

JupyterLab & its extensions:

towards a broad open source ecosystem

Hello world

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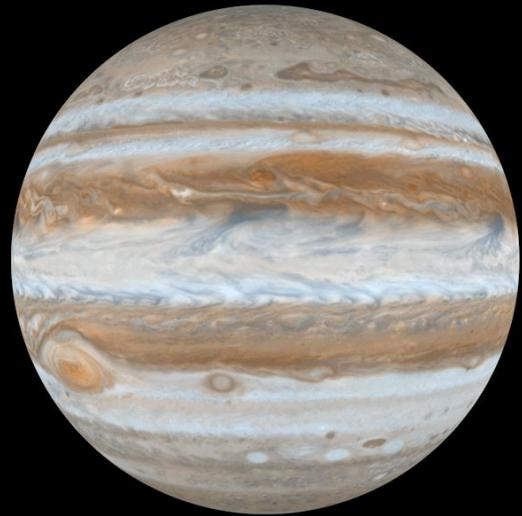


Agenda

1. Introduction to Jupyter Project
2. Data journalism with Jupyter
3. JupyterLab: the new UI
4. Extensions
5. Contributing

What is Jupyter?

Not this one.

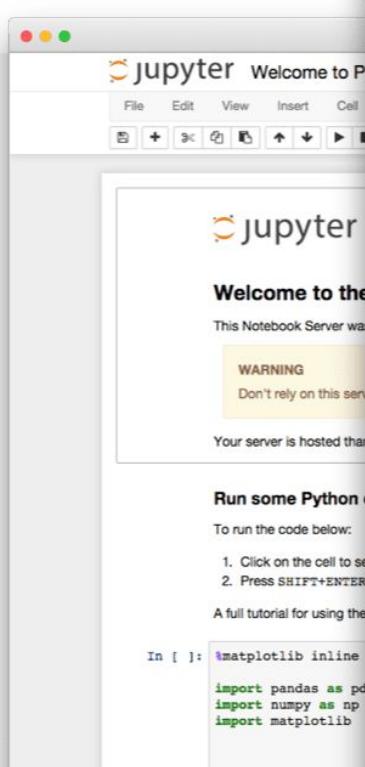


Jupyter Community & Open Source

- High impact (few devs, many users)
- User-driven development
- Visibility
- Meetups
- Tracable
- Free infrastructure
- Sponsorships
- Conferences
- Online discussions



Jupyter Notebook



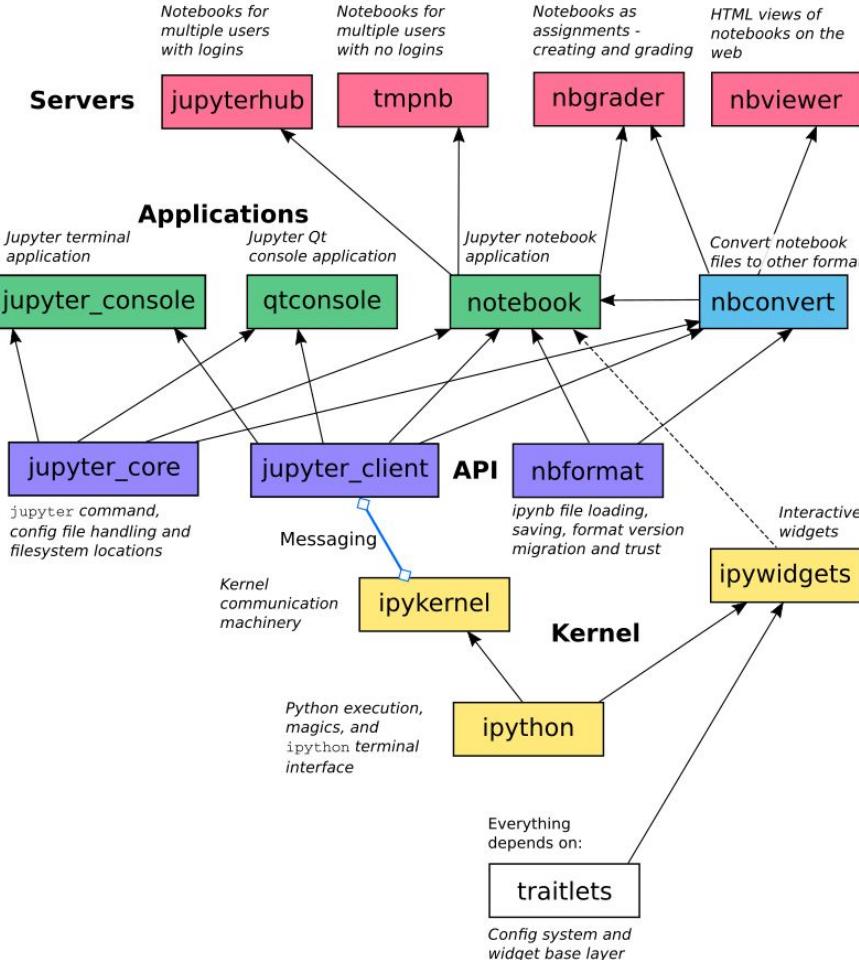
- Web app
- Live code
- Inline visualisations
- Narrative style

Used for data

- Exploration / cleaning
- Visualisation
- Statistical modeling
- Much more

jupyter

Metapackage and
overview docs



Jupyter Projects

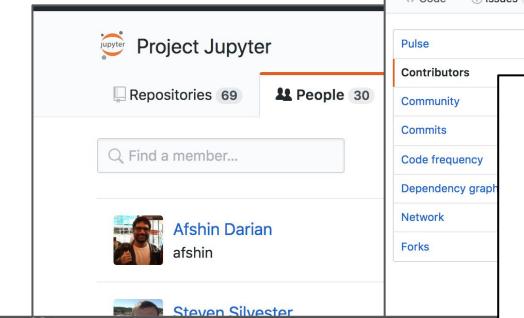
Project Jupyter

Repositories 69 People 30

Find a member...

Afshin Darian
afshin

Steven Sylvester

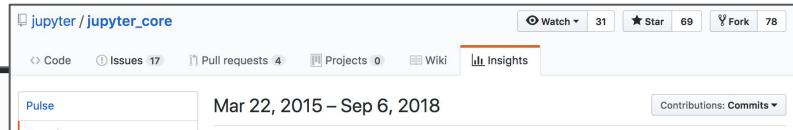


jupyter / jupyter_core

Code Issues 17 Pull requests 4 Projects 0 Wiki Insights

Pulse Contributors Community Commits Code frequency Dependency graph Network

Mar 22, 2015 – Sep 6, 2018 Contributions: Commits



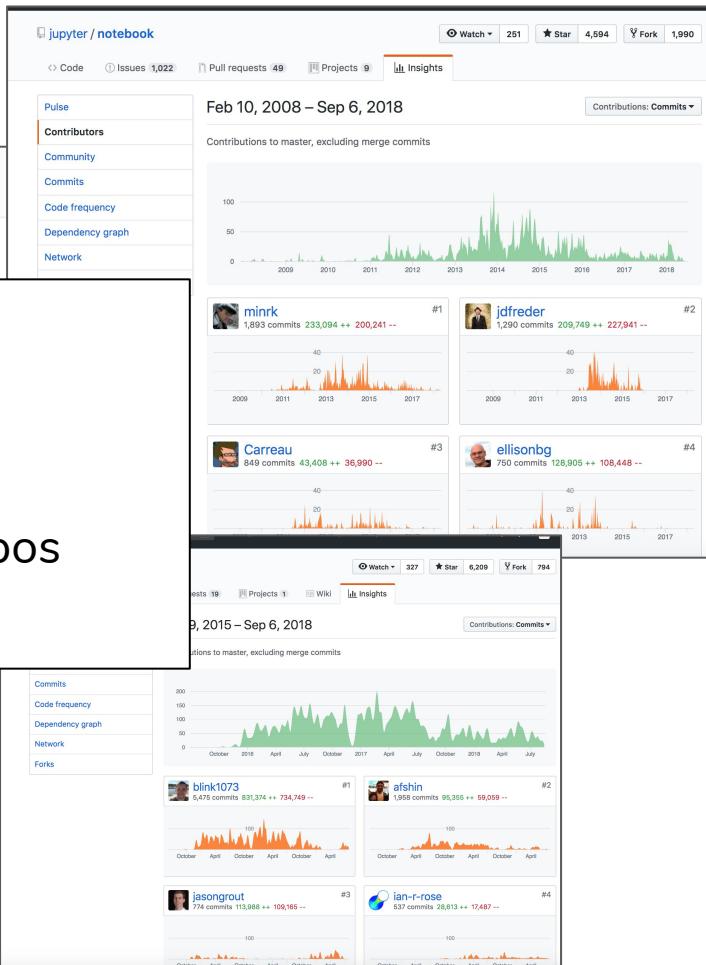
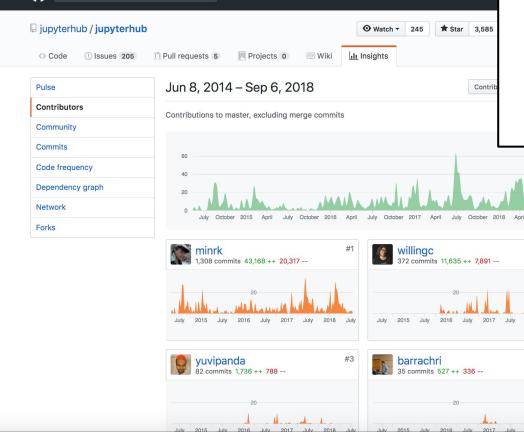
Jupyter: 18K repos
RStudio: 3.8K repos
Apache Zeppelin: 224 repos

jupyterhub / jupyterhub

Code Issues 205 Pull requests 6 Projects 0 Wiki Insights

Pulse Contributors Community Commits Code frequency Dependency graph Network Forks

Jun 8, 2014 – Sep 6, 2018 Contributions to master, excluding merge commits



↑ cloudfoundry 2 points · 10 days ago

-- Warning -- Opinion only, I didn't collect the data over time -- This just feels correct.

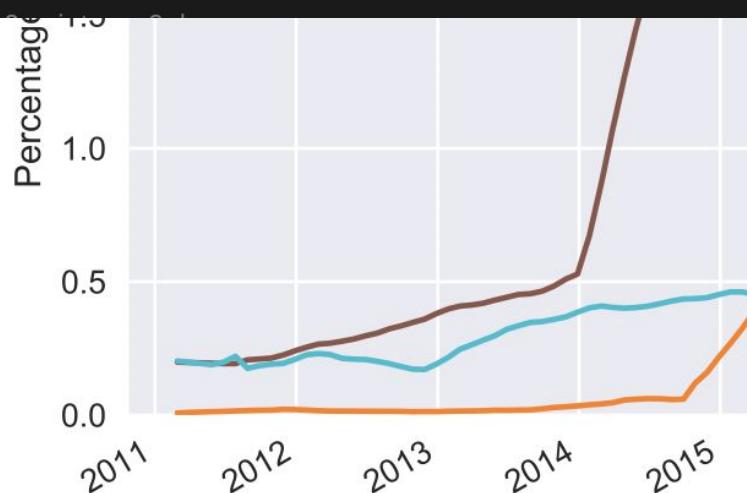
8 Years ago almost all new Data Scientists used R - or MatLab

4 years ago almost all new Data Scientists knew both R and Python.

Now see most new Data Scientists knowing only Python

Reply Share Report Save Give gold

Jupyter Notebook



The Incredible Growth of Python



by David Robinson on September 6, 2017

We recently explored how wealthy countries (those defined as [high-income](#) by the World Bank) tend to visit a different set of technologies than the rest of the world. Among the largest differences we saw was in the programming language Python. When we focus on high-income countries, the growth of Python is even larger than it might appear from tools like [Stack Overflow Trends](#), or in other rankings that consider global software development.



In this post, we'll explore the extraordinary growth of the Python programming language in the last five years, as seen by Stack Overflow traffic within high-income countries. The term "fastest-growing" can be [hard to define precisely](#), but we make the case that **Python has a solid claim to being the fastest-growing major programming language**.

A data journalism story
(...with Jupyter)



Fernando Perez
@fperez_org

Following

Delighted to see @TheEconomist publishing the data and code backing their stories on @GitHub, as @ProjectJupyter notebooks. Data-driven journalism has parallels with open science and reproducible research; sharing these practices can encourage a more informed public dialog.

Evan Henfleigh @futuraprime

We've always identified our sources, but sometimes that's not enough. That's why @TheEconomist is releasing the data and code behind our stories.
medium.economist.com/peeling-back-t...

9:02 AM - 10 Oct 2018

228 Retweets 524 Likes



Late Edition
Today, rain early, afternoon sunshine, mild, high 51. Tonight, partly cloudy, low 37. Tomorrow, some sunshine, then cloudy, chillier, high 43. Details in SportsSunday, Page 8.

Times

6, 2018 \$6.00

Buying Online Influence From a Shadowy Market

Fake Followers Are Counterfeit Coins in a Booming Social Media Economy



This article is by Nicholas Confessore, Gabriel J.X. Dance, Richard Harris and Mark Hansen.

The real Jessica Rychly is a Minnesota teenager with a broad smile and wavy hair. She likes reading and the rapper Post Malone. When she goes on Facebook or Twitter, she sometimes muses about being bored or trades jokes with friends. Occasionally, like many teenagers, she posts a duck-face selfie.

"I don't want my picture connected to the account, nor my name," Ms. Rychly, now 19, said. "I can't believe that someone would even pay for it. It is just horrible."

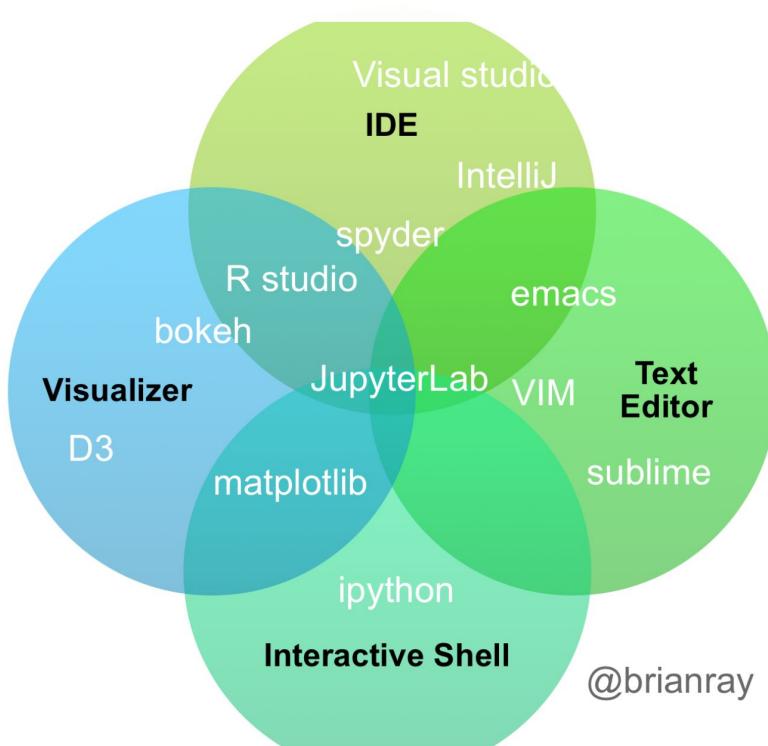
These accounts are counterfeit coins in the booming economy of online influence, reaching into vir-



Jessica Rychly's social identity was stolen by a bot when she was in high school.

What about JupyterLab?

JupyterLab



<https://github.com/jupyterlab/jupyterlab-git>

File Edit View Run Kernel Tabs Settings Help

Files + ↗ C

notebooks

Name	Last Modified
Data.ipynb	an hour ago
Fasta.ipynb	a day ago
Julia.ipynb	a day ago
Lorenz.ipynb	seconds ago
R.ipynb	a day ago
iris.csv	a day ago
lightning.json	9 days ago
lorenz.py	3 minutes ago

Running

Commands

Cell Tools

Tabs

Lorenz.ipynb Terminal 1 Console 1 Data.ipynb README.md Python 3

In this Notebook we explore the Lorenz system of differential equations:

$$\begin{aligned}\dot{x} &= \sigma(y - x) \\ \dot{y} &= \rho x - y - xz \\ \dot{z} &= -\beta z + xy\end{aligned}$$

Let's call the function once to view the solutions. For this set of parameters, we see the trajectories swirling around two points, called attractors.

In [4]: `from lorenz import solve_lorenz
t, x_t = solve_lorenz(N=10)`

Output View

lorenz.py

`def solve_lorenz(N=10, max_time=4.0, sigma=10.0, beta=8./3, rho=28.0):
 """Plot a solution to the Lorenz differential equations."""
 fig = plt.figure()
 ax = fig.add_axes([0, 0, 1, 1], projection='3d')
 ax.axis('off')

 # prepare the axes limits
 ax.set_xlim((-25, 25))
 ax.set_ylim((-35, 35))
 ax.set_zlim((5, 55))

 def lorenz_deriv(x_y_z, t0, sigma=sigma, beta=beta, rho=rho):
 """Compute the time-derivative of a Lorenz system."""
 x, y, z = x_y_z
 return [sigma * (y - x), x * (rho - z) - y, x * y - beta * z]

 # Choose random starting points, uniformly distributed from -15 to 15
 np.random.seed(1)
 x0 = -15 + 30 * np.random((N, 3))`

Integration with git

<https://github.com/jupyterlab/jupyterlab-git>

Quick Demo

@zzhangjii

@NoahStapp

@hzarea

More: <https://goo.gl/6kQZwD>

The screenshot shows a GitHub repository page for 'jupyterlab/jupyterlab-git'. The repository name is at the top left. The header includes navigation links for Pull requests, Issues, Marketplace, and Explore, along with user statistics: Watch (39), Star (164), Fork (49). Below the header, there's a search bar and tabs for Code, Issues (15), Pull requests (2), Projects (1), Wiki, and Insights. A brief description follows: 'A Git extension for JupyterLab'. Below this are tags: jupyterlab, git, jupyterlab-extension. Key metrics are displayed: 586 commits, 26 branches, 4 releases, 18 contributors, and BSD-3-Clause license. A dropdown shows 'Branch: master' and a 'New pull request' button. A green 'Clone or download' button is also present. The main content area lists recent commits, such as 'Merge pull request #265 from neelamghelot/refactor-branch-api' by 'blink1073' (8 days ago) and 'Upgrade to jlab 0.35' by 'Upgrader' (24 days ago).

Commit	Description	Time Ago
blink1073 Merge pull request #265 from neelamghelot/refactor-branch-api	Refactor and Add unit test for branch API	8 days ago
jupyterlab_git	Refactor and Add unit test for branch API	8 days ago
specification	Refactor and Add unit test for branch API	8 days ago
src	Refactor and Add unit test for branch API	8 days ago
style	Refactor and Add unit test for branch API	8 days ago
tests	Refactor and Add unit test for branch API	8 days ago
.gitignore	Upgrade to jlab 0.35	24 days ago
.travis.yml	Add unit tests for Branch Header component	19 days ago

Ideas for new extensions

- Functional:
 - External services (e.g. cloud storage)
 - Improved text editor
 - Interactive visualisations
 - ... you name it
- Reproducible: link to mybinder.org
- Searchable: [#jupyterlab-extension GitHub topic](#)



A screenshot of a JupyterLab interface. At the top, there's a header bar with tabs like File, Edit, View, Run, Kernel, Git, Tabs, Settings, and Help. Below the header, there's a navigation bar with buttons for Files, History, and add-git-icons. A dropdown menu labeled "Launcher" is open. In the main content area, there's a file browser titled "README.md" showing a single item named "jupyterlab-git". Below the file list, there are two status indicators: "launch binder" (with a red arrow pointing to it) and "build passing". A descriptive text below the file list reads: "A JupyterLab extension for version control using git".

[Code](#)[Issues 15](#)[Pull requests 2](#)[Projects 1](#)[Wiki](#)[Insights](#)

A Git extension for JupyterLab

[jupyterlab](#)[git](#)[jupyterlab-extension](#)[586 commits](#)[26 branches](#)[4 releases](#)[18 contributors](#)[BSD-3-Clause](#)

Branch: master ▾

[New pull request](#)[Create new file](#)[Upload files](#)[Find file](#)[Clone or download ▾](#)

 blink1073	Merge pull request #265 from neelamgehlot/refactor-branch-api	...	Latest commit 276a42d 6 days ago
 jupyterlab_git	Refactor and Add unit test for branch API		8 days ago
 specification	Refactor and Add unit test for branch API		8 days ago
 src	Refactor and Add unit test for branch API		8 days ago
 style	Refactor and Add unit test for branch API		8 days ago
 tests	Refactor and Add unit test for branch API		8 days ago

JupyterLab

localhost:8888/lab

File Edit View Run Kernel Tabs Settings Help

SEARCH

INSTALLED

No entries

DISCOVER

@jupyter-widgets/jupyterlab-manager

The JupyterLab extension providing Jupyter widgets.

Install

@jupyterlab/celltags

Extension for adding descriptive tags to notebook cells (Beta)

Install

@jupyterlab/fasta-extension

Fasta renderer for JupyterLab

Install

@jupyterlab/geojson-extension

GeoJSON renderer for JupyterLab

Install

@jupyterlab/git

A JupyterLab extension for version control using git

Install

@jupyterlab/github

JupyterLab viewer for GitHub repositories

Install

@jupyterlab/google-drive

Realtime collaboration with JupyterLab through Google Drive

Install

@jupyterlab/hub-extension

JupyterLab integration for JupyterHub

Install

Settings

Raw View Table View

System Defaults

```
{  
    // Extension Manager  
    // @jupyterlab/extensionmanager-extension:plugin  
    // Extension manager settings.  
    //  
*****  
  
    // Enabled Status  
    // Enables extension manager  
(requires Node.js/npm).  
    // WARNING: installing untrusted  
extensions may be unsafe.  
    "enabled": false  
}
```

User Overrides

```
1 {  
2     "enabled": true  
3 }
```

Call for action

“A search bar for JupyterLab extensions”

- List and detail views (npmjs.com, pypi.org)
- Showcase extension (mybinder.org)
- Advanced filtering on data science functionalities (e.g. plotting)
- Based on GitHub/npm/yarn/...
- Possibly becomes an extension itself
- Fully open source



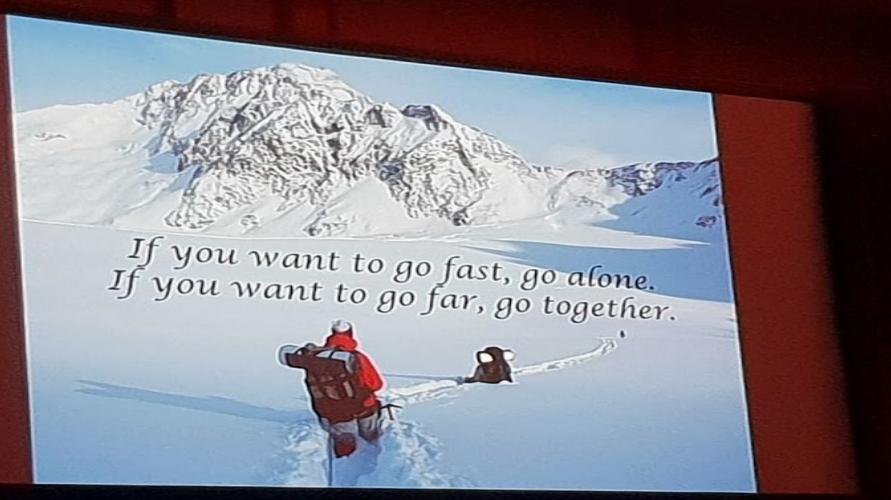
Enrico
HAL24K



Giacomo
UniPd



You?



Thank you

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enrico.rotundo@hal24k.com

**HAL
24K**