from within Python
- Chaining tools together, form models and scripts
- Primary mechanism for extending the software for desktop users

ArcGIS API for Python

- Jupyter: Python, R and remote data sources

In [ ]:
```
import arcgis
from arcgis.gis import GIS
# Create a GIS object, as an anonymous user for this example
gis = GIS()
```

In [ ]:
```
# Create a map widget
map1 = gis.map('Paris') # Passing a place name to the constructor
                        # will initialize the extent of the map.
map1
```

The map widget has several properties that you can query and set, such as its zoom level, basemap, height, etc:

R

Esri and  ?

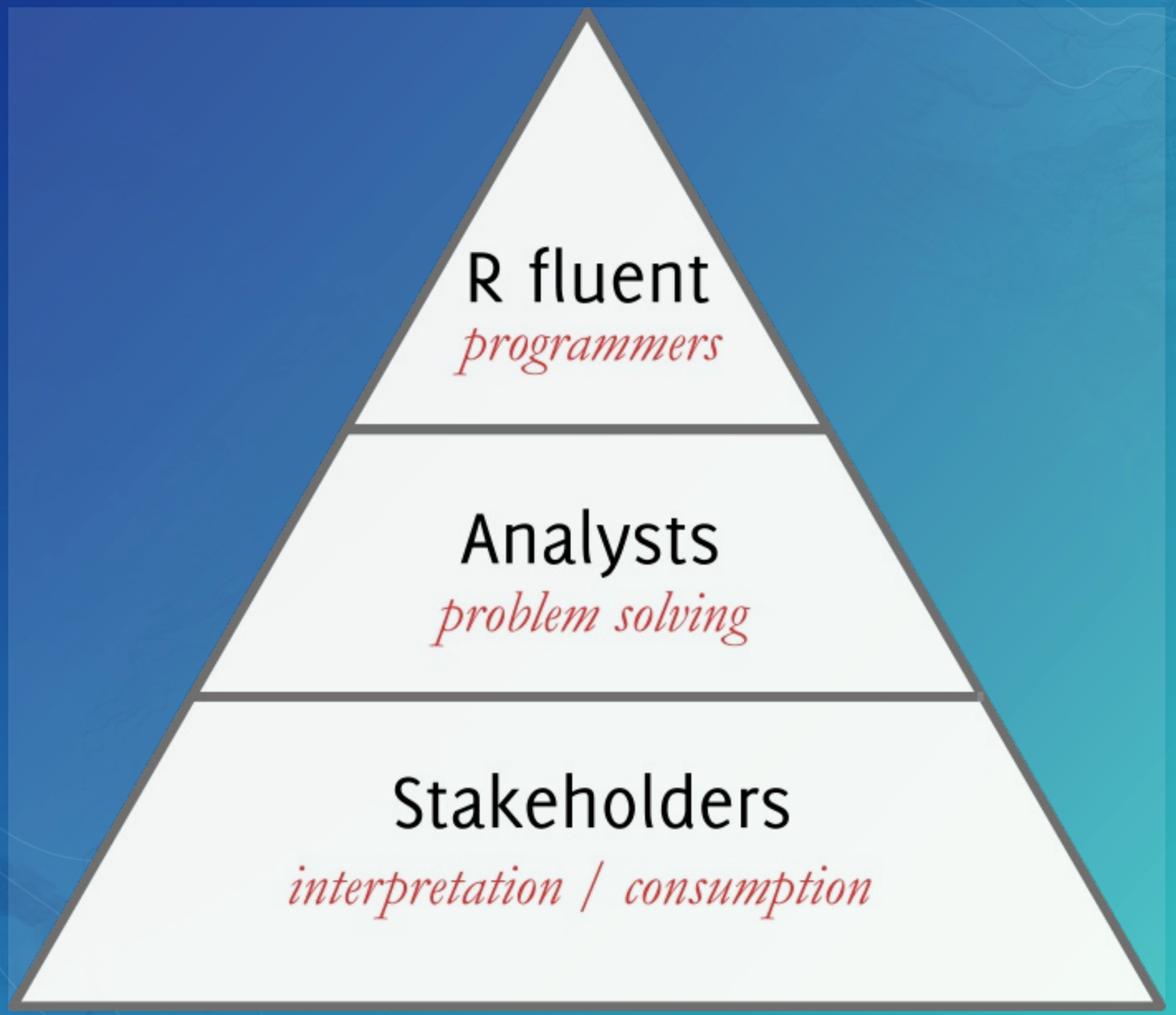
- Integration via ArcGIS–R bridge, last two years
- Joined R Consortium and R Foundation

Why  ?

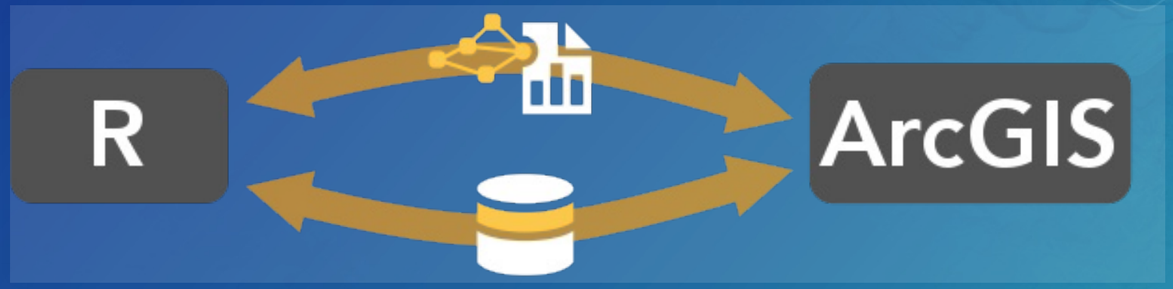
- Powerful core data structures and operations
  - Data frames, functional programming
- Unparalleled breadth of statistical routines
  - The *de facto* language of Statisticians
- CRAN: 6400 packages for solving problems
- Versatile and powerful plotting


R — ArcGIS Bridge

R — ArcGIS Bridge



R — ArcGIS Bridge



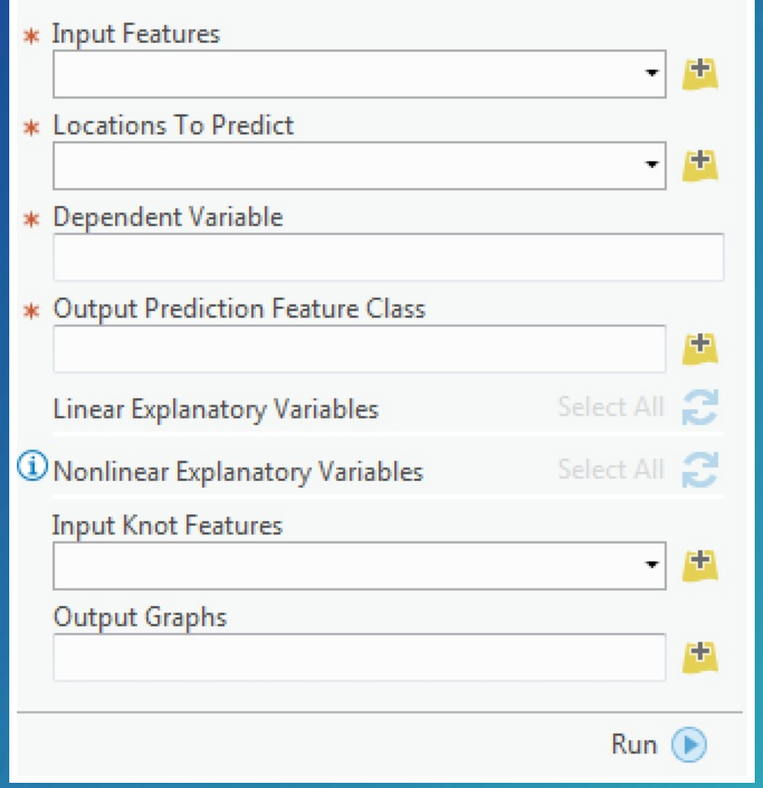
- ArcGIS developers can *create tools and toolboxes* that integrate ArcGIS and R
- ArcGIS users can *access R* code through geoprocessing scripts
- R users can *access organizations GIS' data*, managed in traditional GIS ways

https://r-arcgis.github.io

R — ArcGIS Bridge

- Store data with ArcGIS, access it in R, return R objects back to ArcGIS native data types (e.g. geodatabase feature classes)
- Knows how to convert spatial data to sp objects, R native spatial data type

Building R Script Tools



R: Demo

What’s next?

- Raster support (come see it in action tomorrow)
- Simple features (sf package)
- Scaling with Azure

DSVM Integration

DSVM Integration

- ArcGIS Pro in Azure
- Data Science and Deep Learning machines (high performance)
- A *unified environment* for AI problem solving —
- Provides an in-depth solution – the latest data science code, Microsoft's Cognitive Toolkit (CNTK), ArcGIS Pro, ArcPy, R-ArcGIS Bridge, and Microsoft R Open

DSVM Integration

- We’re excited to see how this can be used. The great work that the Chesapeake Conservancy is doing, extended to your own projects
- R-ArcGIS bridge works seamlessly with Microsoft R Open
- Shared Backbone of Conda (Continuum Analytics) to create a consistent environment for analysis