

SOME THOUGHTS ON

Open Source

Arfon Smith (arfon@stsci.edu)

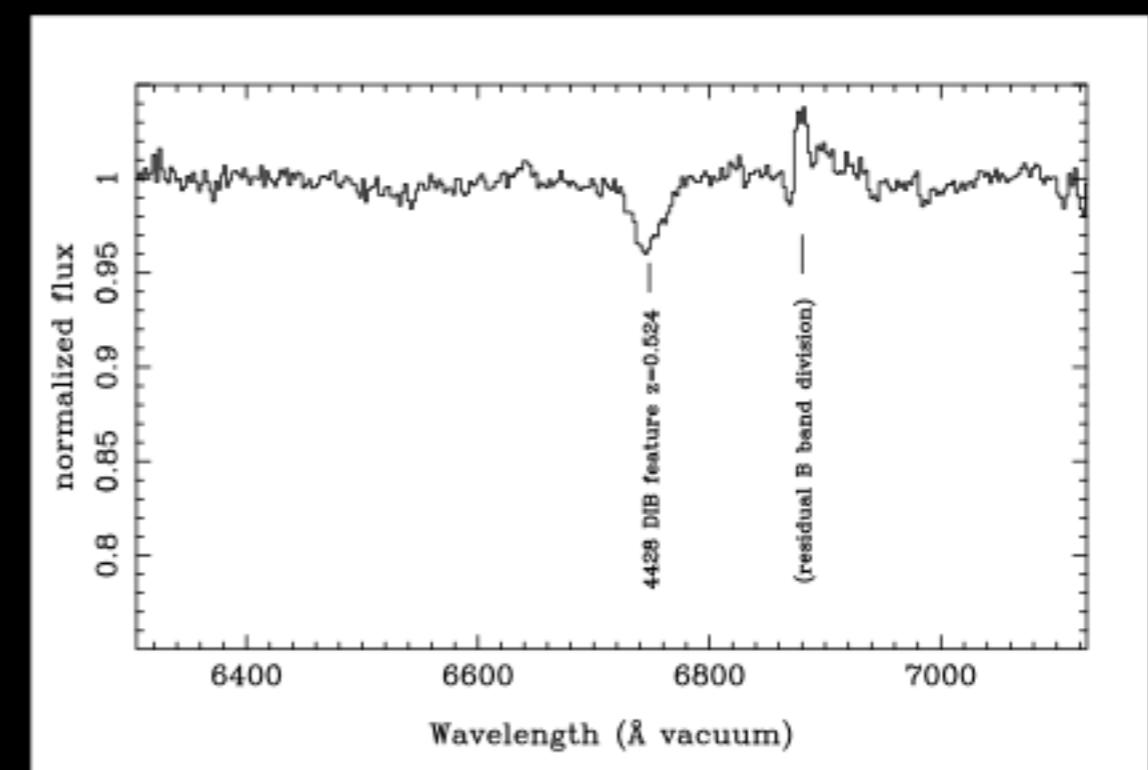
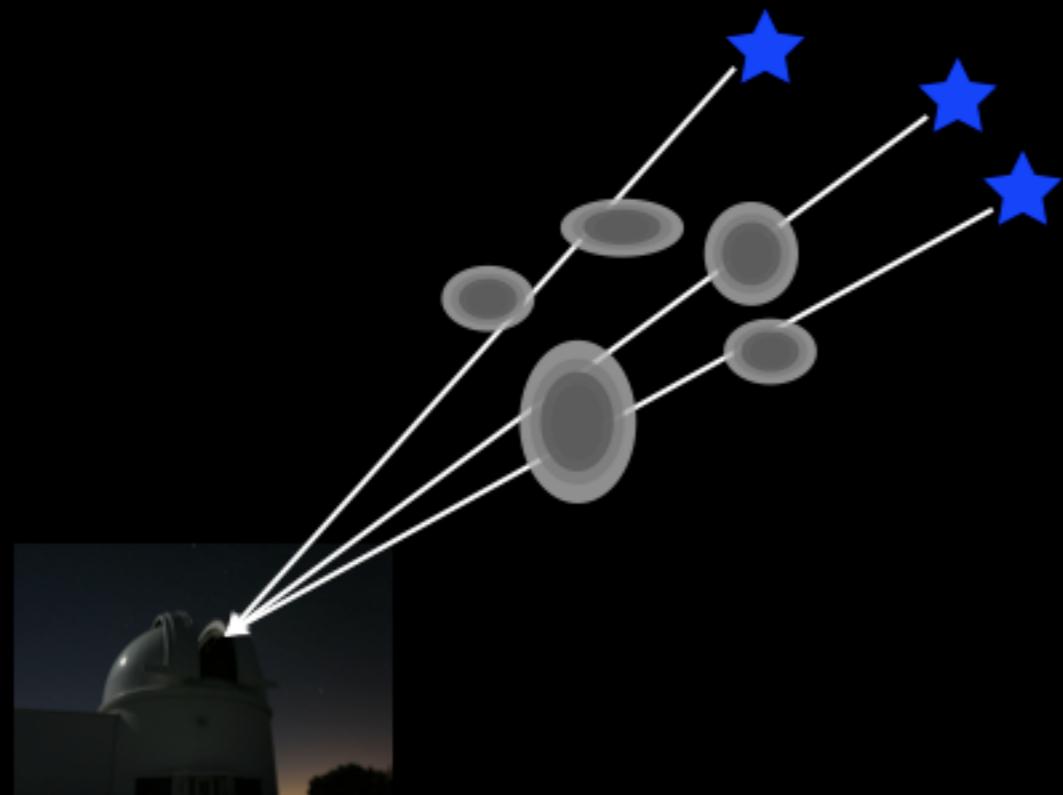
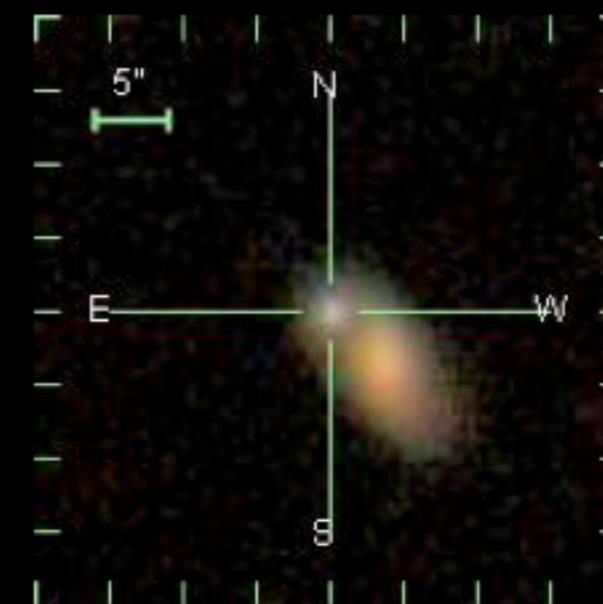
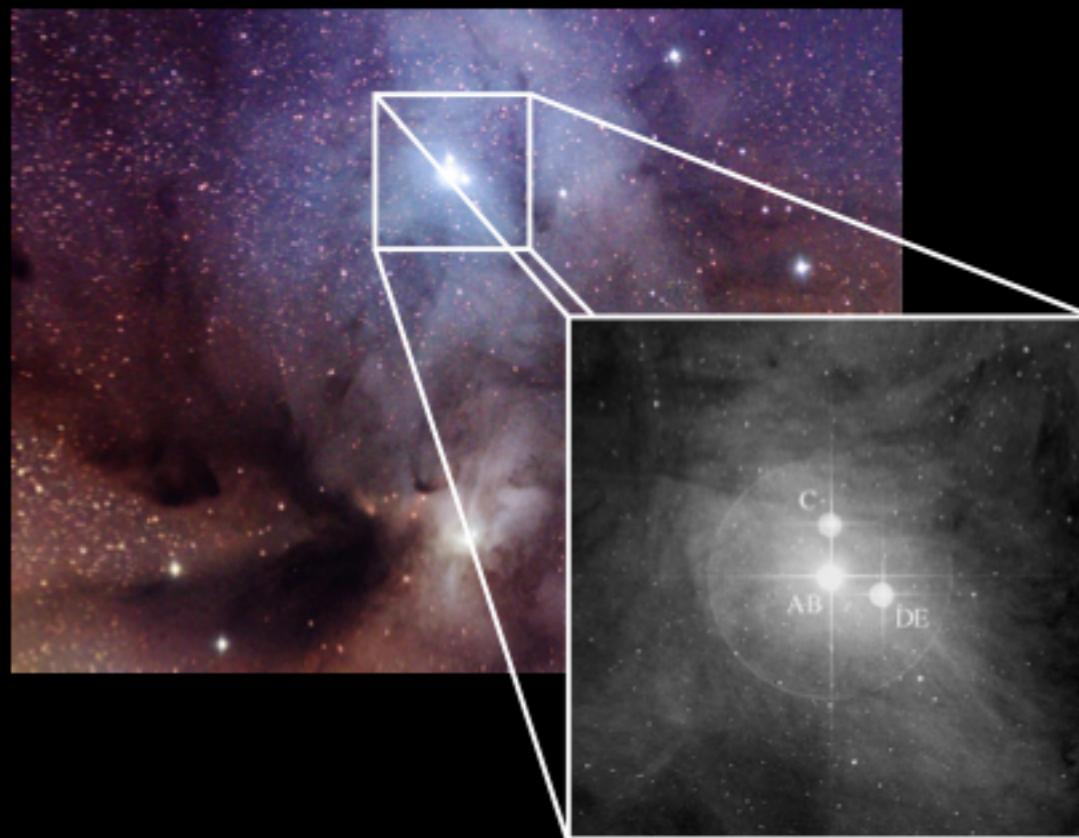
STScI | SPACE TELESCOPE
SCIENCE INSTITUTE



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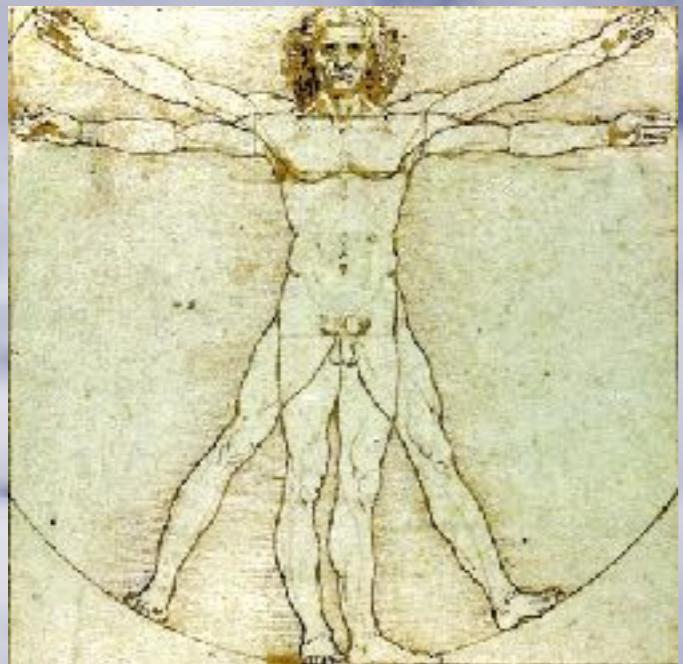
2 minutes about me...





Junkkarinen et al. 2004

TL;DR: AS INTERESTED IN ANALYSIS SOFTWARE AS
SCIENTIFIC RESULTS





il2win

12-0112

u/n : sbsuser
P/n : sbs123



PROJECTS

PROJECTS SAMPLES REPORTS FAMILIES SEARCH

SEQUENCING PROJECT 23: **MALARIA CP6 – PARASITE GENOME DIVERSITY**[Full details →](#)

Single ended bases sequenced:	1,567,271,001 (greater than Q20)
Paired end bases sequenced:	97,192,666,648 (greater than Q20)
Library creation quota:	351
Single ended sequencing quota:	25
Paired end sequencing quota:	277

PROJECT QUOTA FULFILMENT

Library creation **123 of 351**

PROJECT QUOTA FULFILMENT

Single ended sequencing **13 of 25**

PROJECT QUOTA FULFILMENT

Paired end sequencing **279 of 277**

	Library creation	Single ended sequencing	Paired end sequencing
Sequencing requests	123	13	287
└ Completed	116	13	238
└ Pass	116	13	230
└ Fail	0	0	8
└ Outstanding requests	7	0	49
Quota remaining	228	12	0 (2 over)

SAMPLES

[Library creation](#) [Single ended sequencing](#) [Paired end sequencing](#)

Current status for library creation:

Sample name	Bases at > Q20	Requested	Passed QC	Failed QC	Completed	Outstanding
PR0001-C (aefnf)	2,074,430,019	1	1	0	1	0

This page gives you a high level view of the sequencing status for a particular project.

[Register a new sample →](#)
[Project history](#)
[2 comments](#)[Close project](#)[Manage project](#)
[Project ownership](#)[← Back to your projects](#)

Galaxy Zoo

www.galaxyzoo.org/#/classify

CLASSIFY STORY SCIENCE

GALAXY ZOO

DISCUSS PROFILE LANGUAGE

f t g m

Classify

SDSS INVEST

Examples Restart

SHAPE

Is the galaxy simply smooth and rounded, with no sign of a disk?

Smooth Features or disk Star or artifact



Zooniverse - Science Projects

https://www.zooniverse.org/projects

EN 1,116,235 people taking part worldwide Projects Community About us Sign in Register

ZOONIVERSE

All Space Climate Humanities Nature Biology

Space

Sort by Category



How do galaxies form?
NASA's Hubble Space Telescope archive provides hundreds of thousands of galaxy images.

GALAXY ZOO



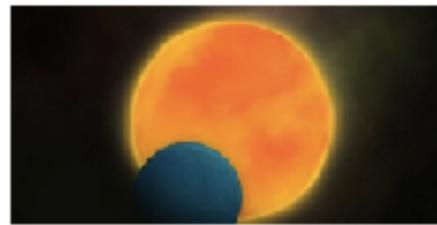
Explore the surface of the Moon
We hope to study the lunar surface in unprecedented detail.

MOON ZOO



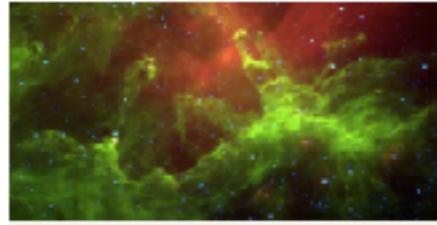
Study explosions on the Sun
Explore interactive diagrams to learn about the Sun and the spacecraft monitoring it.

SOLAR STORMWATCH



Find planets around stars
Lightcurve changes from the Kepler spacecraft can indicate transiting planets.

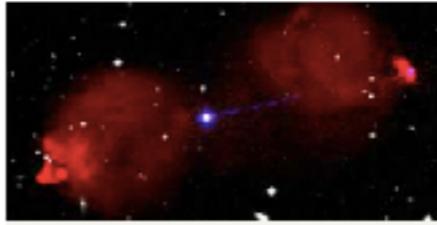
planethunters.org



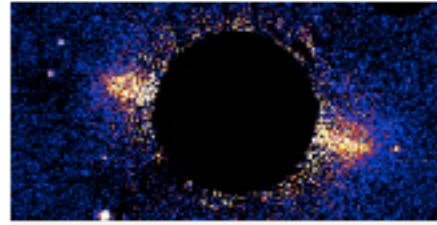
How do stars form?
We're asking you to help us find and draw circles on infrared image data from the Spitzer Space Telescope.



Explore the Red Planet
Planetary scientists need your help to discover what the weather is like on Mars.



Match growing black holes to their jets
We need help to compare infrared and radio data to spot growing black holes.



Find the Birthplace of Planets
Help comb our galaxy, looking for stars that could be harbouring planets.



machine-learning-with-solar-d x Arfon

GitHub, Inc. [US] | https://github.com/mbobra/machine-learning-with-solar-data/blob/master/cme_svm.ipynb

This repository Search Pull requests Issues Marketplace Explore

mbobra / machine-learning-with-solar-data Watch 2 Star 3 Fork 6

Code Issues 0 Pull requests 0 Projects 0 Wiki Insights

Branch: master machine-learning-with-solar-data / cme_svm.ipynb Find file Copy path

mbobra Initial commit 828589f on 23 Mar 2016

1 contributor

4468 lines (4467 sloc) | 943 KB Raw Blame History

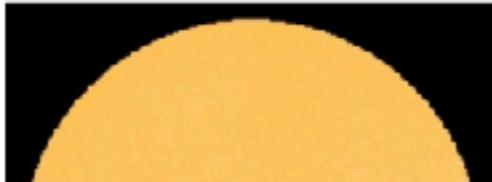
predicting coronal mass ejections using machine learning methods

In this notebook, we will be predicting whether or not a flaring active region will also emit a Coronal Mass Ejection (CME). The analysis that follows is published in Bobra & Ilonidis, 2016, *Astrophysical Journal*. If you use any of this code, we ask that you cite our paper.

Generally, active regions associated with large flares produce coronal mass ejections, but there have been some notable exceptions - for example, the largest active region in the last 24 years, which appeared in October 2014, produced many large flares yet not a single CME. Here is the active region:

```
In [1]: from IPython.display import Image
Image(url='http://jsoc.stanford.edu/data/hmi/images/2014/10/22/20141022_001500_Ic_flat_256.jpg', embed=True)
```

Out[1]:



machine-learning-with-solar-d Aron

GitHub, Inc. [US] | https://github.com/mbobra/machine-learning-with-solar-data/blob/master/cme_svm.ipynb Aron

Citing Matplotlib — Matplotlib Aron

matplotlib.org/citing.html Aron

matplotlib

home | examples | tutorials | pyplot | docs | modules | index

Citing Matplotlib

If Matplotlib contributes to a project that leads to a scientific publication, please acknowledge this fact by citing Hunter et al (2007) using this ready-made BibTeX entry:

```
@Article{Hunter:2007,
    Author    = {Hunter, J. D.},
    Title     = {Matplotlib: A 2D graphics environment},
    Journal   = {Computing In Science & Engineering},
    Volume    = {9},
    Number    = {3},
    Pages     = {90--95},
    abstract   = {Matplotlib is a 2D graphics package used for Python for application development, interactive scripting, and publication-quality image generation across user interfaces and operating systems.},
    publisher  = {IEEE COMPUTER SOC},
    doi        = {10.1109/MCSE.2007.55},
    year       = 2007
}
```

DOIs

v2.1.0

DOI [10.5281/zenodo.1004650](https://doi.org/10.5281/zenodo.1004650)

v2.0.2

DOI [10.5281/zenodo.573577](https://doi.org/10.5281/zenodo.573577)

v2.0.1

powered by NumFOCUS

Depsy 100th percentile

Travis-CI: build passing

Related Topics

Documentation overview

Quick search

Go



machine-learning-with-solar-d Arfon

GitHub, Inc. [US] | https://github.com/mbobra/machine-learning-with-solar-data/blob/master/cme_svm.ipynb Arfon

PJ Software citation principles Arfon

PeerJ, Inc. [US] | https://peerj.com/articles/cs-86.pdf Arfon

Software citation principles

Arfon M. Smith^{1*}, Daniel S. Katz^{2*}, Kyle E. Niemeyer^{3*} and
FORCE11 Software Citation Working Group

¹ GitHub, Inc., San Francisco, California, United States
² National Center for Supercomputing Applications & Electrical and Computer Engineering
Department & School of Information Sciences, University of Illinois at Urbana-Champaign,
Urbana, Illinois, United States
³ School of Mechanical, Industrial, and Manufacturing Engineering, Oregon State University,
Corvallis, Oregon, United States
* These authors contributed equally to this work.

ABSTRACT

Software is a critical part of modern research and yet there is little support across the scholarly ecosystem for its acknowledgement and citation. Inspired by the activities of the FORCE11 working group focused on data citation, this document summarizes the recommendations of the FORCE11 Software Citation Working Group and its activities between June 2015 and April 2016. Based on a review of existing community practices, the goal of the working group was to produce a consolidated set of citation principles that may encourage broad adoption of a consistent policy for software citation across disciplines and venues. Our work is presented here as a set of software citation principles, a discussion of the motivations for developing the principles, reviews of existing community practice, and a discussion of the requirements these principles would place upon different stakeholders. Working examples and possible technical solutions for how these principles can be implemented will be discussed in a separate paper.

Software citation principles

Aronf M. Smith^{1*}, Daniel S. Katz^{2*}, Kyle E. Niemeyer^{3*} and
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¹ GitHub, Inc., San Francisco, California, United States
² National Center for Supercomputing Applications & Electrical and Computer Engineering
Department & School of Information Sciences, University of Illinois at Urbana-Champaign,
Urbana, Illinois, United States
³ School of Mechanical, Industrial, and Manufacturing Engineering, Oregon State University,
Corvallis, Oregon, United States
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machine-learning-with-solar-d Aron

GitHub, Inc. [US] | https://github.com/mbobra/machine-learning-with-solar-data/blob/master/cme_svm.ipynb Aron

VB GitHub releases data on 2.8 million open source repositories through Google BigQuery Aron

Secure | https://venturebeat.com/2016/06/29/github-releases-data-on-2-8-million-open-source-repositories-through-google-bigquery/ Aron

VB NEWS EVENTS RESEARCH f t in Search Q

DEV

GitHub releases data on 2.8 million open source repositories through Google BigQuery

JORDAN NOVET @JORDANNOVET JUNE 29, 2016 1:59 PM

[f](#) [t](#) [in](#) [r](#) [Y](#)

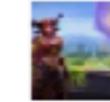


Above: The GitHub Octocat figurine.
Image Credit: GitHub Shop

VB Recommendations

 Firefox Quantum arrives with faster browser engine, major visual overhaul, and Google as default search engine

 EA's defense of Star Wars: Battlefront II is now Reddit's most downvoted comment

 Heroes of the Storm dev on the quest to keep the MOBA strong with new heroes and changes

Upcoming Events

BLUEPRINT Mar 5 - 7

GamesBeat 2018 Apr 9 - 10



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SCIENCE INSTITUTE

Non-profit, based in Baltimore
Established in 1982 to operate HST for NASA
Science operations center for HST & JWST
Develop software to support community
Mixed staff (astronomers & engineers)
Archive for > 20 different missions (including Kepler)
Government contractor (funding via NASA SMD)



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THREE THINGS...

1. *Insights from GitHub*
2. *The work we do at STScl*
3. *Recommendations*

Insights from GitHub

1

24M users
1.5M organizations
67M repositories
100M pull requests
1B commits in 2016

GitHub

NASA GitHub, Inc. [US] | https://github.com/nasa Arfon

This organization Search Pull requests Issues Marketplace Explore

NASA United States of America http://www.nasa.gov github@lists.nasa.gov

Repositories 144 People 31

Search repositories... Type: All Language: All

ominas
Forked from ppenteado/ominas
Opensource Multi-INstrument Analysis Software
• IDL ★1 1 Updated 22 minutes ago

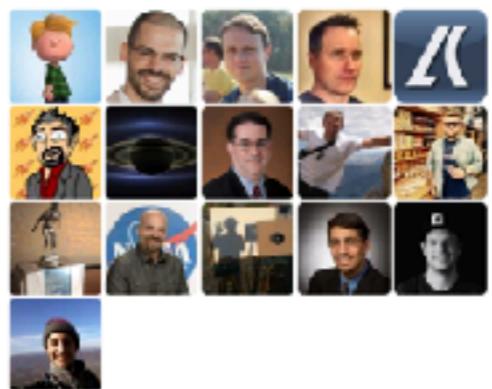
openmct
A web based mission control framework.
• JavaScript ★4,737 486 38 issues need help Updated an hour ago

utm-apis
The collection of APIs for NASA's UTM project in the form of OpenAPI documents.
★4 5 Updated 2 hours ago

Top languages

- C
- Python
- C++
- JavaScript
- Java

People 31



Every company is a software company.

WSJ Marc Andreessen on Why Soft... X Arfon

Secure | <https://www.wsj.com/articles/SB1000142405311903480904576512250915629460>

DCW JONES, A NEWS CORP COMPANY ▾

DJIA ▼ 23409.47 -0.13% S&P 500 ▼ 2578.87 -0.23% Nasdaq ▼ 6737.87 -0.29% U.S. 10 Yr ▲ 8/32 Yield 2.375% Crude Oil ▼ 55.00 -3.10% Euro ▼ 1.1799 0%

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 WORK & FAMILY When Your Company Makes You Queasy  OFF DUTY TRAVEL An Escape to Miami, Beautifully Resilient ...  Hate Mirrors But Can't Stop Looking at Yourself? There's Help  MY RIDE A Bold Barracuda That's All Muscle  Asia Boosts CI Led by s van Gog 

ESSAY

Why Software Is Eating The World

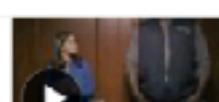
By [Marc Andreessen](#)
August 20, 2011

This week, Hewlett-Packard (where I am on the board) announced that it is exploring jettisoning its struggling PC business in favor of investing more heavily in software, where it sees better potential for growth. Meanwhile, Google plans to buy up the cellphone handset maker Motorola Mobility. Both moves surprised the tech world. But both moves are also in line with a trend I've observed, one that makes me optimistic about the future growth...

RELATED VIDEO

 **Groupon Investor Marc Andreessen: 'No Tech Bubble'**
In an interview with WSJ's Kevin Delaney, Groupon and LinkedIn investor Marc Andreessen insists that the recent popularity of tech companies does not constitute a bubble. He also stressed that both Apple and Google are

Recommended Videos

1. [Secretary Mnuchin on the Roy Moore Assault Allegations](#) 
2. [Woman Recounts Alleged Sexual Assault by Roy Moore](#) 
3. [In the Elevator With Shaq](#) 
4. [Women Voters Lift Democrats in Trump Era](#) 



Open source is in every company.

(EVEN IF THEY DON'T KNOW IT)

Maturity model



Releasing new open source software

Contributing to open source software

Consuming open source software

Open is the new normal.

Open source as a strategic advantage.

GitHub Octoverse 2017 | High Arfon

Secure | https://octoverse.github.com

Ten most-forked projects

1	 TENSORFLOW/TENSORFLOW	24K
2	 TWBS/BOOTSTRAP	15K
3	 GITHUB/GITIGNORE	10.8K
4	 BARRYCLARK/JEKYLL-NOW	10.7K
5	 TENSORFLOW/MODELS	8.9K
6	 VUEJS/VUE	8.1K
7	 FACEBOOK/REACT	8K
8	 JLORD/PATCHWORK	7.4K
9	 SPRING-PROJECTS/SPRING-BOOT	7.4K
10	 TORVALDS/LINUX	6.1K

This list doesn't include MOOC courses, but an R programming assignment on Coursera has forks in the thousands, too. If forks are any indication, more than 100,000 students have started this assignment.

Projects with the most contributors

 MICROSOFT/VS CODE	15K
 FACEBOOK/REACT-NATIVE	8.8K
 NPM/NPM	7.6K
 ANGULAR/ANGULAR-CLI	7.4K
 TENSORFLOW/TENSORFLOW	7.3K
 FORTAWESOME/FONT-AWESOME	6.8K
 ANGULAR/ANGULAR	6K
 DOCKER/DOCKER	6K
 JLORD/PATCHWORK	6.9K

Sustainability is an increasing concern.

Arfon

Secure | <https://www.fordfoundation.org/library/reports-and-studies/roads-and-bridges-the-unseen-labor-behind-our-digital-infrastruct...>

 FORDFOUNDATION

WORK WORLDWIDE IDEAS ABOUT 



LIBRARY | REPORTS AND STUDIES

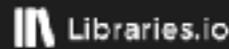


Roads and Bridges: The Unseen Labor Behind Our Digital Infrastructure

14 JULY 2016

Libraries.io - The Open Source 

Secure | <https://libraries.io>

 Libraries.io [Login](#)

Libraries.io

Search open source libraries, frameworks and tools... [Search](#)

Libraries.io monitors 2,501,647 open source libraries across 34 different package managers, so you don't have to. [Find out more](#)

 **Discover new software**
Search 2.5M projects by [licence](#), [language](#) or [keyword](#), or explore new, trending or popular projects.

[Explore](#)

 **Monitor your dependencies**
Stay up to date with notifications of updates, licence incompatibilities or deleted dependencies.

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 **Maintain your OSS project**
Understand your users and make informed decisions about features with usage and version data.

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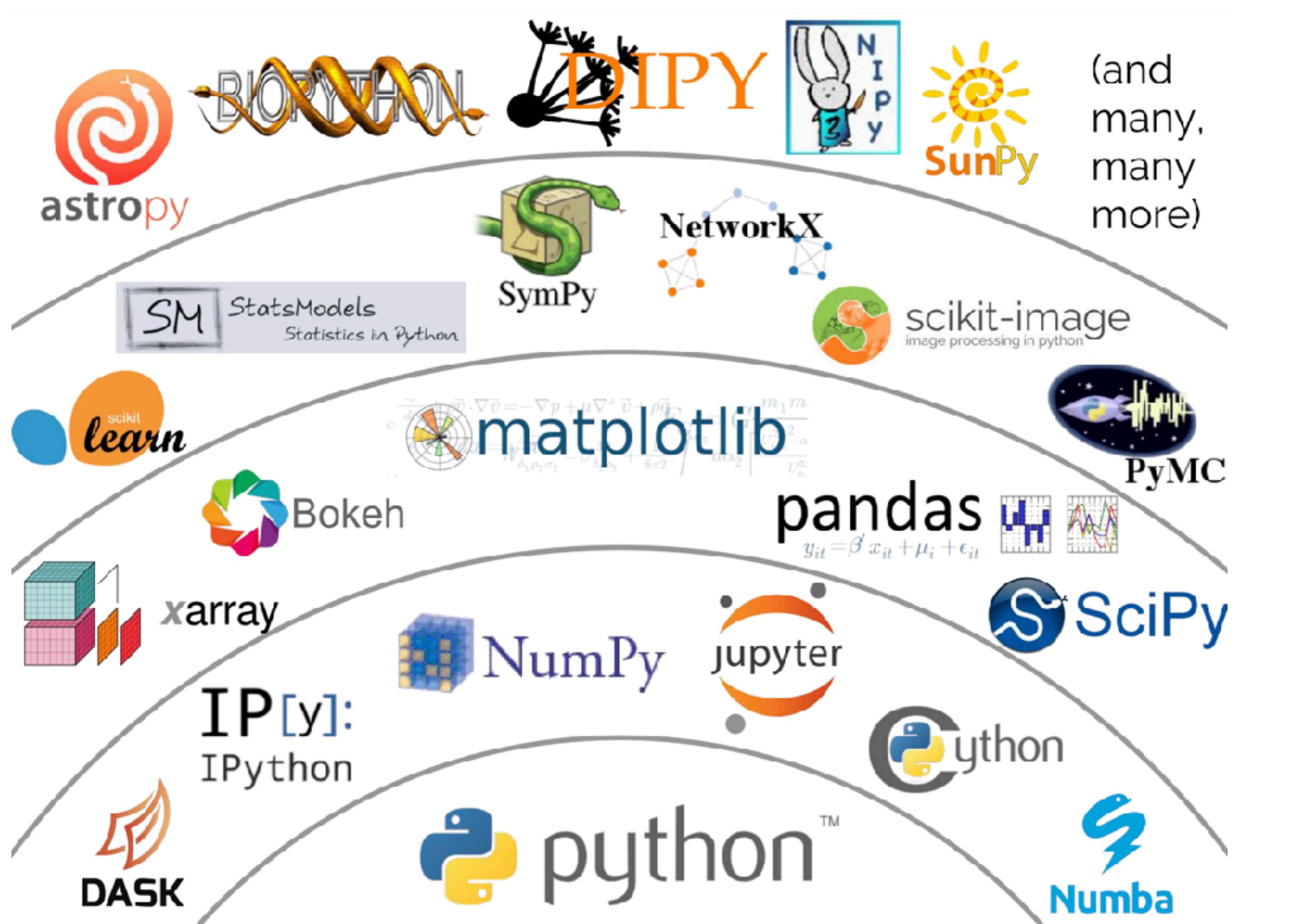
 **Use Libraries.io data**
Use Libraries.io data in your applications, services or research. Use our [API](#) to stay up to date.

[Documentation](#)

Supported Package Managers

 Go 811K Projects	 npm 814K Projects	 Packagist 179K Projects
 Rubygems 140K Projects	 Pypi 114K Projects	 Maven 106K Projects
 NuGet 105K Projects	 Bower 86.5K Projects	 WordPress 53.5K Projects

**‘Data-oriented’ software is particularly fertile
open source territory.**



Credit: Jake VanderPlas

Project Jupyter | About Us

jupyter.org/about.html

jupyter

Install About Us Community Documentation NBViewer Widgets Blog

THE LEONA M. AND HARRY B.
HELMSLEY
CHARITABLE TRUST

ALFRED P. SLOAN FOUNDATION

GORDON AND BETTY MOORE FOUNDATION

Google

Rackspace the #1 managed cloud company

fastly

Horizon 2020 European Union funding for Research & Innovation

Microsoft

Institutional Partners

Institutional Partners are organizations that support the project by employing Jupyter Steering Council members. Current Institutional Partners include:

CONTINUUM ANALYTICS

Bloomberg

NETFLIX

CAL POLY SAN LUIS OBISPO

Berkeley UNIVERSITY OF CALIFORNIA

QuantStack Scientific Computing

Data science driving much of this.

Airbnb

GitHub, Inc. [US] | https://github.com/airbnb

This organization Search Pull requests Issues Marketplace Explore

Airbnb

San Francisco http://airbnb.io

Repositories 148 People 30

Pinned repositories

javascript
JavaScript Style Guide
JavaScript ★ 61.6k ⚡ 11.9k

enzyme
JavaScript Testing utilities for React
JavaScript ★ 11.5k ⚡ 1.2k

aerosolve
A machine learning package built for humans.
Scala ★ 4.2k ⚡ 542

react-dates
An easily internationalizable, mobile-friendly datepicker library for the web
JavaScript ★ 5.7k ⚡ 651

lottie-android
Render After Effects animations natively on Android and iOS, Web, and React Native
Java ★ 17k ⚡ 2.5k

lottie-ios
An iOS library to natively render After Effects vector animations
Objective-C ★ 11.3k ⚡ 1.4k

Search repositories... Type: All Language: All

lottie-web
after effects to html library
JavaScript ★ 8,203 ⚡ 623 MIT Updated 2 minutes ago

Top languages

JavaScript Ruby Java
Python HTML

Home | Airbnb Engineering  airbnb.io 

Featured Projects



ReAir

Easy-to-use tools for replicating tables and partitions between Hive data warehouses.

[View Project](#)



Apache Superset (incubating)

A data exploration platform designed to be visual, intuitive, and interactive.

[View Project](#)



Enzyme

JavaScript Testing utilities for React.

[View Project](#)



Aerosolve

A machine learning package built for humans.

[View Project](#)



Apache Airflow (incubating)

Use Apache Airflow (incubating) to author workflows as directed acyclic graphs (DAGs) of tasks.

[View Project](#)



Airpal

A web-based, query execution tool for Facebook's PrestoDB.

[View Project](#)

Netflix, Inc. GitHub, Inc. [US] https://github.com/Netflix Aron

This organization Search Pull requests Issues Marketplace Explore

NETFLIX OSS Netflix, Inc. (1)

Netflix Open Source Platform

Los Gatos, California http://netflix.github.io/ netflixoss@netflix.com

Repositories 131 People 40

Search repositories... Type: All Language: All

hollow
Hollow is a java library and toolset for disseminating in-memory datasets from a single producer to many consumers for high performance read-only access.

Java 579 52 Apache-2.0 Updated 8 minutes ago

genie
Distributed Big Data Orchestration Service

java distributed-systems big-data spring-boot bigdata

Java 798 196 Apache-2.0 Updated an hour ago

msl
Message Security Layer

JavaScript 432 55 Apache-2.0 Updated an hour ago

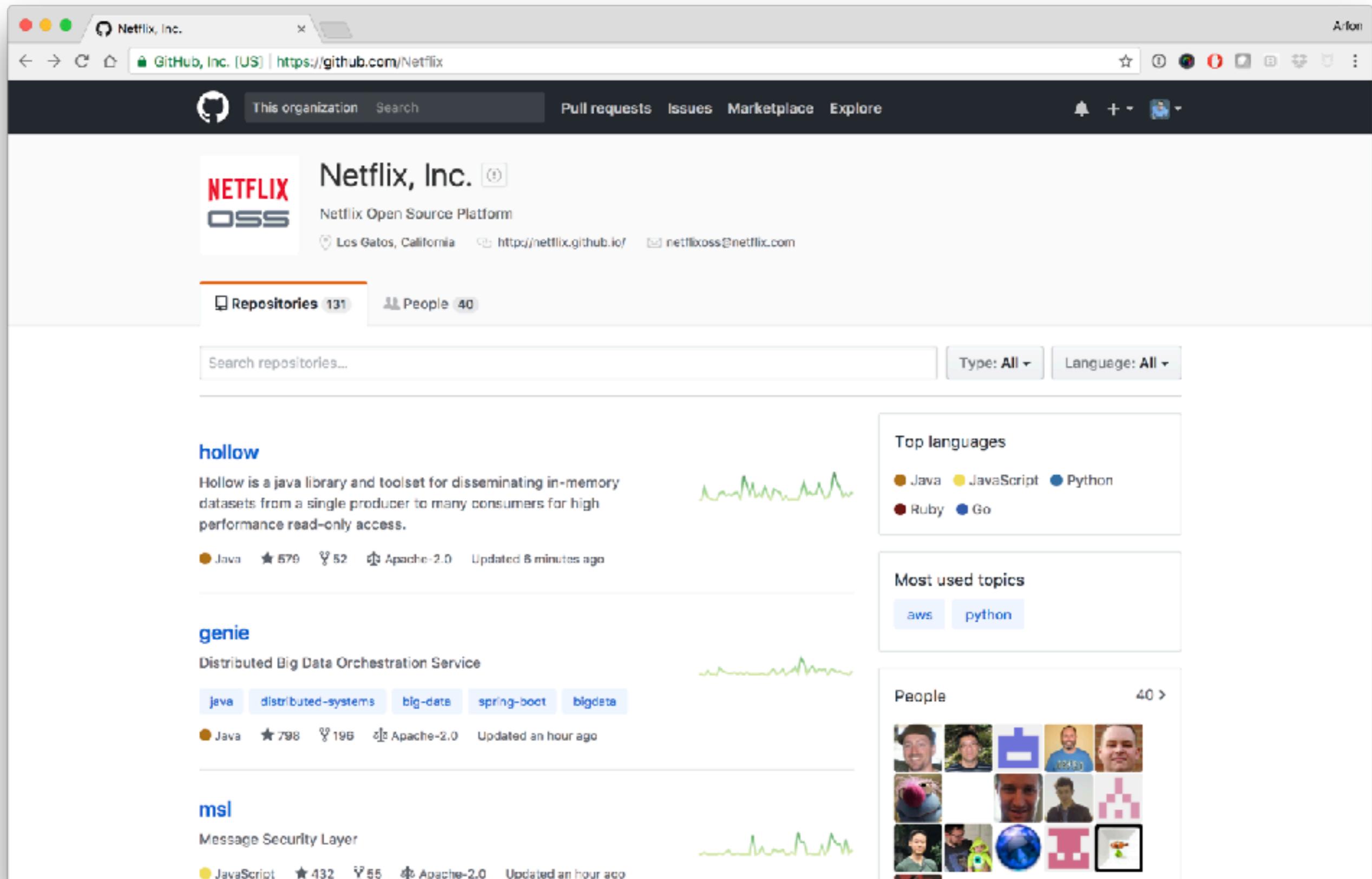
Top languages

Java JavaScript Python Ruby Go

Most used topics

aws python

People 40 >



Netflix Open Source Software Center

Netflix is committed to open source. Netflix both leverages and provides open source technology focused on providing the leading Internet television network. Our technology focuses on providing immersive experiences across all Internet-connected screens. Netflix's deployment technology allows for continuous build and integration into our worldwide deployments serving members in over 50 countries. Our focus on reliability defined the bar for cloud based elastic deployments with several layers of failover. Netflix also provides the technology to operate services responsibly with operational insight, peak performance, and security. We provide technologies for data (persistent & semi-persistent) that serve the real-time load to our 62 million members, as well as power the big data analytics that allow us to make informed decisions on how to improve our service. If you want to learn more, jump into any of the functional areas below to learn more.

Big Data

Data is invaluable in making Netflix such an exceptional service for our customers. Behind the scenes, we have a rich ecosystem of (big) data technologies facilitating our algorithms and analytics. We use and contribute to broadly-adopted open source technologies including Hadoop, Hive, Pig, Parquet, Presto, and Spark. In addition, we've developed and contributed some additional tools and services, which have further elevated our data platform. [Genie](#) is a powerful, REST-based abstraction to our various data processing frameworks, notably Hadoop. [Invictus](#) provides detailed insights into the performance of our Hadoop jobs and clusters. [Lipstick](#) shows the workflow of Pig jobs in a clear, visual fashion. And [Acastithus](#) enables the bulk abstraction of data out of Cassandra for downstream analytic processing.

Build and Delivery Tools

Taking code from desktop to the cloud

Netflix has open sourced many of our Gradle plugins under the name [Nebula](#). Nebula started off as a set of strong opinions to make Gradle simple to use for our developers. But we quickly learned that we could use the same assumptions on our open source projects and on other Gradle plugins to make them easy to build, test and deploy. By standardizing plugin development, we've lowered the barrier to generating them, allowing us to keep our build modular.

AT&T Open Source GitHub, Inc. [US] https://github.com/att Action

This organization Search Pull requests Issues Marketplace Explore

AT&T Open Source  

[http://www.research.att.com](#) github@research.att.com

[Repositories 93](#) [People 4](#)

Search repositories... Type: All Language: All

docker-forensics
Tools to assist in forensicating docker
Python 21 4 BSD-3-Clause Updated 2 hours ago

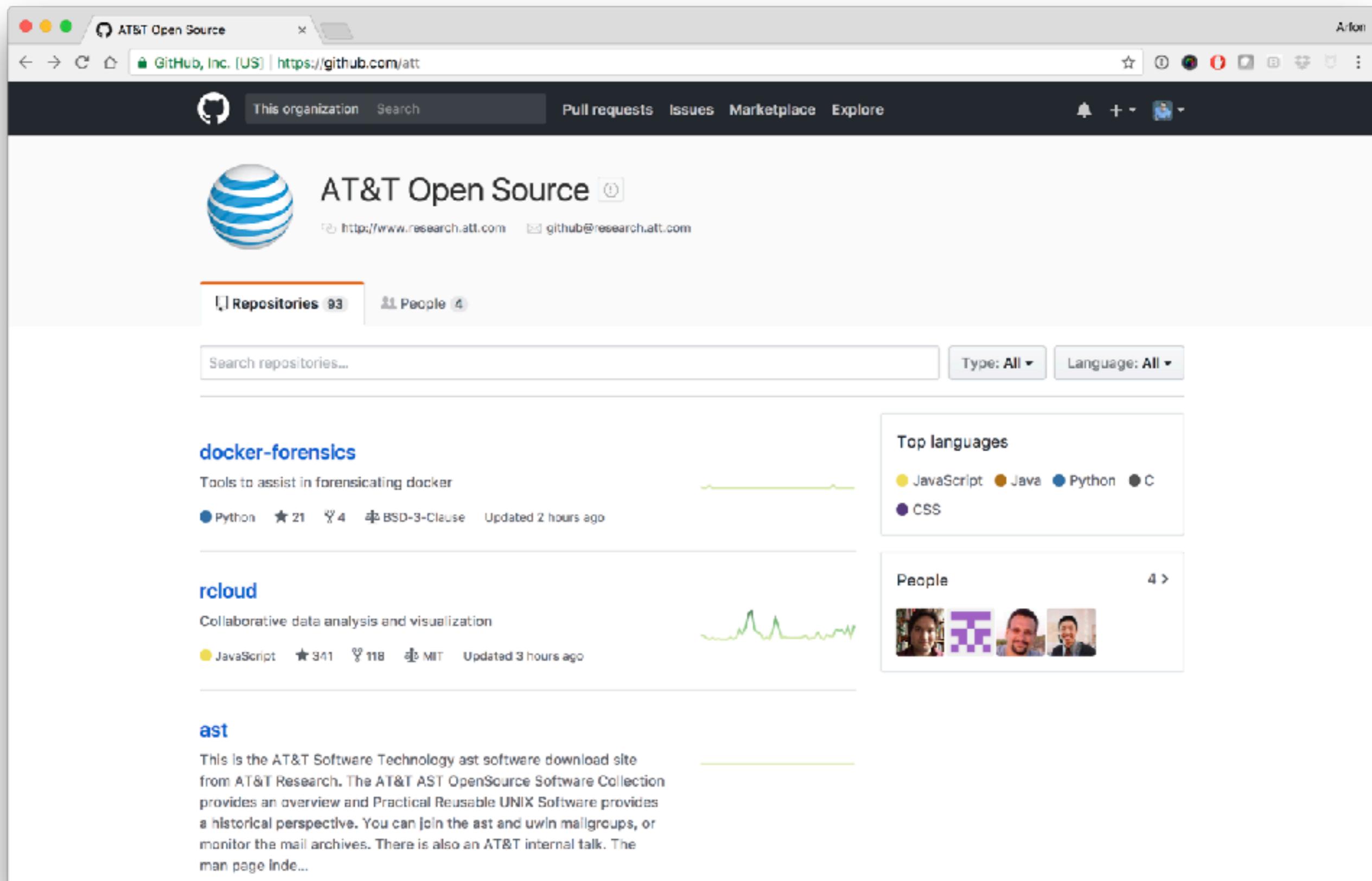
rcloud
Collaborative data analysis and visualization
JavaScript 341 118 MIT Updated 3 hours ago

ast
This is the AT&T Software Technology ast software download site from AT&T Research. The AT&T AST OpenSource Software Collection provides an overview and Practical Reusable UNIX Software provides a historical perspective. You can join the ast and uwin mailgroups, or monitor the mail archives. There is also an AT&T internal talk. The man page index...

Top languages

JavaScript Java Python C
CSS

People 4 >



The screenshot shows the RCloud website as it appears in a web browser. The header includes the RCloud logo, a search bar, and navigation links for GALLERY, TUTORIALS, DOCUMENTATION, COMMUNITY, and TRYIT. The main title is "The Social Coding Environment for Big Data Analytics & Visualization". Below the title, there are four main sections: "Exploration" (with a magnifying glass icon), "Open Source" (with a padlock icon), "Collaboration" (with a people icon), and "In the Cloud" (with a cloud icon). Each section contains a brief description. At the bottom, there is a testimonial quote.

RCloud - The Social Coding En × Aron

rcloud.social/index.html

RCloud GALLERY / TUTORIALS / DOCUMENTATION / COMMUNITY / TRYIT

The Social Coding Environment for Big Data Analytics & Visualization

Exploration

Interactive, web-based environment to explore data on an interactive command line, including visualization and interactive graphics.

Open Source

Code is available on Github – collaborators and contributors welcome!

Collaboration

Social coding integrated development environment (IDE): search, run, comment, fork, modify and share code and analyses – deployed as web services, web pages or dashboards.

In the Cloud

Accessible from any connected device or computer anywhere, scalable power of distributed computing.

“ Recently, the American Business Awards recognized RCloud as one of the Technical

License is important.

Open source license usage on GitHub.com

GitHub, Inc. [US] | https://github.com/blog/1964-open-source-license-usage-on-github-com

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Pull requests Issues Marketplace Explore

March 9, 2015 by benbalter in Watercooler

Open source simply isn't open source without a proper license. Unless you've explicitly told others that they can modify and reuse your work, you've only showed others your code; you haven't shared it. Here at GitHub, we're big fans of open source, so we set out to better understand how our users approached licensing their code by looking at license usage across public, non-forked repositories, in hopes of encouraging more users to share their work with others.

Percentage of repositories licensed

Year	Percentage (%)
2008	62
2009	35
2010	22
2011	15
2012	10
2013	10
2014	25
2015	15

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Open source license usage on GitHub

GitHub, Inc. [US] | <https://github.com/blog/1964-open-source-license-usage-on-github-com>

Breakdown of license usage

We also wanted to look at the relative breakdown of the most popular open source licenses. You can see their popularity expressed below as a percentage of licensed projects on GitHub.com:

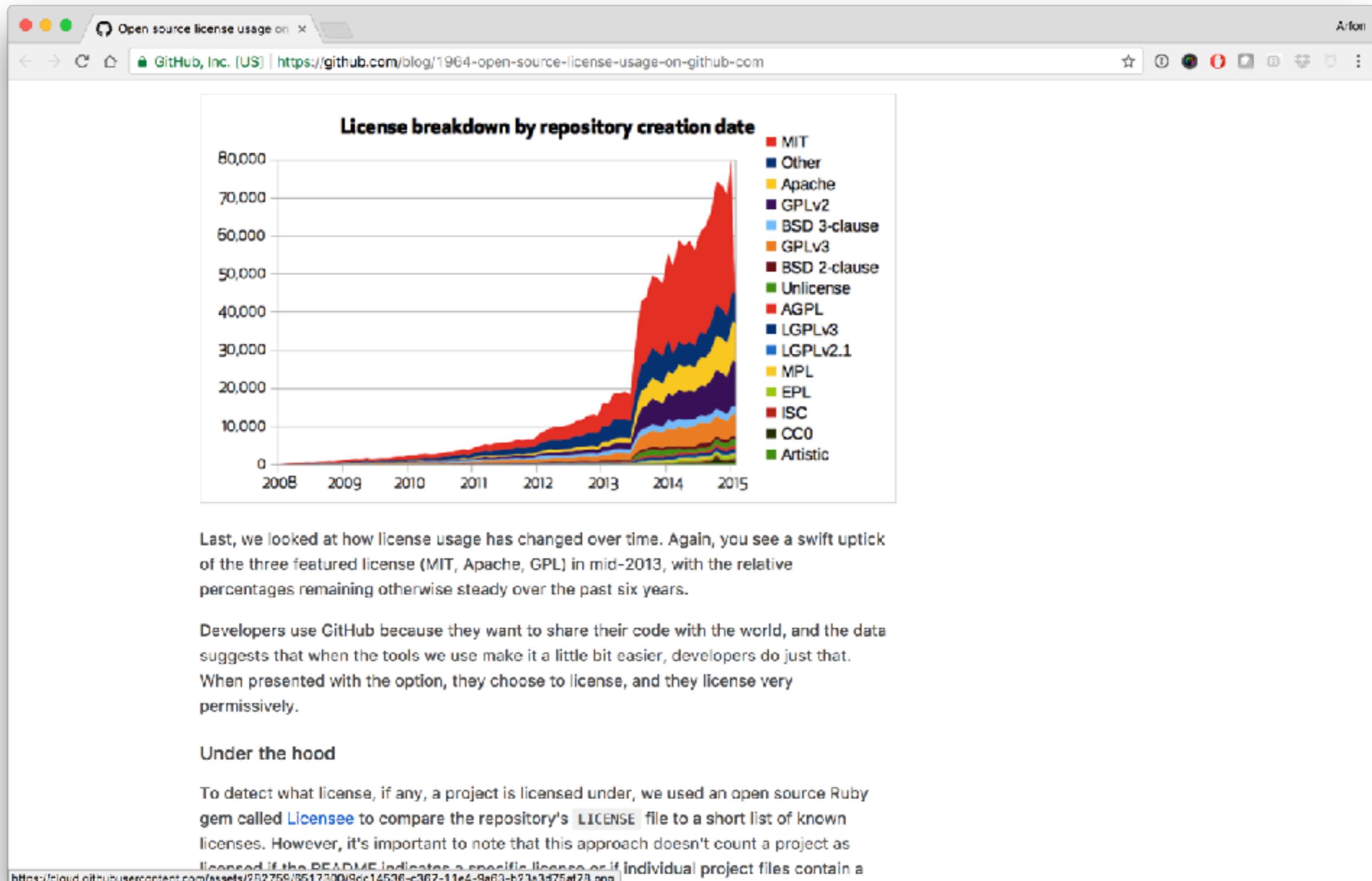
Rank	License	% of projects
1	MIT	44.69%
2	Other	15.68%
3	GPLv2	12.96%
4	Apache	11.19%
5	GPLv3	8.88%
6	BSD 3-clause	4.53%
7	Unlicense	1.87%
8	BSD 2-clause	1.70%
9	LGPLv3	1.30%
10	AGPLv3	1.05%

Unsurprisingly, MIT, Apache, and GPL are the clear front runners, with some 15% of licensed projects opting for a non-standard license or standard license not among those listed on choosealicense.com.

License breakdown by repository creation date

Days	MIT (%)	Other (%)	Apache (%)	GPLv2 (%)	BSD 3-clause (%)
0	0	0	0	0	0
10,000	10	10	1	1	5
20,000	40	12	1	1	10
30,000	75	15	1	1	15

Legend: MIT (Red), Other (Blue), Apache (Yellow), GPLv2 (Purple), BSD 3-clause (Light Blue)



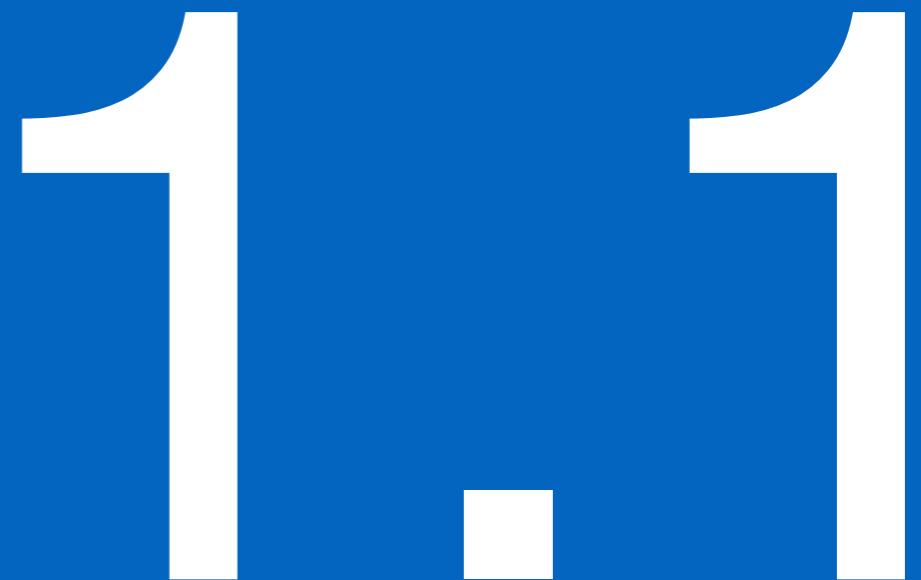
WHICH LICENSE YOU PICK

License is important.

Business friendly, ‘permissive’ licenses are dominant in data-oriented software

Academia can learn from open source.

Insights from GitHub: Ideas Academia should copy



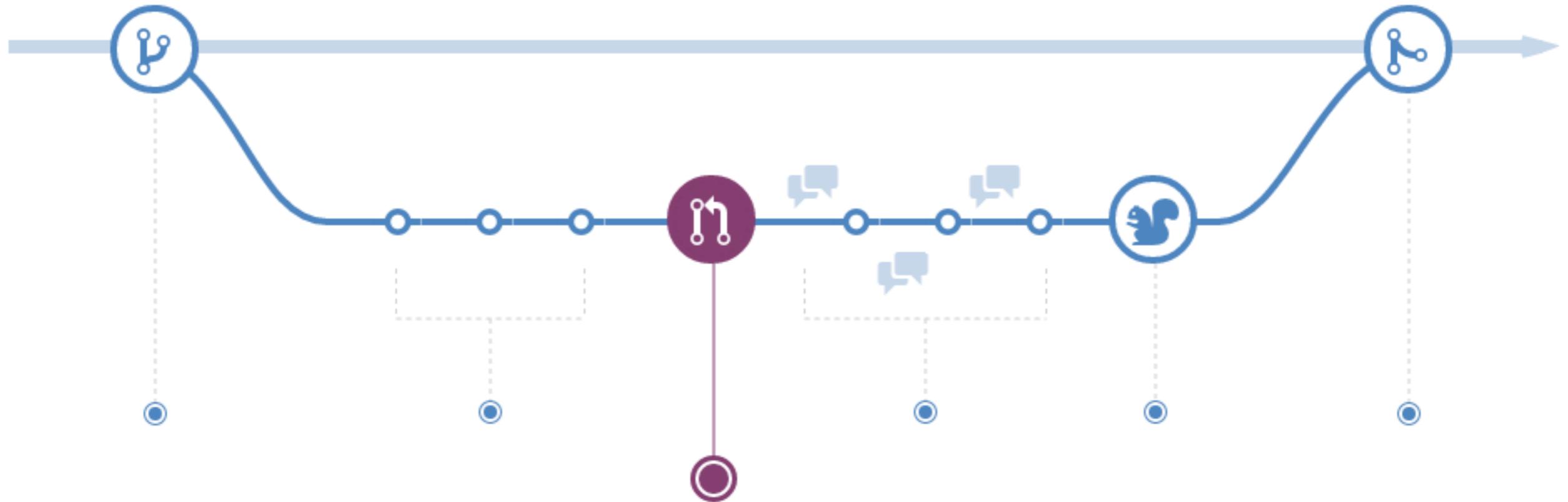
Idea 1: Open collaborations

Open Source vs Open Collaborations

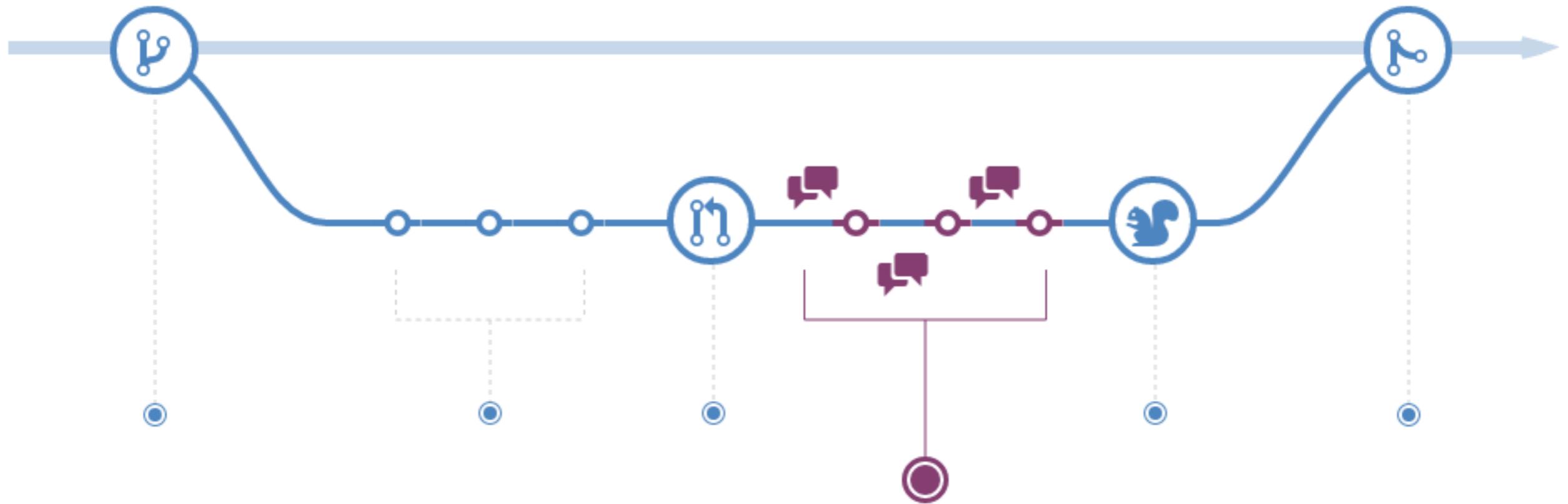
Open Source: *the right to modify*

Open Collaborations: a *highly collaborative development process and are receptive to contributions of code, documentation, discussion, etc from anyone who shows competent interest.*

The pull request



Code first, permission later



Capture context

Expanded About Section by X

GitHub, Inc. [US] https://github.com/github/github/pull/2797

This repository Search or type a command Explore Gist Blog Help arton

PRIVATE  **github / github** Unwatch 48 Star 42 Fork 37

Merged pjhyett merged 130 commits into master from about over 1 year ago 1,017 #2797

Discussion 130 Commits 130 Files Changed 35

 pjhyett opened this pull request 2 years ago

Expanded About Section

No one is assigned  Milestone: About 2.0 

Starting to work on <https://team.githubapp.com/projects/15>

At this point I've just applied the repo admin styling to give us some about sections and shuffled the existing content around. It's rough, but you get the idea:

github Signup and Pricing Explore GitHub Features Blog Login

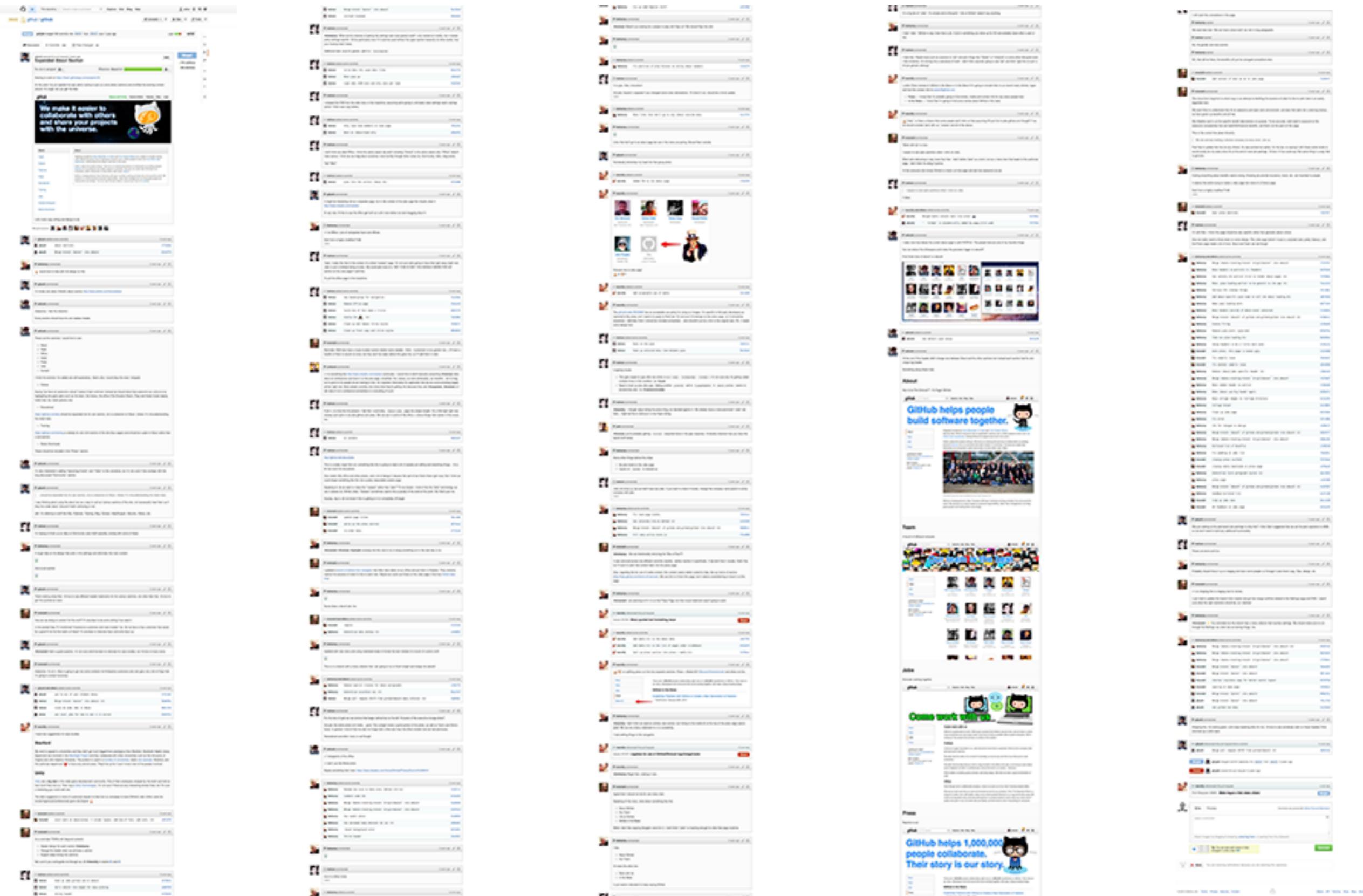
We make it easier to collaborate with others and share your projects with the universe.

About About

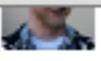
Waiting for [github-camo.global.ssl.fastly.net...](https://github-camo.global.ssl.fastly.net)

Originally founded by [Chris Wanstrath](#), [PJ Hyett](#) and [Tom Preston-Werner](#) as a project to simplify sharing code, GitHub has never been more popular, used by over a million users to store over two million code



Expanded About Section by X

<https://github.com/github/github/pull/2797>

 pjhyett Merge pull request #2797 from github/about3 ... ddb9c9a

Merged  pjhyett merged commit ddb9c9a into master from about3 2 years ago

Closed  pjhyett closed the pull request 2 years ago

 I  leereilly referenced this pull request a year ago

Pull Request #6881: Make logos a first class citizen 

 Write Preview Comments are parsed with GitHub Flavored Markdown

Leave a comment

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 3 0 5 0 **Tip:** You can also add notes to lines changed in a file under [Diff](#)

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Exposed process

Every time this happens
the community learns

Idea 2: Culture of reuse

**Software composed of many
components**

Your software is the thing
that is *different*

Current academic credit
model rewards novelty

Idea 3: Verification

*“open source is...
reproducible by necessity”*

Fernando Perez

Pull Requests · GitHub/linguist ·  GitHub, Inc. [US] <https://github.com/github/linguist/pulls>

This repository Search Explore Gist Blog Help Action + ⚙️ ⚙️

github / linguist

Unwatch 45 ⭐ Star 2,473 ⚙️ Fork 1,019

Issues Pull requests Labels Milestones Filters is:pr is:open New pull request

	Author	Labels	Milestones	Assignee	Sort
<input type="checkbox"/> #39	Open	✓ 1,188 Closed			
<input type="checkbox"/> #1844	Public Key as a language with .asc and .pub extensions	✓			17 minutes ago by pchaigno
<input type="checkbox"/> #1841	Add support for Turtle and SPARQL	✓			19 hours ago by danmichaelo
<input type="checkbox"/> #1837	Add Lisp and PicoLisp language.	✓			2 days ago by Grahack
<input type="checkbox"/> #1832	Optimization of generated?	✓			2 days ago by pchaigno
<input type="checkbox"/> #1831	Set "missing" ace modes to 'text'	✓			2 days ago by gjtorikian
<input type="checkbox"/> #1830	Fix bug in #1731; add .xml.fr and .html.fr	✓			2 days ago by larenbrinkhoff
<input type="checkbox"/> #1829	Test folder for files without a language	✓			2 days ago by pchaigno
<input type="checkbox"/> #1828	Support for Rc from Plan9	✓			3 days ago by pchaigno
<input type="checkbox"/> #1825	SaltStack state files use the same extension as old schema library source files	✗			3 days ago by iggy

Pull Requests · GitHub/linguist ·  GitHub, Inc. [US] <https://github.com/github/linguist/pulls?q=is%3Aopen+author%3Abkeepers+is%3Apr>  

This repository Search Explore Gist Blog Help  aron 

 **github / linguist**  Unwatch 45  Star 2,473  Fork 1,019

[Issues](#) **Pull requests** [Labels](#) [Milestones](#) [Filters](#) [New pull request](#)

X Clear current search query, filters, and sorts

<input type="checkbox"/> 1 Open	<input type="checkbox"/> 30 Closed	Author	Labels	Milestones	Assignee	Sort
 Remove .script! hack 	 #1786 opened 9 days ago by bkeepers					 7

 **ProTip!** Notify someone on an issue with a mention, like: @aron.

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Remove .script! hack by bkeepers · Pull Request #1786

<https://github.com/github/linguist/pull/1786>

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[Action](#) [Unwatch](#) 45 [Star](#) 2,473 [Fork](#) 1,019

github / linguist

Remove .script! hack #1786

Open bkeepers wants to merge 3 commits into [strategies](#) from [remove-script-ext](#)

[Conversation](#) 7 [Commits](#) 3 [Files changed](#) 36 [+27 -60](#)

 bkeepers commented 9 days ago

It is no longer necessary.

/cc @carfon @pchaigno

 bkeepers added some commits 9 days ago

-  Remove .script! hack ✓ b386098
-  Don't need a separate class for filename lookup 77Fcc53
-  Remove puts ✓ 7241746

 bkeepers commented 9 days ago

I should note that this is also dependent on [#1663](#).

 bkeepers commented on the diff 9 days ago

[View full changes](#)

 @@ -53,16 +53,13 @@ def self.each(&block)

[Labels](#) None yet

[Milestone](#) No milestone

[Assignee](#) No one—assign yourself

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2 participants

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Remove script! hack by bl

GitHub, Inc. [US] https://github.com/github/linguist/pull/1786

makes mistakes. I don't think it would be able to choose among all script languages...
If we continue with this behavior we should make sure first that the classifier will do a good job.

bkeepers commented 9 days ago

Admin

Fair point.

Add more commits by pushing to the `remove-script-ext` branch on [github/linguist](#).

• Waiting to hear about 7241746 — The Travis CI build is in progress - [Details](#)

Merge with caution!
You can also merge branches on the [command line](#).

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Travis CI - Free Hosted CI

https://travis-ci.org/github/linguist/builds/42438064

Travis Home Blog Status Help Travis CI for Private Repositories Arfon Smith

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github/developer.github.com 594
🕒 2 min 34 sec
🕒 about 5 hours ago

leereilly/swot 573
🕒 48 sec
🕒 about 6 hours ago

github/android 364
🕒 1 min 59 sec
🕒 about 12 hours ago

github/github-ldap 478
🕒 3 min 4 sec
🕒 a day ago

education/teachers_pet 244
🕒 1 min 10 sec
🕒 a day ago

github/github-services 308

github/linguist

Language Savant. If your repository's language is being reported incorrectly, send us a pull request!

Current Build History Pull Requests Branch Summary Build #3869 C

strategies - Remove puts #3869 passed ran for 8 min 3 sec 8 days ago

Brandon Keepers authored and committed Commit b1229d9 #1796: Remove script! hack

Build Matrix

Job	Duration	Finished	Ruby	OS
3869.1	1 min 51 sec	8 days ago	1.9.3	linux
3869.2	1 min 52 sec	8 days ago	2.0.0	linux
3869.3	2 min 10 sec	8 days ago	2.1	linux
3869.4	2 min 10 sec	8 days ago	2.2	linux

https://travis-ci.org/github/linguist/builds/42438064

Travis CI - Free Hosted CI

<https://travis-ci.org/github/linguist/jobs/42438067>

about 5 hours ago

leereilly/swot 573

48 sec

about 6 hours ago

github/android 364

1 min 59 sec

about 12 hours ago

github/github-ldap 178

3 min 4 sec

a day ago

education/teachers_pet 244

1 min 10 sec

a day ago

github/github-services 308

4 min 18 sec

a day ago

openjournals/brief-ideas 59

3 min 59 sec

2 days ago

github/pages-gem 263

1 min 37 sec

4 days ago

strategies - Remove puts

#3869.3 passed

ran for 2 min 10 sec
8 days ago

Brandon Keepers authored and committed

Commit b1229d9 #1786: Remove script! hack

```
1 Using worker: worker-linux-6-2.bb.travis-ci.org:travis-linux-19
2
3 Build system information
4
5
6 $ git clone --depth=50 git://github.com/github/linguist.git github/linguist
7 git_checkout 2.19s
8
9 $ rvm use 2.1 --install --binary --fuzzy
10 rvm 0.42s
11
12 $ export BUNDLE_GEMFILE=$PWD/Gemfile
13
14 $ ruby --version
15 ruby 2.1.4p265 (2014-10-27 revision 48166) [x86_64-linux]
16
17 $ rvm --version
18 rvm 1.26.0 (master) by Wayne E. Seguin <wayneeseguin@gmail.com>, Michal Papis <mpapis@gmail.com>
19 [https://rvm.io/]
20
21 $ bundle --version
22 Bundler version 1.7.4
23
24 $ gem --version
25 2.4.2
26
27 $ git fetch origin master:master
28 before_install.1 0.09s
29 $ git fetch origin v2.0.0:v2.0.0
30 before_install.2 0.35s
31 $ git fetch origin test/attributes:test/attributes
32 before_install.3 0.15s
33 $ git fetch origin test/master:test/master
34 before_install.4 0.09s
35 $ sudo apt-get install libisu-dev -y
36 before_install.5 6.89s
37
38 $ bundle install --jobs=3 --retry=3
39
40 $ bundle exec rake
41
42 Run options:
43
44
45 # Running tests:
46
47
48 Finished tests in 26.317702s, 28.4599 tests/s, 309.6015 assertions/s.
49 749 tests, 8148 assertions, 0 failures, 0 errors, 0 skips
50
51
52 ruby -v: ruby 2.1.4p265 (2014-10-27 revision 48166) [x86_64-linux]
53
54
55 The command "bundle exec rake" exited with 0.
56
57
```

Remove script! hack by bl

GitHub, Inc. [US] https://github.com/github/linguist/pull/1786

makes mistakes. I don't think it would be able to choose among all script languages...
If we continue with this behavior we should make sure first that the classifier will do a good job.

bkeepers commented 9 days ago

Admin

Fair point.

Add more commits by pushing to the `remove-script-ext` branch on [github/linguist](#).

✓ All is well — The Travis CI build passed · Details

This pull request can be automatically merged.

You can also merge branches on the [command line](#).

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cms-sw/cmssw

GitHub, Inc. [US] https://github.com/cms-sw/cmssw

This repository Search Explore Gist Blog Help

Watch 45 Star 193 Fork 1,158

cms-sw / cmssw

CMS Offline Software <http://cms-sw.github.io/>

141,869 commits 39 branches 2,775 releases 306 contributors

branch: CMSSW_7_4_X

Merge pull request #6794 from matt-komm/new_trajectory_seeding ...

omsbuild authored a day ago

Latest commit ed0897h819

File	Commit Message	Time
Alignment	Merge pull request #6644 from eavdeova/NewScenario	10 days ago
AnalysisAlgos	removed refvector from interface	2 months ago
AnalysisDataFormats	Changes for root 5.34.22	12 days ago
BigProducts/Simulation	disable LTO for biglibs with gcc 4.9.x	a month ago
CalibCalorimetry	Allow experiment type to be set	19 days ago
CalibFormats	Make CaloTPGTranscoder interface thread safe	a month ago
CalibMuon	Merge pull request #6877 from namapana/DTRecConditions	a month ago
CalibTracker	Merge pull request #5784 from hidaspal/PXBDetId_PXFDetId_to_TrackerTo...	2 months ago
Calibration	Merge pull request #5772 from matteosan1/topic_HLTUpdateFor73X	24 days ago
CaloOnlineTools	Use thread-safe access to HCAL containers	a month ago
CommonTools	Merge pull request #6804 from vadler/73X-fixPileUpModulesReconfiguration	11 days ago
CondCore	Merge remote branch 'origin/CMSSW_7_3_X' into CMSSW_7_0_X	5 days ago
CondFormats	fix build errors in PhysicsToolsObjects	7 days ago

SSH clone URL: git@github.com:cms-sw/cmssw

You can clone with [HTTPS](#), [SSH](#), or [Subversion](#).

Clone in Desktop

Download ZIP

https://github.com/cms-sw/cmssw

Request #6625 from liquids/liquidsDropbox_DupInfo

15 days ago

added shifted beamspot by 

GitHub, Inc. [US] <https://github.com/cms-sw/cmssw/pull/6790>

This repository Search Explore Gist Blog Help Action + ⚙️ ⚙️ ⚙️

 **cms-sw / cmssw** Watch 45 Star 193 Fork 1,158

added shifted beamspot #6790

Open civanch wants to merge 1 commit into [cms-sw:CMSSW_7_4_X](#) from [civanch:shifted beam spot](#)

Conversation 4 Commits 1 Files changed 3 +20 -0

 **civanch** commented 2 days ago

HCAL requested special beam spot position to test HF phi asymmetry.

 **added shifted beamspot** ✓ G4158Fc

 **cmsbuild** added this to the [Next CMSSW_7_4_X](#) milestone 2 days ago

 **cmsbuild** added [operations-pending](#) [pending-signatures](#) [simulation-pending](#) [tests-pending](#) [comparison-pending](#) labels 2 days ago

 **cmsbuild** commented 2 days ago

A new Pull Request was created by [@civanch](#) (Vladimir Ivantchenko) for [CMSSW_7_4_X](#).

added shifted beamspot

It involves the following packages:

Configuration/StandardSequences
IOMC/EventVertexGenerators

Labels

[comparison-eval...](#)
[operations-pending](#)
[pending-signatures](#)
[simulation-approved](#)
[tests-approved](#)

Milestone

[Next CMSSW_7_4_X](#)

Assignee

No one assigned

Notifications

Subscribe

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added shifted beamspot by cmsbuild

GitHub, Inc. [US] https://github.com/cms-sw/cmsaw/pull/6790

Owner

Assignee

No one assigned

Notifications

Subscribe

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2 participants

cmsbuild commented 2 days ago

A new Pull Request was created by [@civanch](#) (Vladimir Ivantchenko) for CMSSW_7_4_X.

Owner

added shifted beamspot

It involves the following packages:

Configuration/StandardSequences
IOMC/EventVertexGenerators

[@civanch](#), [@nclopezo](#), [@mdhildreth](#), [@cmsbuild](#), [@franzoni](#), [@davidlange6](#) can you please review it and eventually sign? Thanks.

[@ghellwig](#), [@makortel](#), [@GiacomoSguazzoni](#), [@rovere](#), [@VinInn](#), [@appeltel](#), [@cerati](#), [@dgulhan](#) this is something you requested to watch as well.

You can sign-off by replying to this message having '+1' in the first line of your reply.

You can reject by replying to this message having '-1' in the first line of your reply.

civanch commented 2 days ago

Collaborator

+1

cmsbuild added [pending-signatures](#) [simulation-approved](#) [comparison-pending](#) [operations-pending](#) [tests-pending](#) and removed [comparison-pending](#) [pending-signatures](#) [tests-pending](#) [operations-pending](#) [simulation-pending](#) labels 2 days ago

cmsbuild commented 2 days ago

Owner

+1

Tested at: [64158fc](#)

<https://cmssdt.cern.ch/SDT/enkds-artifacts/pull-request-integration/PR-6790/1439/summary.html>

cmsbuild added [tests-approved](#) [comparison-pending](#) [operations-pending](#) [pending-signatures](#)

added shifted beamspot by

GitHub, Inc. [US] <https://github.com/cms-sw/cmsaw/pull/6790>

cmsbuild added **tests-approved** **comparison-pending** **operations-pending** **pending-signatures** **simulation-approved** and removed **operations-pending** **comparison-pending** **simulation-approved** **pending-signatures** **tests-pending** labels 2 days ago

cmsbuild commented 2 days ago

Owner

Comparison is ready

<https://cmssdt.cern.ch/SDT/jenkins-artifacts/pull-request-integration/PR-6790/1439/summary.html>

cmsbuild added **comparison-available** **operations-pending** **pending-signatures** **simulation-approved** **tests-approved** and removed **comparison-pending** **operations-pending** **pending-signatures** **simulation-approved** **tests-approved** labels 2 days ago

 ✓ All is well — Tests OK · Details

This pull request can be automatically merged by project collaborators.

Only those with write access to this repository can merge pull requests.

Write Preview

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2

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OED – Operations & Engineering
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HR – Human Resources
PMO – Program Management Office
BRC – Business Resource Center

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CMO – Community Missions Office
DSMO – Data Sciences Mission Office
HST – Hubble Mission Office
JWST – Webb Mission Office
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Data Analysis Tools, Calibration Pipelines, Data Management Infrastructure & Archives



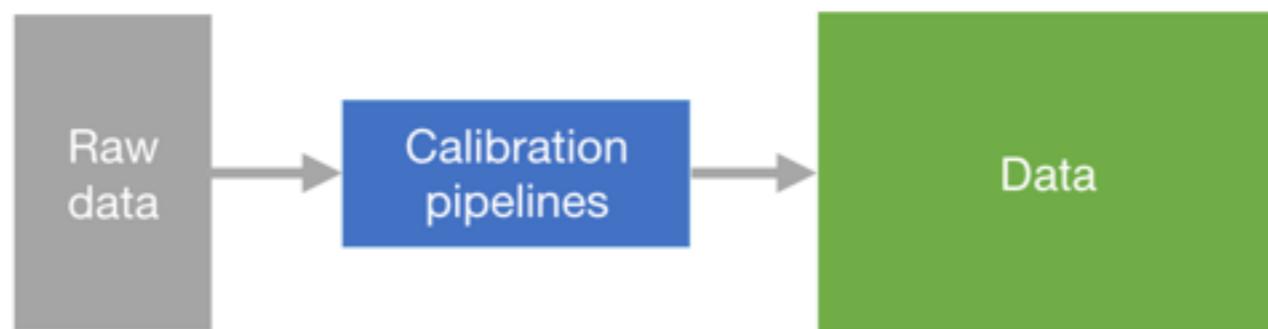
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Most basic archive: A safe store

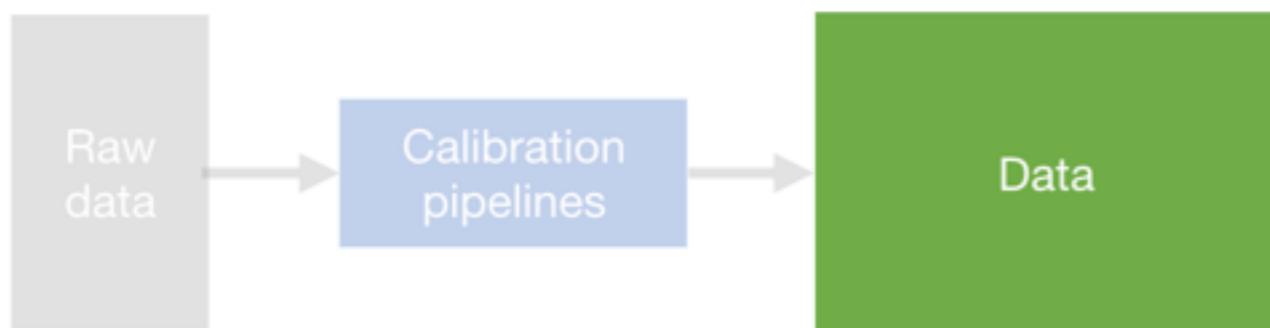
Data



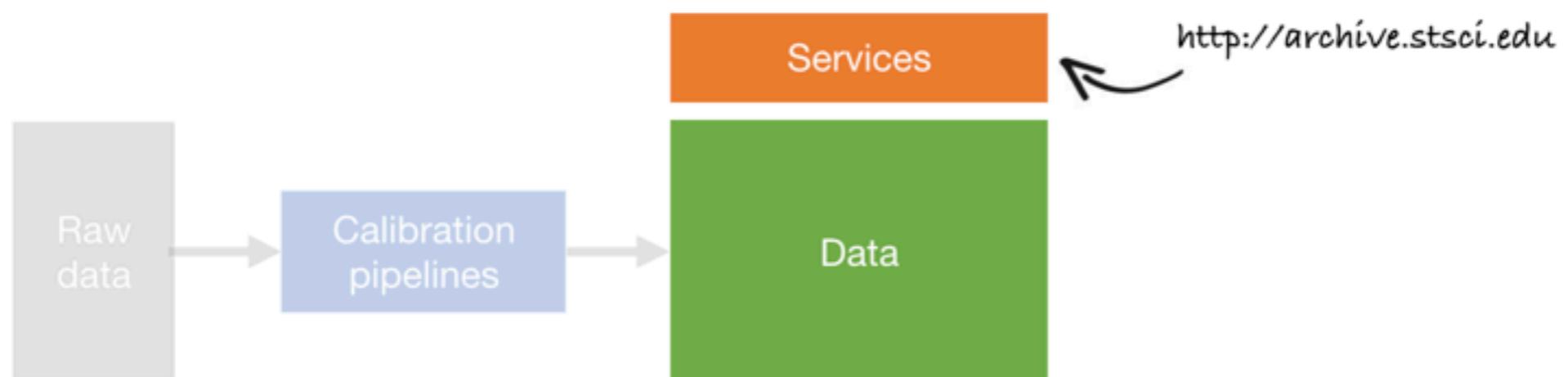
Better: Science-ready data archive



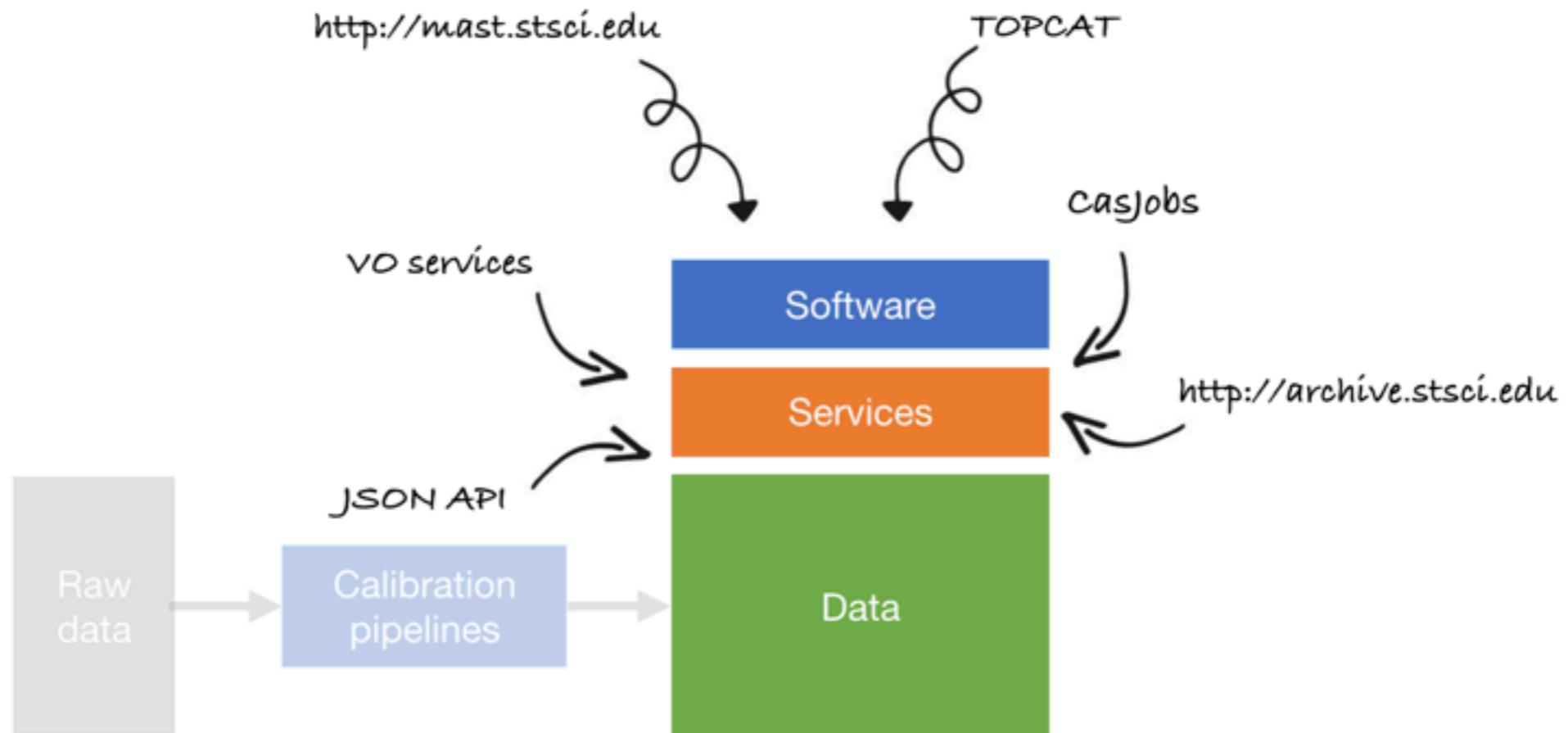
Archive



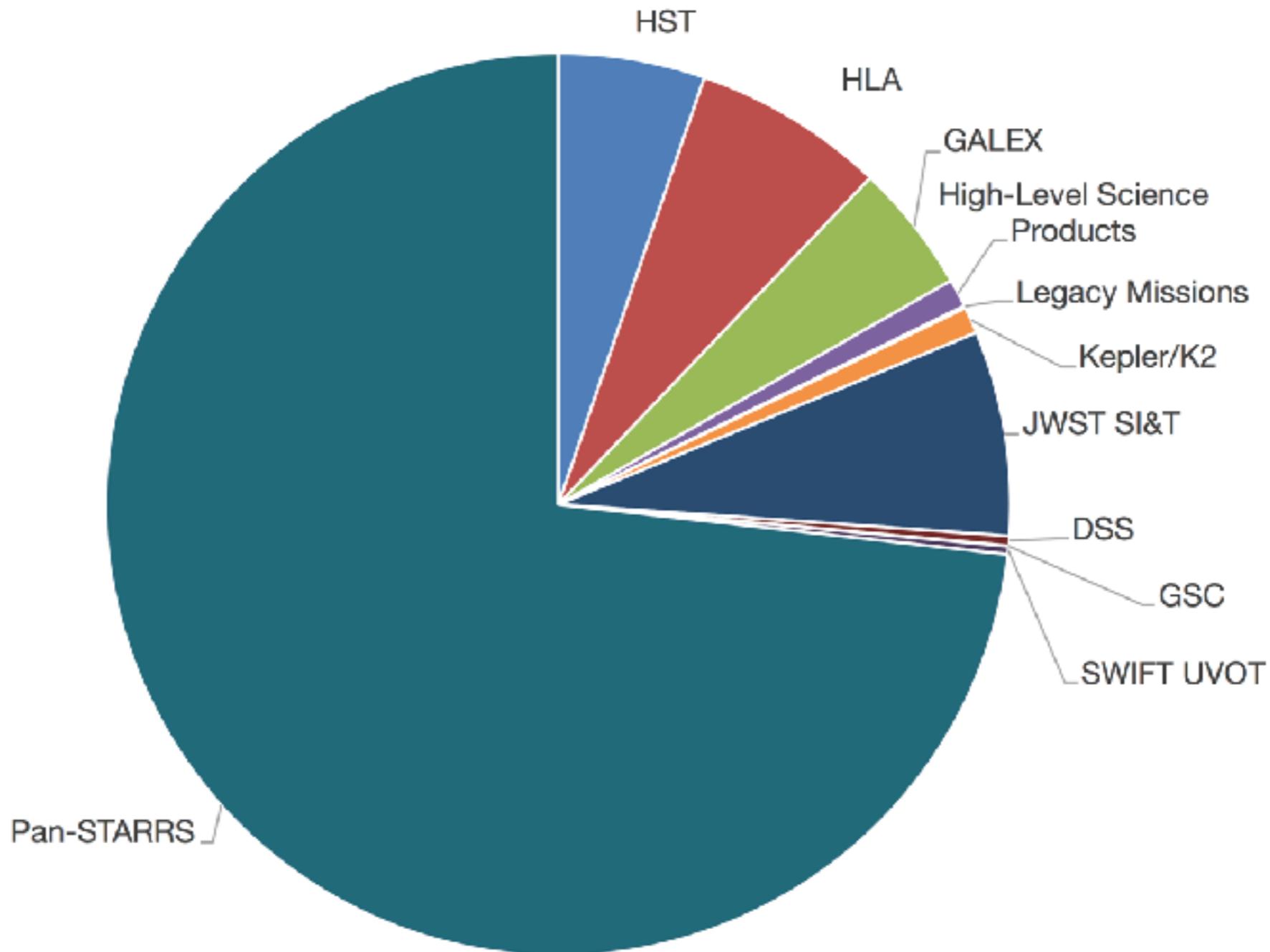
Archive, Services



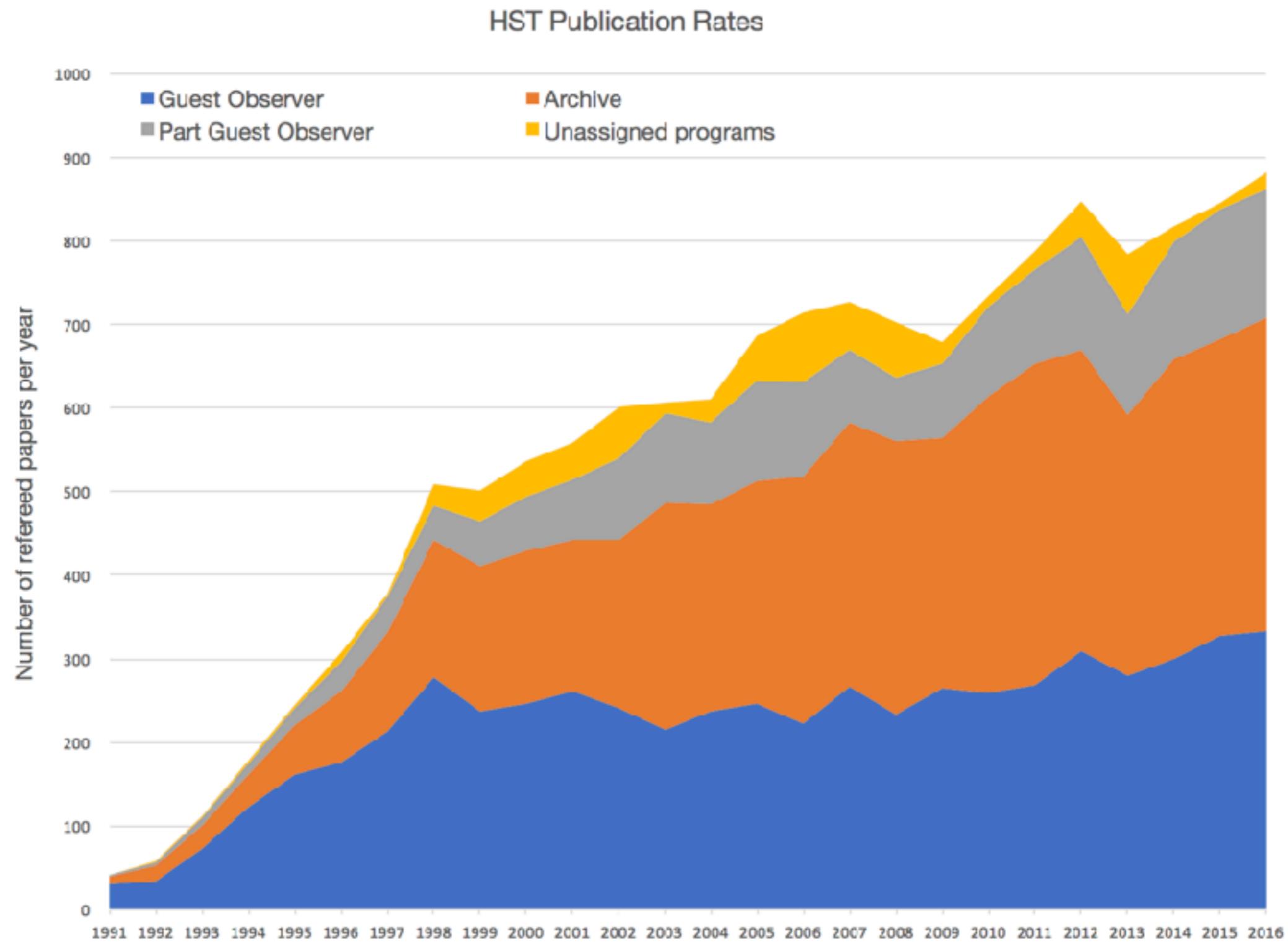
Archive, Services, Software



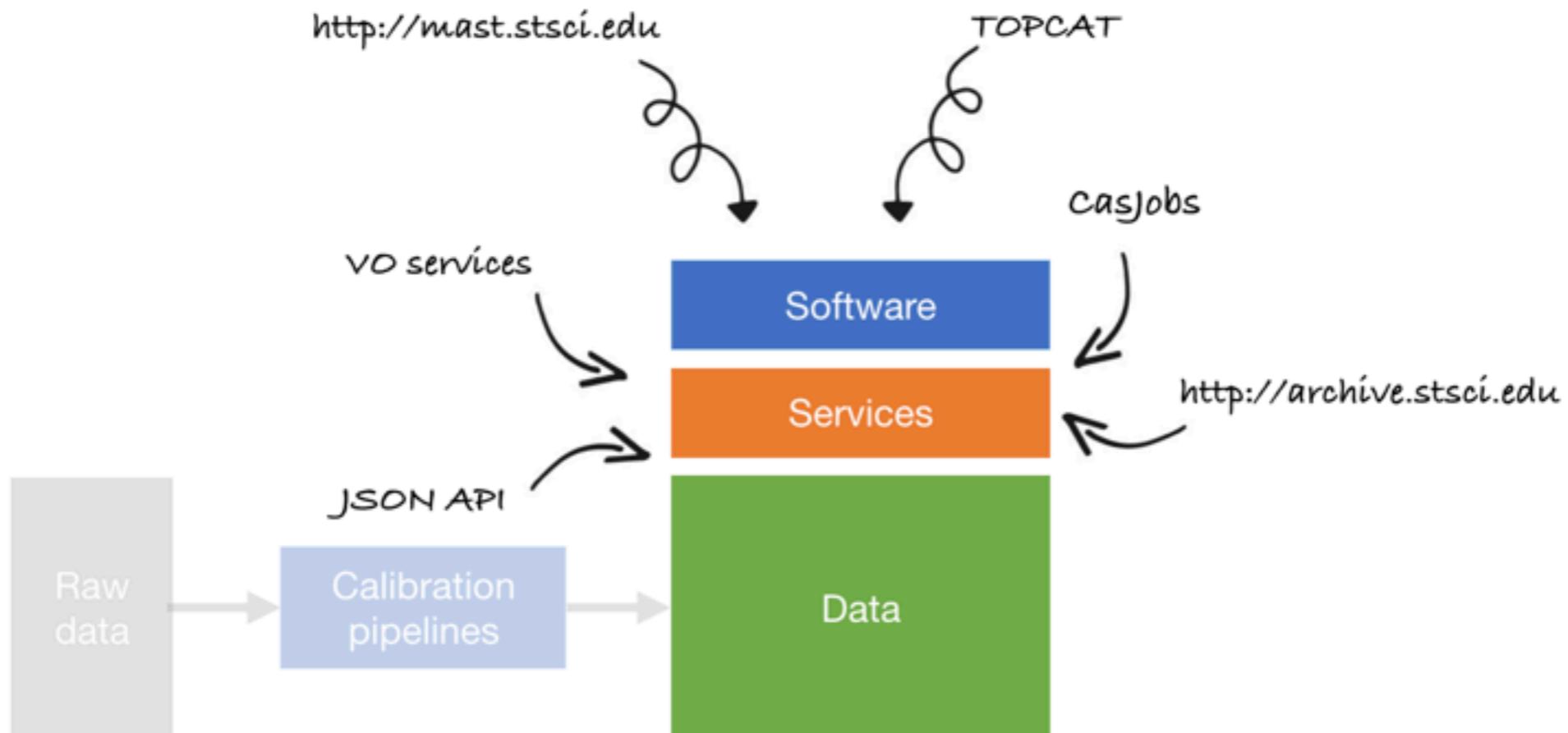
MAST: Multi-mission archive



It works!



Archive, Services, Software



Status quo (until relatively recently)

<http://mast.stsci.edu>

<http://archive.stsci.edu>

VO services

JSON API

`casjobs`

`TOPCAT`



Traditionally thought of as science centers activities





Looking to the future.

Data-intensive missions



LSST



WFIRST

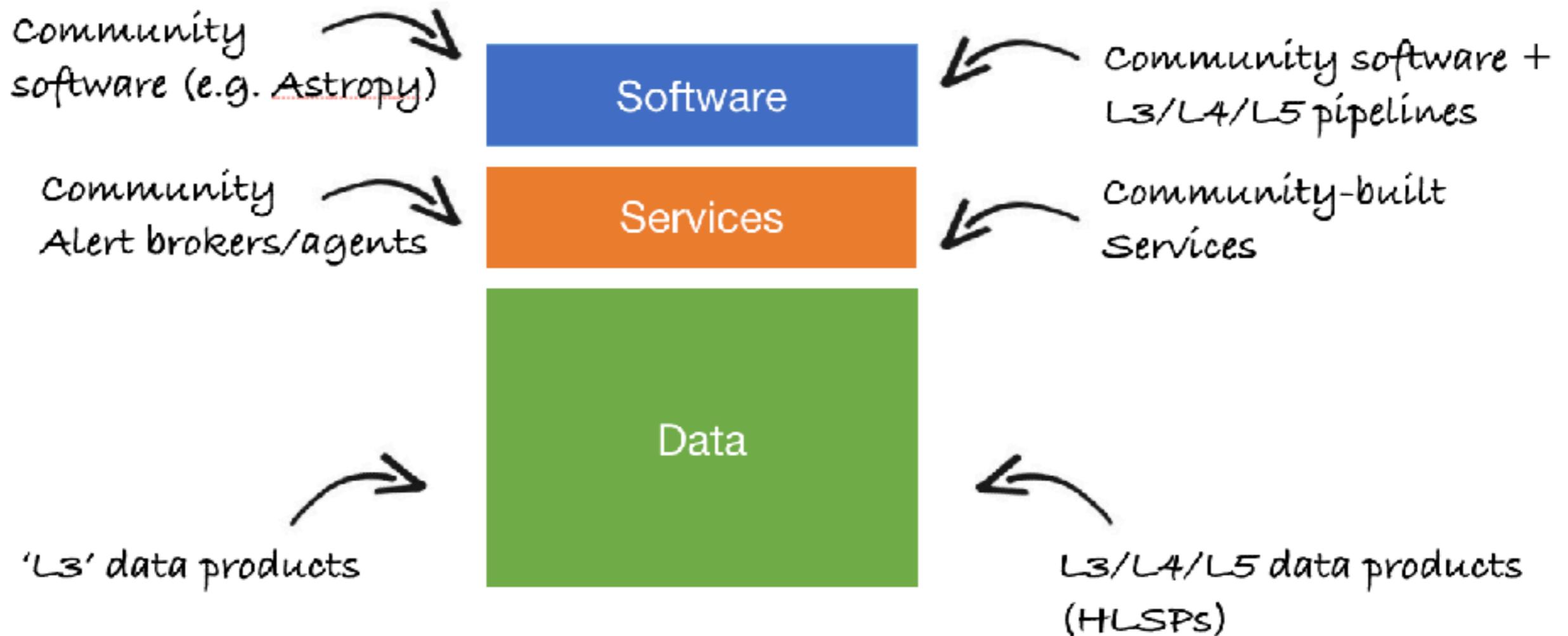


Hybrid missions

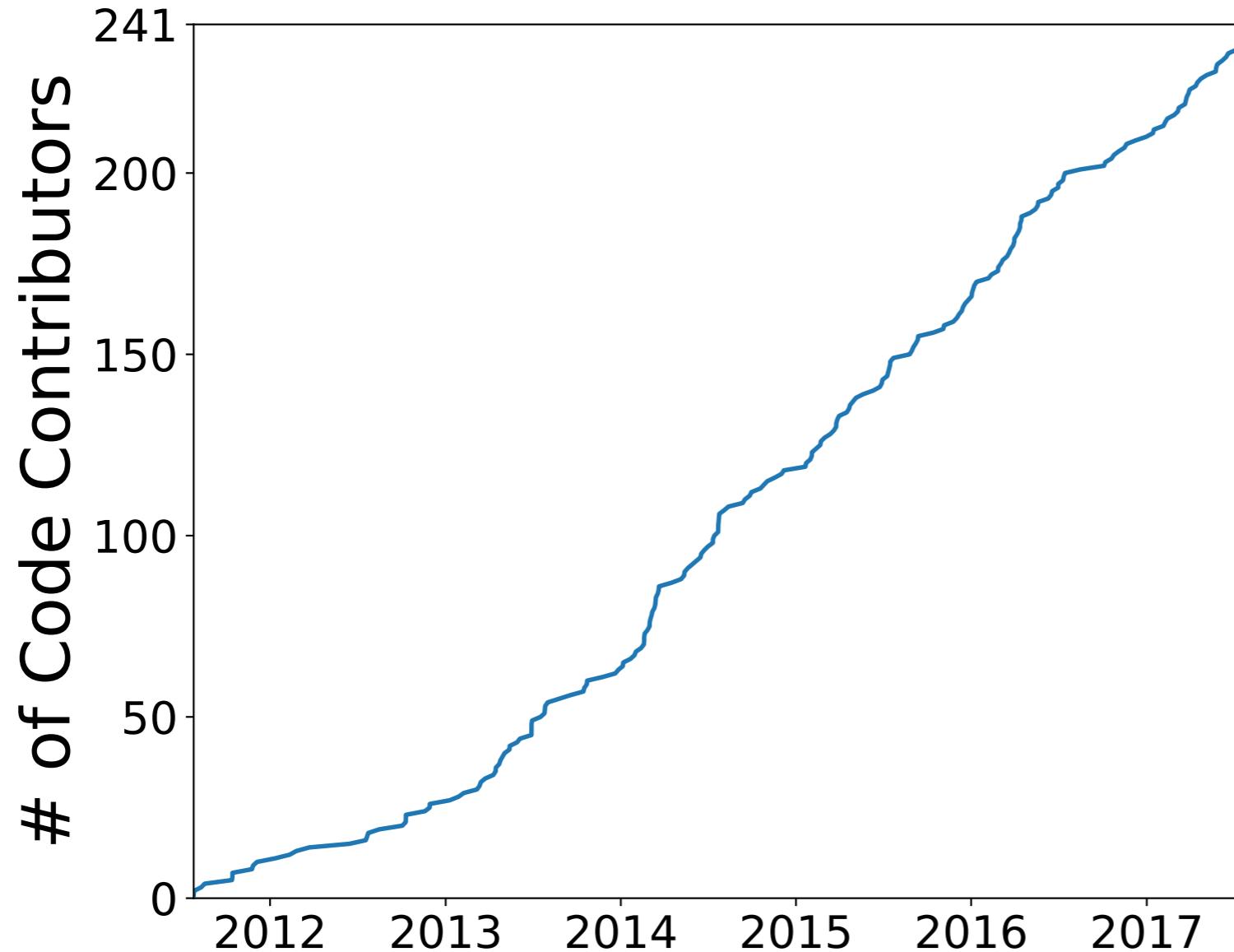
- Physics experiments, ‘planned’ science (e.g. surveys)
- ‘Guest observer’ mode (WFIRST)
- Vast data-rich archives
- Core set of services provided by science centers (data, storage, compute)
- Co-created software (both pipelines and data analysis tools)
- Centralization of projects means more contributed data products/re-analyses



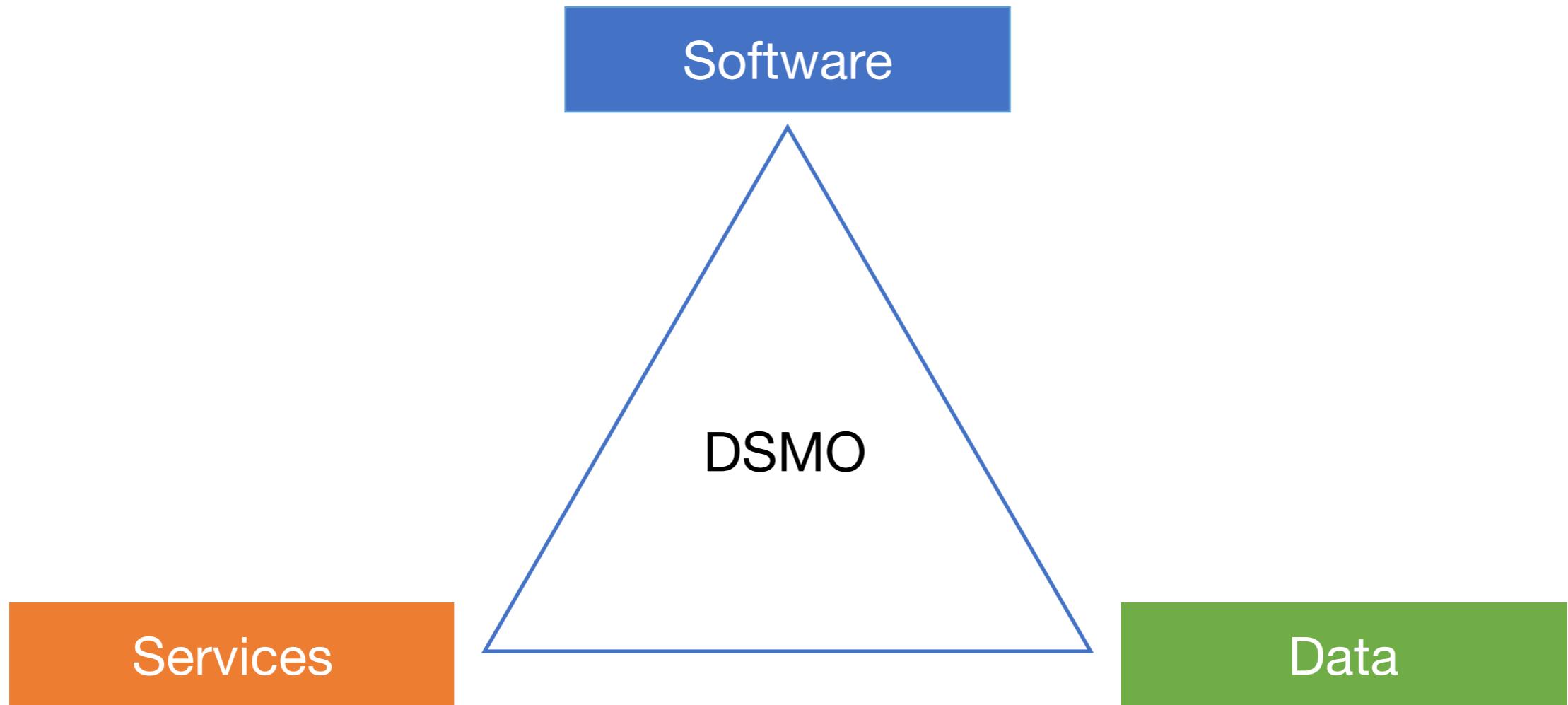
Community contributions at all levels



One example



Science center as a facilitator of these activities



“Design for community contributions at all stages”

Open source is critical for delivering on our mission to support the scientific community.

Recommendations

3

Business-friendly licenses are important.

MIT, BSD, Apache 2

(PUBLIC DOMAIN IS *NOT* CONSIDERED OPEN SOURCE)

GPL-compatibility is important too.

(THIS RULES OUT THE NASA OPEN SOURCE LICENSE)

**Standard NASA contracts are overly-restrictive
(typically reserve all IP)**

Boiler-plate language for contracts that would support the ability for any party to acquire copyright and release software developed under the contract

EXCLUDING ITAR AND EAR ETC.

**Process described at code.nasa.gov is
complex (and slow)**

(AND THEN YOU END UP WITH THE NOSA LICENSE)

nasa/kepler-pipeline: Kepler Science Data Processing Pipeline

GitHub, Inc. [US] | <https://github.com/nasa/kepler-pipeline>

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nasa / kepler-pipeline

Code Issues 0 Pull requests 0 Projects 0 Wiki Insights

Kepler Science Data Processing Pipeline

10 commits 1 branch 0 releases 2 contributors

Branch: master New pull request Create new file Upload files Find file Clone or download

wohler Fix rendering of Figure 2 ... Latest commit 8b6ba00 on 2 Aug

File	Commit Message	Time
parameters	Initial commit of Kepler Science Data Processing Pipeline source code...	4 months ago
source-code	Initial commit of Kepler Science Data Processing Pipeline source code...	4 months ago
MATHWORKS-LIMITED-LICENSE...	Initial commit of Kepler Science Data Processing Pipeline source code...	4 months ago
NASA-OPEN-SOURCE-AGREEME...	Initial commit of Kepler Science Data Processing Pipeline source code...	4 months ago
README.md	Remove bullets from contact info	4 months ago
kscrm.pdf	Fix rendering of Figure 2	4 months ago

README.md

Kepler Science Data Processing Pipeline

The Kepler telescope launched into orbit in March 2009, initiating NASA's first mission to discover Earth-size planets

**Great Observatories have been an exemplar
for open data. Let's make open source software a
defining feature of NASA science too.**

Thanks!

Arfon Smith (arfon@stsci.edu)

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