Jupyter Notebooks for Ops

LISA 2019

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Objectives

- An introduction/history of Jupyter Notebooks (aka "How Did We Get Here?")
- How they can be used in ways pertinent to ops folks (aka "What Do We Do Here?")
- How they can be maintained to facilitate use for non-ops folks (aka "How Can We Help These Folks Here?")
- What's next? (aka "What's Next?")
Introduction

Who are you? What do you do?

- Current employer: N/A
- A tech professional for ~20 years in various sectors (consulting, telecommunications, public sector, manufacturing)
  - System administration (Linux mostly, some other UNIX, some Windows)
  - many technical hats
- Enjoy trying to use tools to provide solutions in novel ways
- My fifth LISA (FIF!)
How did we get here?

What are Jupyter Notebooks?

Formal definition from [Project Jupyter](https://jupyter.org):

“The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and explanatory text. Uses include: data cleaning and transformation, numerical simulation, statistical modeling, machine learning and much more.”
How did we get here?

What specifically is a Jupyter Notebook?

Jupyter Notebooks are a mix of three distinct components (all maintained by Project Jupyter: The entire project is 100% open source under the 3-clause BSD license.

- The notebook document format, (based on JSON)
- The interactive computing protocol, (based on ZeroMQ and Websockets
- The kernel, (the default is iPython's Python kernel)*
* more on this later
How did we get here?
What is iPython?

- iPython runs the Python in the notebook
- Reference for any other kernel for Jupyter Notebooks
- interesting way to run Python in its own right
What Do We Do Here?
Installing Jupyter Notebooks

- pip install jupyter
- conda install jupyter

PSA: Please use virtual environments or, put another way...
Please don’t use system Python for applications. You will likely regret it later.
What Do We Do Here?

- Run Python

- Runbooks with better documentation

- Experimentation/Consumption with web data (e.g. REST API)

- Use as a presentation tool

- Now let's do it in (enter name of language here)
  - Python == default language
  - With additional kernels, the number of supported languages > 100 [Jupyter Kernels](https://github.com/jupyter/jupyter/wiki/Jupyter-kernels)
How Can We Help These Folks Here?

- JupyterHub == Multi-user Jupyter Notebook instance
  - [The Littlest JupyterHub](https://the-littlest-jupyterhub.readthedocs.io/en/latest/)
  - [Zero to JupyterHub in Kubernetes](https://zero-to-jupyterhub.readthedocs.io/en/latest/)
What's Next?

- JupyterLab
  - Next iteration of Jupyter Notebooks
  - "JupyterLab is a web-based interactive development environment for Jupyter notebooks, code, and data. JupyterLab is flexible: configure and arrange the user interface to support a wide range of workflows in data science, scientific computing, and machine learning. JupyterLab is extensible and modular: write plugins that add new components and integrate with existing ones."
What's Next?

- Azure Notebooks
  - Cloud-based hosting of Jupyter Notebooks
  - Provides support for R & F# in addition to Python
What’s Next?

- Polynote (from Netflix)
  - At the time of this talk, has only been open sourced for a week. For more info, visit the website polynote (https://polynote.org)
Contact

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References/Resources

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