



JupyterLab: The Evolution of the Jupyter Notebook

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The Jupyter Notebook



Jupyter Notebook



Interactive, Exploratory, Reproducible

- **Interactive**, browser-based computing environment
- **Exploratory** data science, ML, visualization, analysis, stats
- **Reproducible** document format:
 - Code
 - Narrative text (markdown)
 - Equations (LaTeX)
 - Images, visualizations
- Over 50 programming languages
- Everything open-source (BSD license)

Jupyter Notebook



A Jupyter Notebook document with a visualization of measles data.

Project Jupyter: Where are we today?



~3M
Users



Over
650,000
Notebooks
on GitHub



Trending in open source

See what the GitHub community is most excited about today.

Repositories

Developers

Trending: today ▾

All languages

Unknown languages

C

Emacs Lisp

JavaScript

Mathematica

Objective-C

Python


TeX

Other: Jupyter Notebook ▾

BinRoot / TensorFlow-Book

★ Star

Accompanying source code for Machine Learning with TensorFlow. Refer to the book for step-by-step explanations.


Jupyter Notebook ★ 1,625 🔗 170 Built by 

★ 187 stars today

dannyneil / public_plstm

★ Star

Phased LSTM






Jupyter Notebook ★ 85 🔗 22 Built by 

★ 30 stars today

tensorflow / magenta

★ Star

Magenta: Music and Art Generation with Machine Intelligence


Jupyter Notebook ★ 4,076 🔗 534 Built by     

★ 19 stars today

waleedka / traffic-signs-tensorflow

★ Star

Traffic Signs Detection and Recognition with Tensorflow

Jupyter Notebook ★ 37 🔗 8 Built by 

★ 15 stars today

jakevdp / PythonDataScienceHandbook

★ Star

ProTip! Looking for most starred Jupyter Notebook repositories? [Try this search](https://github.com/trending/jupyter-notebook?since=weekly)

<https://github.com/trending/jupyter-notebook?since=weekly>

Enabling Reproducible Science





LIGO Open Science Center

LIGO is operated by California Institute of Technology and Massachusetts Institute of Technology and supported by the U.S. National Science Foundation.

Getting Started

- Tutorials
- Data
 - Events**
 - Bulk Data
- Timelines
- My Sources
- Software
- GPS ↔ UTC
- About LIGO
- Data Analysis Projects
- Acknowledgement

Welcome to the LIGO Open Science Center

About LIGO
Get Started with LIGO data
Join the E-mail list for updates
For general information on LIGO, please visit ligo.org
If you have LSC credentials, you may go to the [development site](#)

More discoveries from LIGO!

Data Releases from two events and a candidate event

released 2016 June 15:
[Event of December 26, GW151226: Chirp mass 9](#)

released 2016 June 15:
[Candidate event of October 12, LVT151012: Chirp mass 15](#)

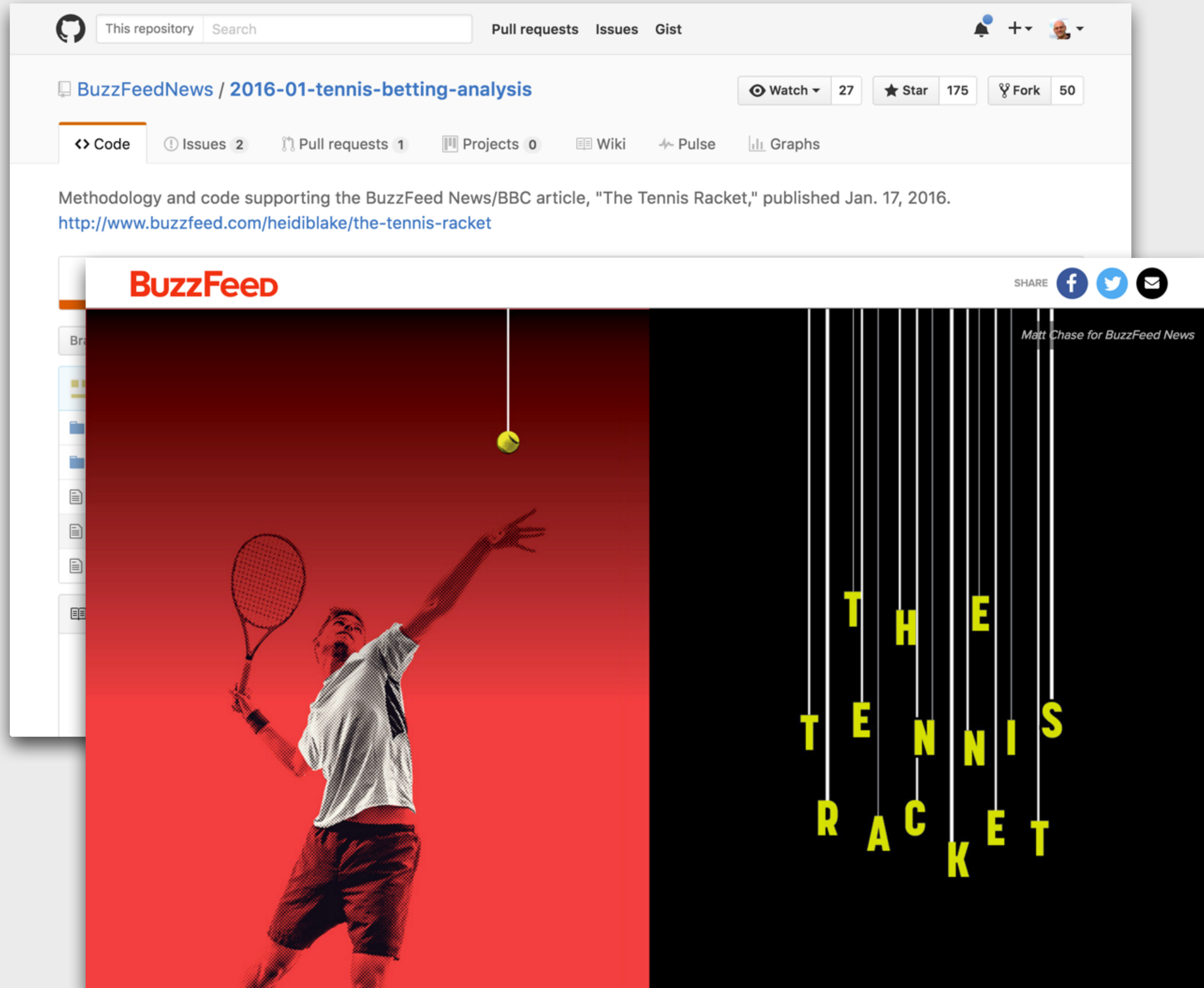
released 2016 Feb 11:
[Event of September 14, GW150914: Chirp mass 30](#)

The [LIGO Laboratory's Data Management Plan](#) describes the scope and timing of LIGO data releases.

Jupyter notebook
See the new tutorial on signal processing with LIGO data, as a Jupyter (iPython) notebook.
[Tutorial on Binary Black Hole Signals in LIGO Open Data](#)

<https://losc.ligo.org/about/>

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SECURITY

SOFTWARE ARCHITECTURE

SOFTWARE ENGINEERING

DATA TOOLS

+ FOLLOW THIS TOPIC

Data visualization with Seaborn

Seaborn provides an API on top of matplotlib, which uses sane plot and color defaults and simple functions for common statistical plot types.

By Jake VanderPlas, May 7, 2015

Embracing Jupyter Notebooks at O'Reilly

O'Reilly Media is using our Atlas platform to make Jupyter Notebooks a first class authoring environment for our publishing program.

By Andrew Odewahn, May 7, 2015

Embracing Jupyter Notebooks at O'Reilly

O'Reilly Media is thrilled to announce that we're making IPython Notebooks a first-class authoring environment for our publishing program, on par with Word or our Atlas platform. As part of our move to embrace the platform, we're also experimenting on beta.oreilly.com with new ways for readers to experience this content, like these examples:

- [Data visualization with Seaborn](#)
- [Introduction to Support Vector Machines](#)
- [Simple Line Plots with Matplotlib](#)
- [Three-dimensional Plotting in Matplotlib](#)
- [An illustrated introduction to the t-SNE algorithm](#)

Data visualization with Seaborn

<https://beta.oreilly.com/learning/data-visualization-with-seaborn>

There are other parameters which can be passed to `jointplot` : for example, we can use a hexagonally-based histogram instead:

```
with sns.axes_style('white'):
    sns.jointplot("x", "y", data, kind='hex')
```

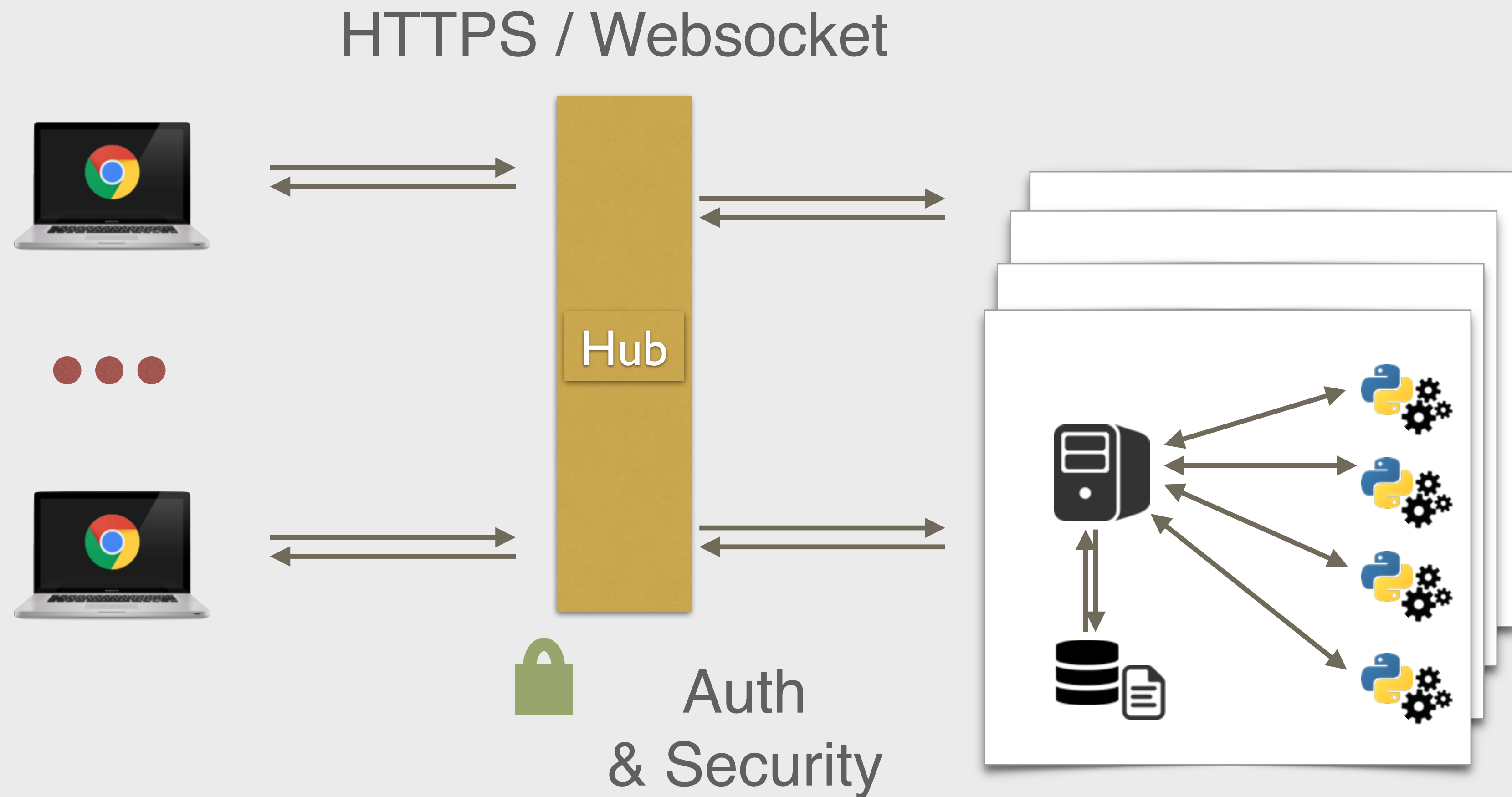
done

O'Reilly Atlas authoring platform incorporating live code

<https://www.oreilly.com/ideas/jupyter-at-oreilly>



Multi-user Notebook Servers



<https://github.com/jupyterhub/jupyterhub>



Multi-user Notebook Servers



A screenshot of the NERSC (National Energy Research Scientific Computing Center) website. The header features the NERSC logo, the tagline "Powering Scientific Discovery Since 1974", and a search bar. A navigation menu includes links for HOME, ABOUT, SCIENCE AT NERSC, SYSTEMS, FOR USERS, NEWS & PUBLICATIONS (which is highlighted), R & D, EVENTS, LIVE STATUS, and TIMELINE. A sidebar on the left lists "NEWS & PUBLICATIONS" with sub-links for News, Science News, Center News, NERSC in the News, Cori Ranks 5th Among TOP500, and Publications & Reports. The main content area displays a news article titled "JUPYTER NOTEBOOKS WILL OPEN UP NEW POSSIBILITIES ON NERSC'S CORI SUPERCOMPUTER" in large green letters, dated "NOVEMBER 2, 2016". A breadcrumb trail at the top of the article reads: Home » News & Publications » News » Center News » Jupyter Notebooks Will Open up New Possibilities on NERSC's Cori Super.

Deploying JupyterHub for Education



Jessica Hamrick | March 24, 2015

[docker](#) / [python](#)

<https://github.com/jupyterhub/jupyterhub>



Teaching Interactive Courses; Educational Material

A screenshot of the GitHub repository page for 'Data Science 8'. The page shows the repository name, description, and a list of pinned repositories. Overlaid on the page are two white boxes. The top box is for 'nbgrader', showing its Google Group, build status (passing), codecov coverage (89%), and a description: 'A system for assigning and grading Jupyter notebooks.' The bottom box is for 'JupyterHub', showing its logo and the text 'JupyterHub'.

Data Science 8 ⓘ
The Foundations of Data Science course at UC Berkeley
<http://www.data8.org>

Repositories **People** 4

Pinned repositories

datascience
A Python library for introductory data science

Jupyter Notebook ★ 56 🍴 24

textbook
The textbook for the course
Thinking: The Foundations of Data Science

Jupyter Notebook ★ 45 🍴 9

jupyterhub-deploy
JupyterHub deployment for Data 8

jupyterhub-k8s
Data 8's deployment of JupyterHub on

nbgrader

Google Group build passing codecov 89%

A system for assigning and grading Jupyter notebooks.

jupyterHub

A gallery of interesting IPython Notebooks

<http://data8.org>

<https://github.com/ipython/ipython/wiki/A-gallery-of-interesting-IPython-Notebooks>

More Than Just Notebooks

jupyter

Files

Running

Clusters

Try

jupyterlab

alpha release

Select items to perform actions on them.

Upload

New

/ github / ellisonbg / altair

Name

Last Modified

..

seconds ago

altair

4 days ago

altair.egg-info

4 days ago

dist

3 days ago

images

a month ago

tools

6 days ago

LICENSE

5 days ago

Makefile

6 days ago

MANIFEST.in

3 days ago

NOTES_FOR_MAINTAINERS.md

5 days ago

README.md

3 days ago

jupyter

setup.py

Last Sunday at 11:44 PM

File

Edit

View

Language

Python

```
44 import io
45 import os
46 import re
47
48 try:
49     from setuptools import setup
50 except ImportError:
51     from distutils.core import setup
52
53
54 def read(path, encoding='utf-8'):
55     path = os.path.join(os.path.dirname(__file__), path)
56     with io.open(path, encoding=encoding) as fp:
57         return fp.read()
58
59
60 def version(path):
61     """Obtain the package version from a python file e.g. pkg/__init__.py
62
63     See <https://packaging.python.org/en/latest/single_source_version.html>.
64     """
65     version_file = read(path)
66     version_match = re.search(r'__version__ = [\'"]([^\"]*)[\'"]',
67                               version_file, re.M)
68     if version_match:
```

jupyter

```
bash-3.2$ ls
LICENSE
MANIFEST.in
Makefile
NOTES_FOR_MAINTAINERS.md
README.md
altair
altair.egg-info
dist
images
requirements.txt
setup.py
tools
bash-3.2$ ls altair/notebooks/
01-Index.ipynb
02-Introduction.ipynb
03-ScatterCharts.ipynb
04-BarCharts.ipynb
05-LineCharts.ipynb
06-AreaCharts.ipynb
07-LayeredCharts.ipynb
08-GroupedRegressionCharts.ipynb
09-CarsDataset.ipynb
10-IrisPairgrid.ipynb
auto_examples
example.html
bash-3.2$
```

jupyter

01-Index

Last Checkpoint: Last Monday at 1:46 PM (autosaved)

File

Edit

View

Insert

Cell

Kernel

Widgets

Help

Python 3

Quick Altair example

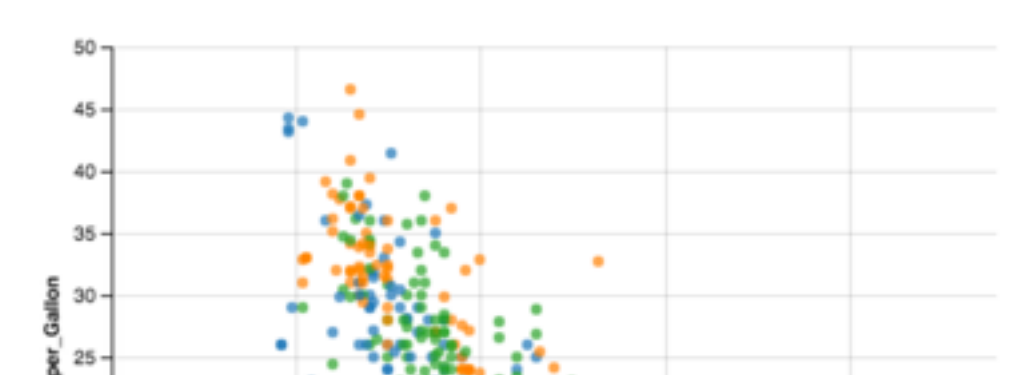
Here is a quick example of the Altair API in action:

```
In [1]: from altair import datasets, Chart

data = datasets.load_dataset('cars')

c = Chart(data).mark_circle().encode(
    x='Horsepower',
    y='Miles_per_Gallon',
    color='Origin',
)

c # save the chart as a variable and display here
```





Building Blocks

File Browser

Notebooks

Terminal

Text Editor

Kernels

Output



What are we hearing from users?



2015 UX Survey

- Mostly daily/weekly users
- Love the notebook workflow and user experience
- Top needs:
 - Integration with version control systems (Git, GitHub)
 - Improved code/text editing
 - Flexible layout and integration between the building blocks
 - Debugger, profiler, variable inspector, etc.



Introducing JupyterLab (alpha)



JupyterLab

Natural Evolution of the Notebook

- JupyterLab: a browser **Interactive Development Environment**
- Common building blocks: notebook, terminal, editor, etc.
- Integration between tools
- Extension system for 3rd party plugins
- Fluid, efficient UX
- Built on PhosphorJS (<http://phosphorjs.github.io/>)
- Open-Source (BSD licensed)

<https://github.com/jupyter/jupyterlab>



Live Demos!



Roadmap

- Today JupyterLab is an **alpha preview only**
- Not suggested for general usage:
 - Design, UI, UX, interactions, code all changing rapidly!
- Phases:
 - 1) Series of alpha/beta releases of JupyterLab available as an alternative UI alongside the classic notebook
 - 2) JupyterLab 1.0 = feature parity with classic notebook + small number of new features (first half 2017?)
 - 3) JupyterLab default UI, classic notebook still available
 - 4) Classic notebook only available as separate download



Thank you!

alpha preview!

```
pip install jupyterlab
jupyter serverextension enable --py --sys-prefix jupyterlab
or
conda install -c conda-forge jupyterlab
```

- Credits and thanks:
 - The Project Jupyter community
 - Partnership between Bloomberg, Continuum, and Jupyter
 - Moore, Sloan, Helmsley Foundations
- Jupyter is a **NumFOCUS Foundation Sponsored Project**
- Help: gitter.im/jupyterlab/jupyterlab; Jupyter Google group

github.com/jupyterlab/jupyterlab

