DEVELOPER SUMMIT

March 10–13

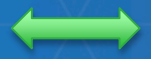
Integrating Open Source Statistical Packages with ArcGIS

Mark V. Janikas
Liang-Huan Chin

Introduction

- Traditional Spatial Analysis
- Spatial Analyst
- Geostatistics
- Spatial Statistics

Spatial Analytics in ArcGIS: Moving Forward

- Python
  - Spatial Analyst
    - Raster  NumPy
    - SciPy
  - Spatial Statistics and Geostatistics
    - Data Access Module
    - Vector  NumPy
    - Spatial Statistics Data Object and Utilities
    - Matplotlib, NetCDF4-Python
  - Effort to Support Scientific Community
    - SciPy, PANDAS, PySAL

The Great and Extendable Python

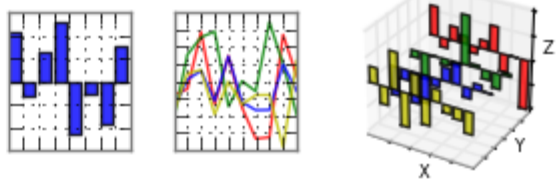
- **Direct**
  - **Numeric/Scientific Python Modules**
  - **http://wiki.python.org/moin/NumericAndScientific**
    - **+60 Modules Listed**
  - **Check Compatibility… Then Plug and Play**
    - **pip, GitHub, easy_install, svn**
    - **Unofficial Windows Binaries for Python Extensions – Christoph Gohlke, UC Irvine**
      - **http://www.lfd.uci.edu/~gohlke/pythonlibs/**
  - **Conda Effort**

IP[y]: IPython
Interactive Computing

SciPy.org

pandas

$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$

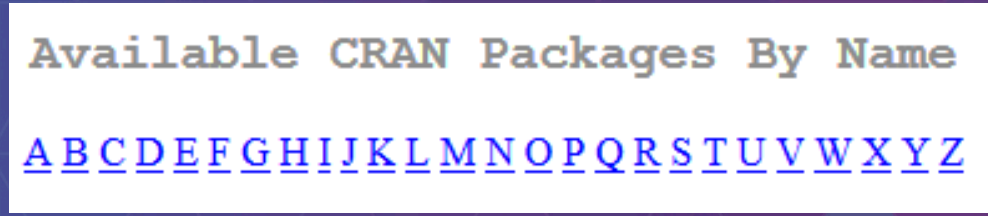


scikit learn

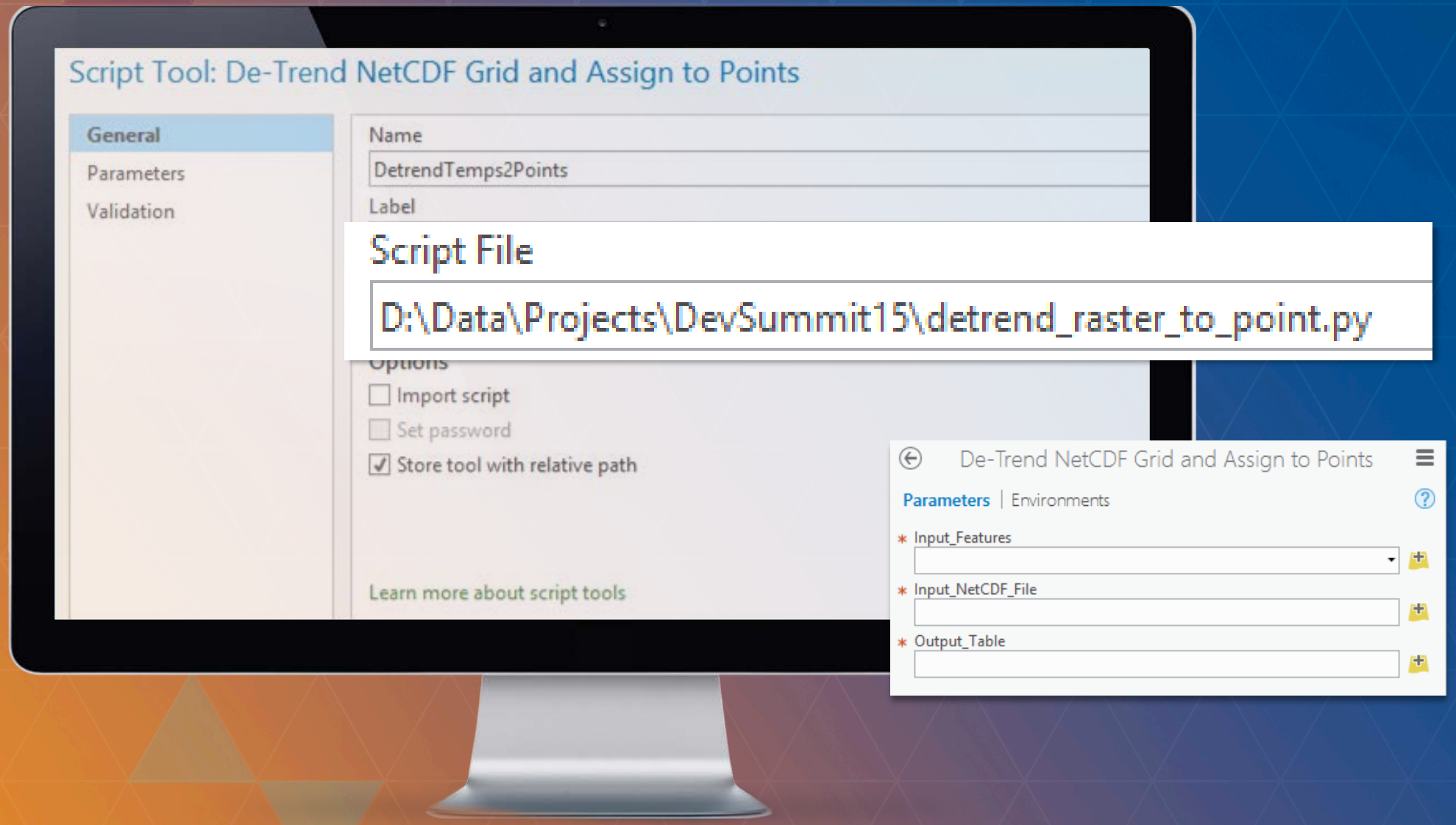
pysal
Python Spatial Analysis Library

R Integration

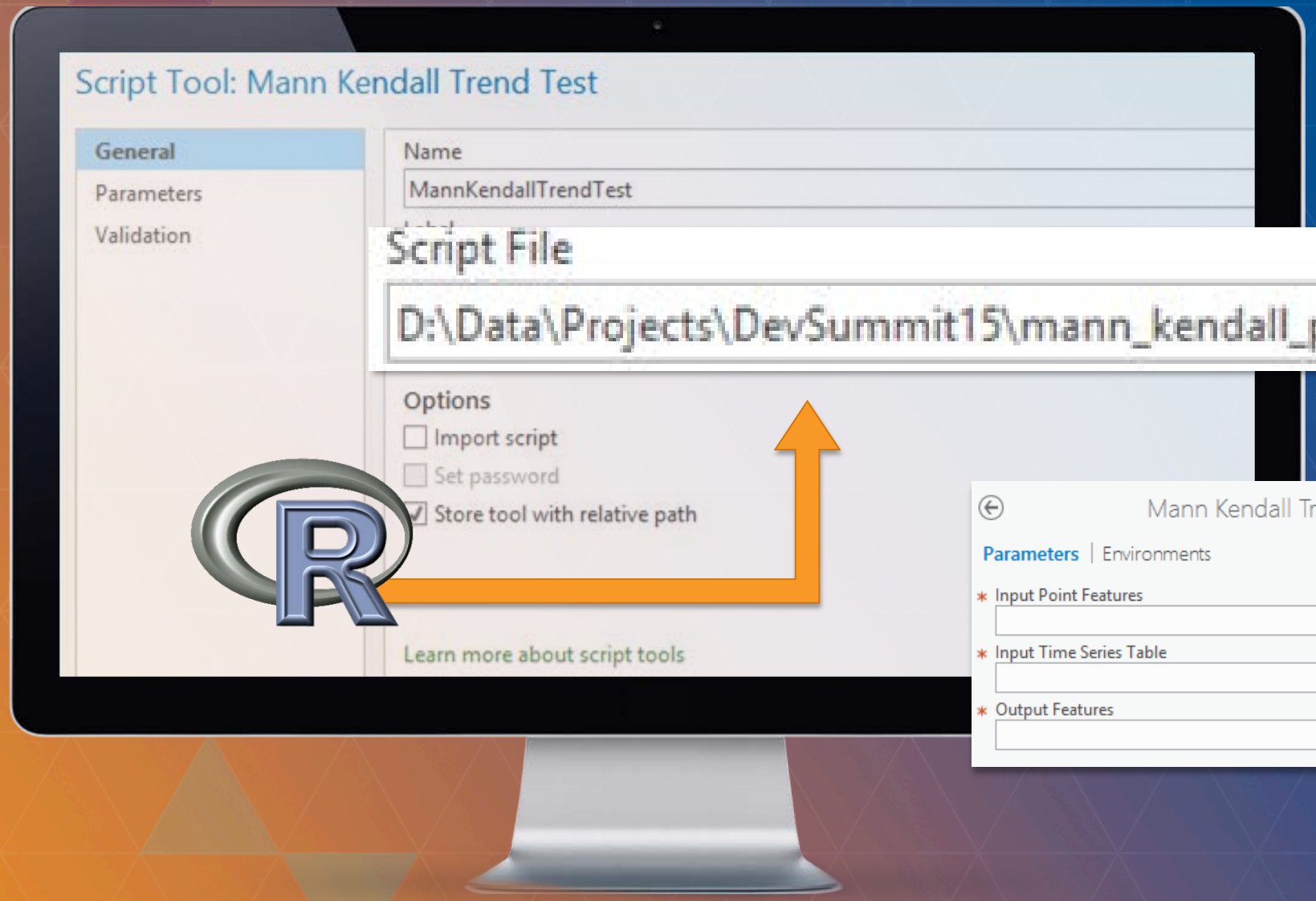
- Highly Active Community
- Cutting Edge Methodologies
- Almost 6400 Libraries
- Old Method (Indirect)
  - Out of Proc
  - Python as the Glue
  - https://github.com/Esri/R-toolbox-py
- New Method
  - In Proc
  - Native Data Access
  - Honors Selection Sets and Projections
  - Vector Data
  - Charts and Graphs
  - GUI Interface



The python™ Script



The R Script


Script Tool: Mann Kendall Trend Test
General
Parameters
Validation
Name
MannKendallTrendTest
Script File
D:\Data\Projects\DevSummit15\mann_kendall_panel.r
Options
Import script
Set password
Store tool with relative path
Learn more about script tools
Mann Kendall Trend Test
Parameters | Environments
Input Point Features
Input Time Series Table
Output Features

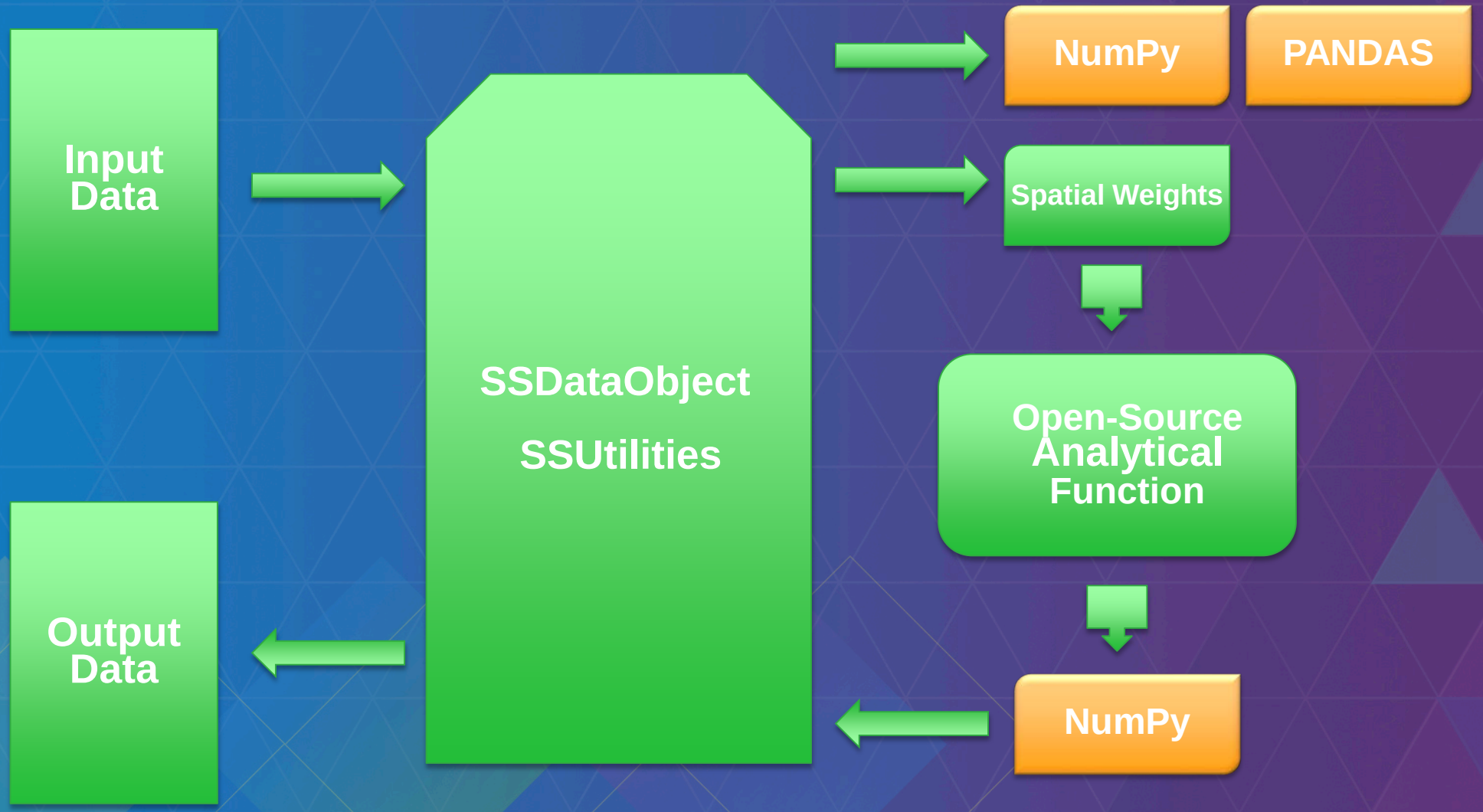
Ways to Access Data in Python

An Example using the IPython Notebook

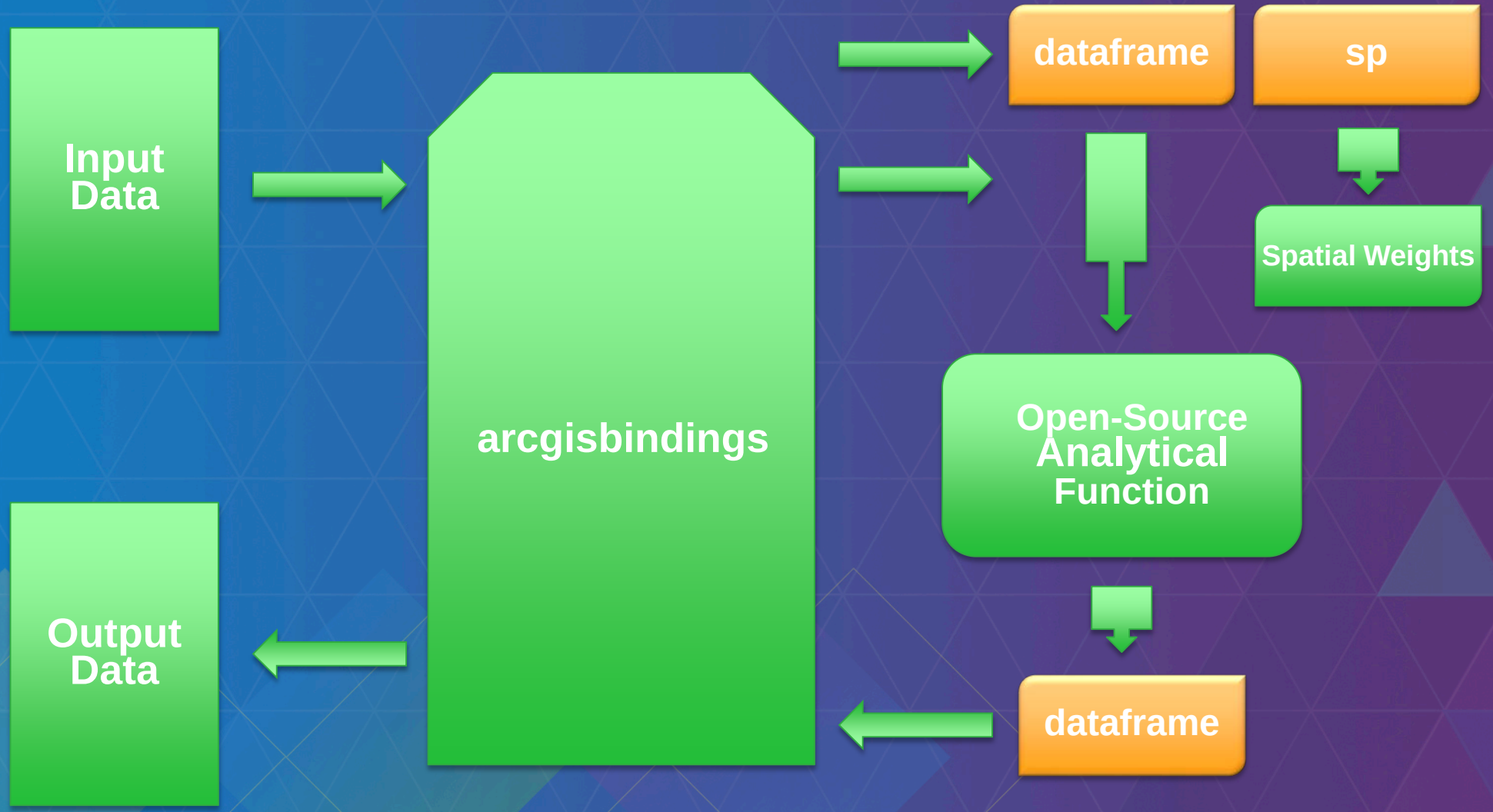
Ways to Access Data in R

An Example using RStudio

Data Access: An Illustrative Python Review



Data Access: An Illustrative R Review



Conclusions

- Esri
  - Commitment to Scientific Community
- Python
  - Conda/Versioning
  - Will Continue to be the Scripting Interface to ArcGIS
    - New Tools
    - ArcPy
- R
  - Script Tool or Stand-Alone
  - 10.3.1 and 11.1
  - Formal Announcement
    - GitHub Repo, Example Toolbox and Documentation
  - Building a Community of R Devs