

CS499 - OPEN SOURCE SOFTWARE DEVELOPMENT

Lecture #02: Basics about open source software

Dr. Igor Wiese

e-mail: igor@utfpr.edu.br

Twitter: [@igorwiese](https://twitter.com/igorwiese)

The Four Freedoms

Freedom 0

"The freedom to run the program, for any purpose"

Freedom 1

"The freedom to study how the program works, and adapt it to your needs"

Freedom 2

"The freedom to redistribute copies so you can help your neighbor"

Freedom 3

"The freedom to improve the program, and release your improvements to the public, so that the whole community benefits"



FSF

OSD CRITERIA

1. Free Redistribution

2. Source Code

3. Derived Works

4. Integrity of The Author's Source Code

5. No Discrimination Against Persons or Groups

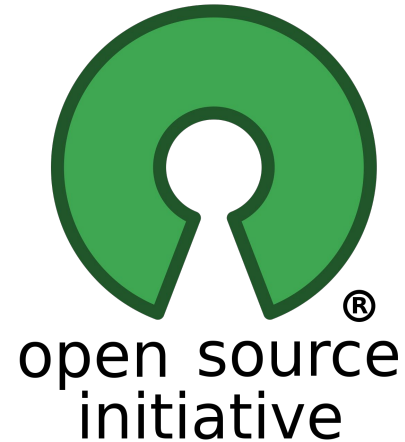
6. No Discrimination Against Fields of Endeavor

7. Distribution of License

8. License Must Not Be Specific to a Product

9. License Must Not Restrict Other Software

10. License Must Be Technology-Neutral



<https://opensource.org/osd>

QUESTIONS

- What is Open Source about?
 - Price?



QUESTIONS

- What is Open Source about?
 - Price?
 - License?



QUESTIONS

- What is Open Source about?
 - Price?
 - License?
 - Social Movement?



QUESTIONS

- What is Open Source about?
 - Price?
 - License?
 - Social Movement?
 - Hobby?



QUESTIONS

- What is Open Source about?
 - Price?
 - License?
 - Social Movement?
 - Hobby?
 - Market trend?



MORE QUESTIONS

- Software vs. hardware: what's the difference?
 - Engineering vs. Software Engineering
 - Tool vs. Knowledge
 - Product vs. Service

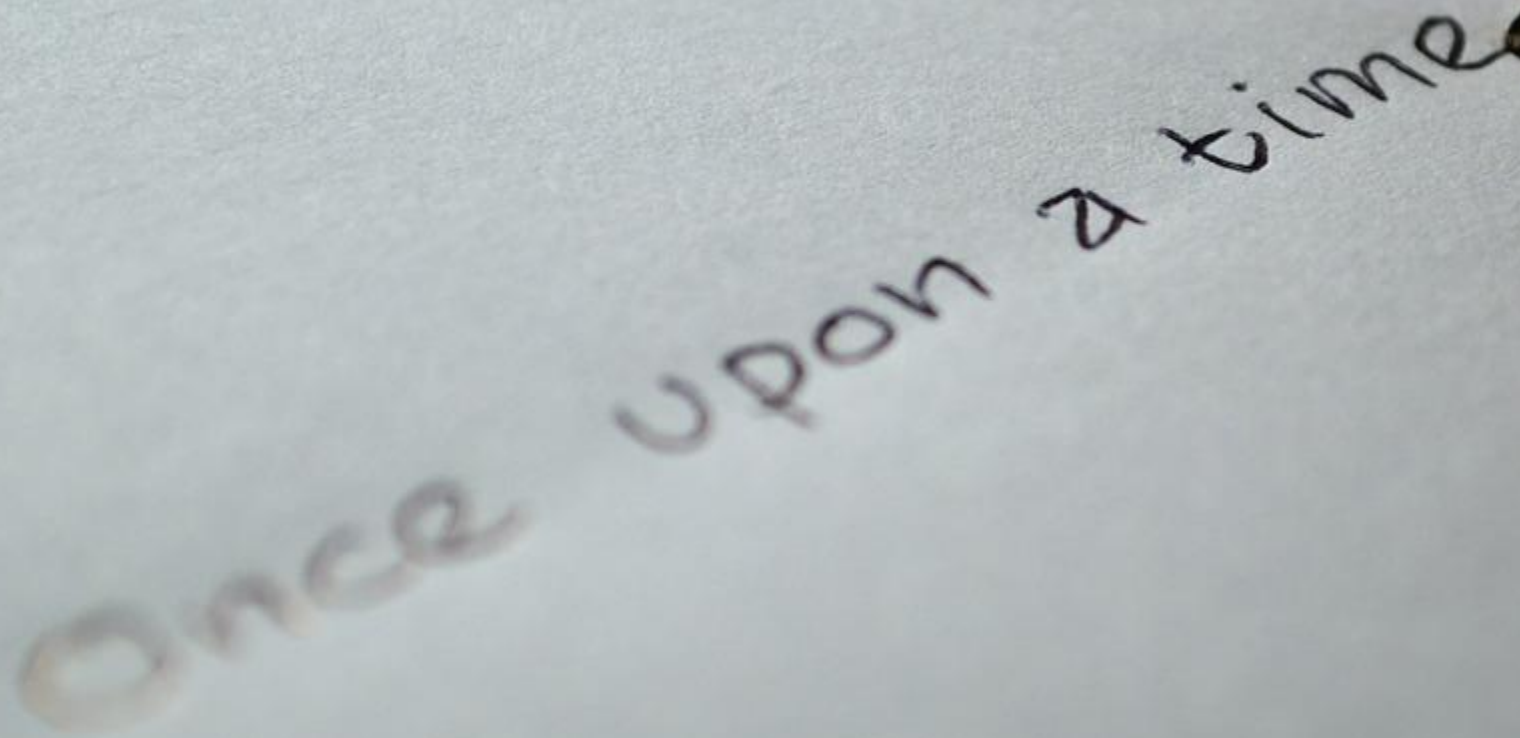
So...

- Open Source is about...
 - Freedom
 - License
 - Code as a way to share knowledge
 - Community!



A LITTLE BIT OF HISTORY

Once upon a time



PRE-HISTORIC...

- Commercial settings:
 - software is usually part of a bigger solution (consulting, hardware, maintenance, etc.)
 - not a solution *per se*
- Academic settings:
 - Software is informally shared as a way to share knowledge
- Hobbyists
 - Hacking for fun
 - Garage programmers community

AND THE HISTORY...

- 1976 – Bill Gates’ “Open Letter to Hobbyists”
 - **Copyright infringement + commercial power**
 - *“Will quality software be written for the hobby market?”*
 - *“One thing you do do is prevent good software from being written.”*
- 1980 – Stallman problem with Xerox printer
 - **Stallman refused access to the source code for the printer driver**
- 1981 – IBM signs a deal with “Micro-Soft”
 - **MS-DOS embedded in each and every IBM machine**
- 1984 – Stallman launches GNU project
 - **1985 – Free Software Foundation (FSF) was formed to house funding for the GNU Project**

AND THE HISTORY...

- 1991 – Linus Torvalds creates (or kicks off) Linux
 - Personal/informal project
 - Message to a newsgroup at Usenet
 - V 1.0.0 released in 1994 with 170+ KLoC
- 1995 – Internet Boom
 - Linux is distributed in large-scale
- 1997 – Eric Raymond writes “*The Cathedral and the Bazaar*”
 - Advantages of Open Source
 - Development in a decentralized way

AND THE HISTORY...

- 1998 – Netscape open-sourced
 - **Fight with MS Explorer?**
- 1998 – Eric Raymond, Linus Torvalds and others launch the Open Source Initiative (OSI)
 - **Technical reasons to Open-source**
 - **Use of “Open Source” instead of “Free software”**
- 1999 – Sourceforge is launched
- 2000 – OpenOffice is launched
- 2001 – IBM invests \$1 billion on Linux

AND THE HISTORY...

- 2005 – Sun launches Solaris 10 as Open Source
- 2007 – Sun launches JDK under GPL
- GitHub launches in 2008
 - **GitHub BOOM ~2010–2011 (2 million repos in 2011)**
- ... MANY COMPANIES JOINING

GitHub  @github · 16m

We're thrilled to announce that we've entered into an acquisition agreement with [@Microsoft!](#)
news.microsoft.com/?p=406917



WHY OSS???

WHY OPEN SOURCE?

- Incentive to collaboration □ human relationship
- Technical education
- “Low-cost” access to “high-end” technology
- Decentralizes the “power” of the software
- Government □ knowledge and transparency

WHY OPEN SOURCE?

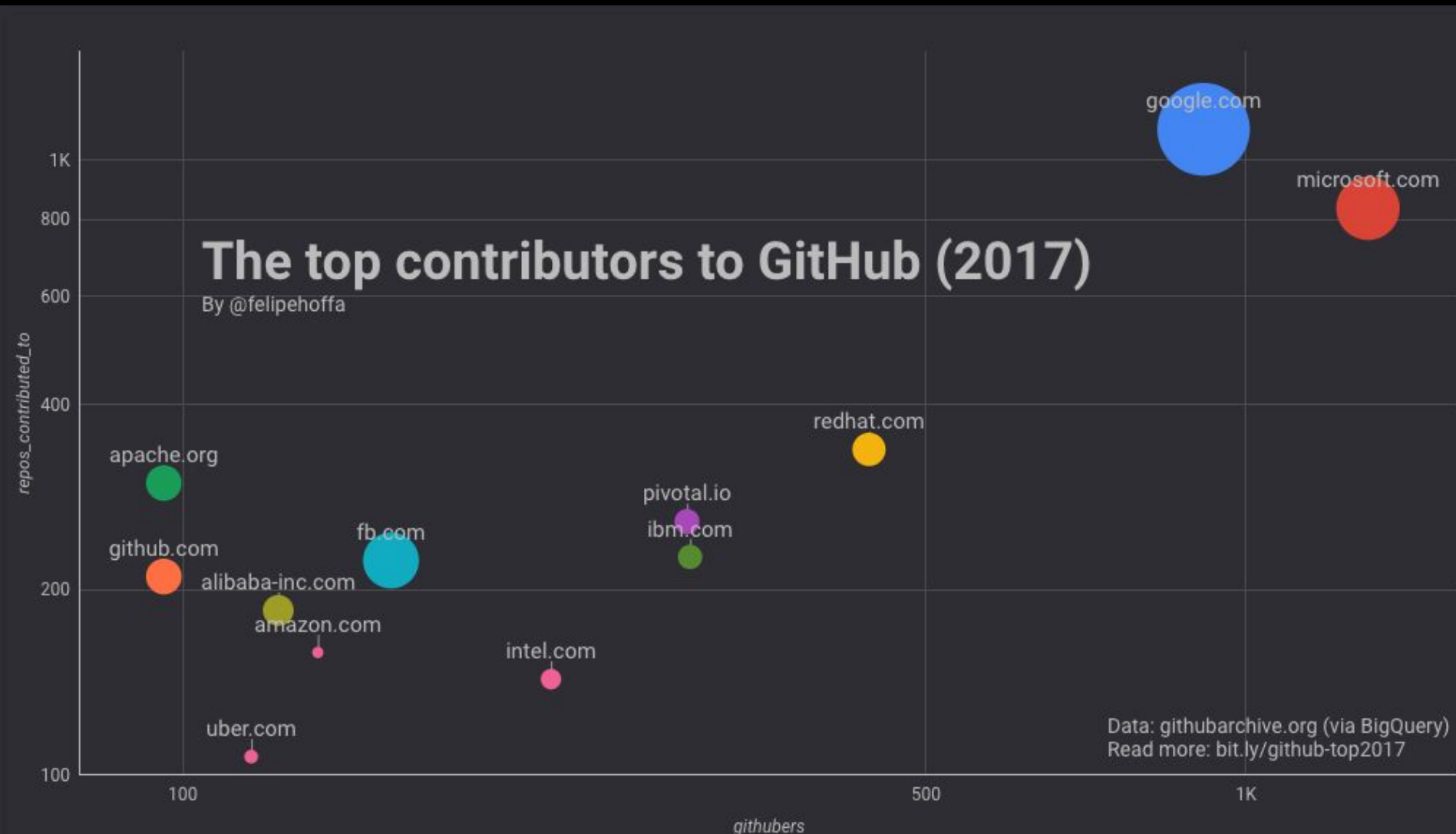
- Less cost (is that a thing? When?)
- Less bugs □ More quality
 - *“Given enough eye-balls all bugs are shallow”*
- Customization and improvements
- Competition for support

“PROBLEMS”

- Quality assessment of the solutions
- Reputation (FUD)
- Sustainability
- “Intellectual property”

FINAL FACTS

AND... OPEN SOURCE LEADS THE WAY



Q Organizations...

Industry

January

2022

RANK	ORGANIZATION	ACTIVE CONTRIBUTORS		TOTAL COMMUNITY		
1	Google	2912	+843	6955	+1245	>
2	Microsoft	2644	+719	6327	+1528	>
3	Red Hat	2426	+567	3955	+583	>
4	Intel	1142	+350	2813	+566	>
5	IBM	994	+314	2660	+678	>
6	Amazon	887	+287	2460	+699	>
7	Facebook	706	+250	2518	+712	>
8	VMware	584	+169	1133	+231	>
9	GitHub	536	+145	1473	+375	>
10	SAP	484	+158	1035	+221	>

<

1

2

3

...

28

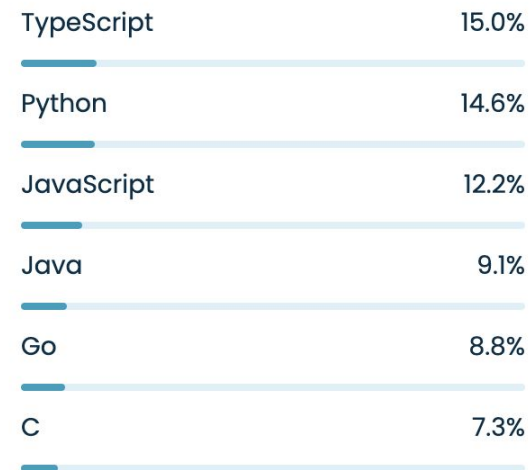
29

30

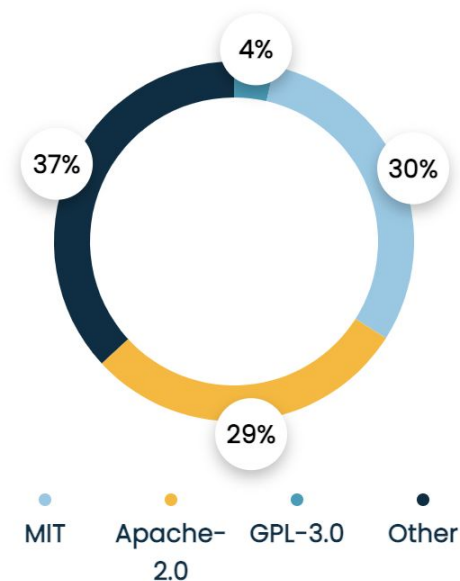
>

291 records

Top languages



License usage



Why are companies Open-sourcing?

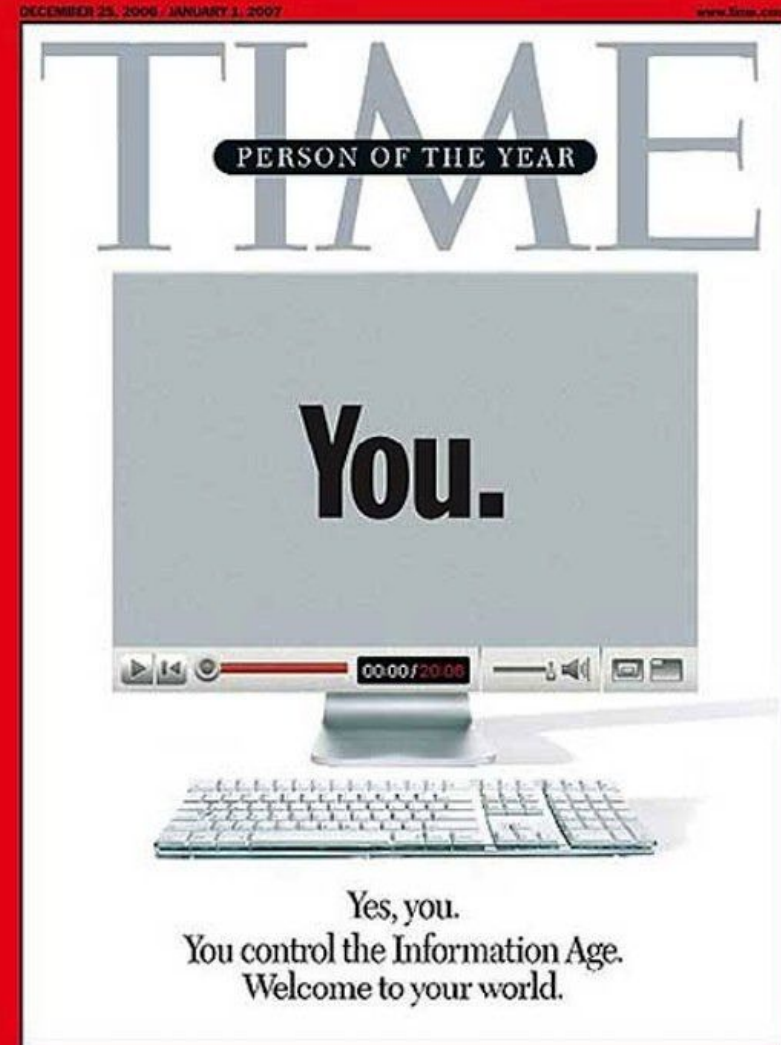


Open
Source

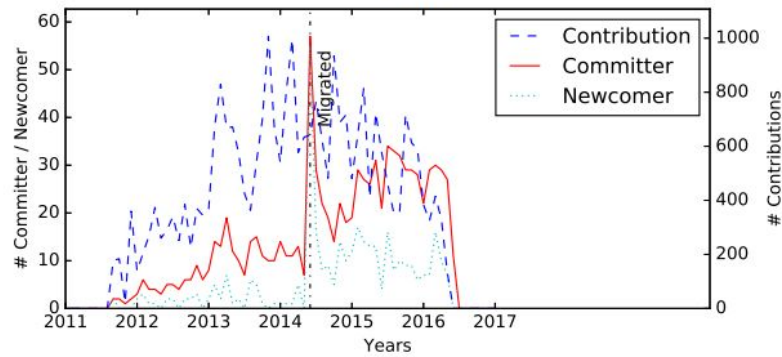
LEVERAGING THE CROWD

“The World Wide Web became a tool for bringing together the small contributions of millions of people and making them matter”

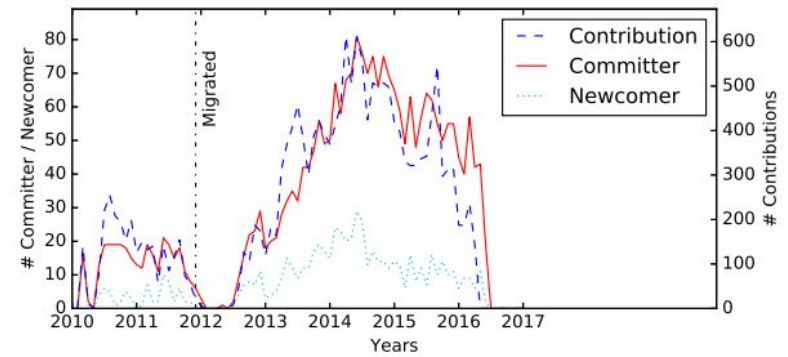
Collaboration in large-scale



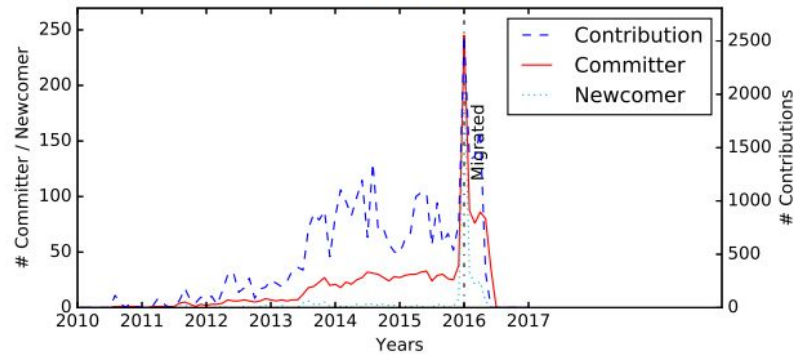
Atom



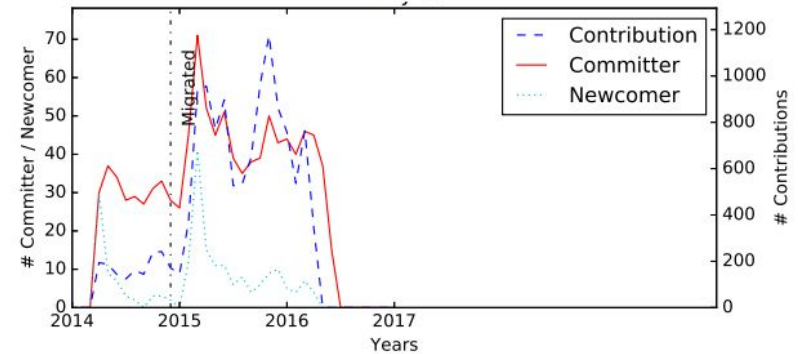
HHVM



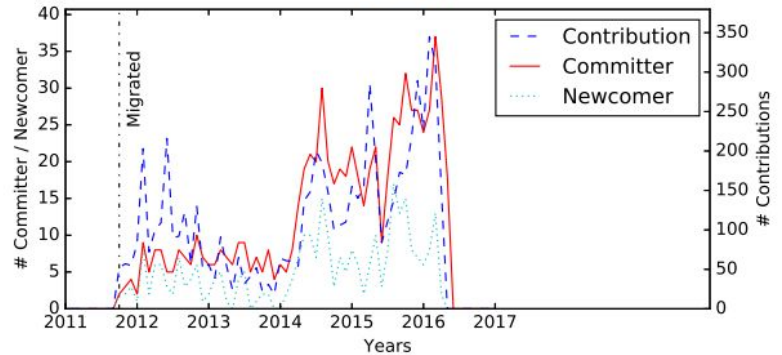
Swift



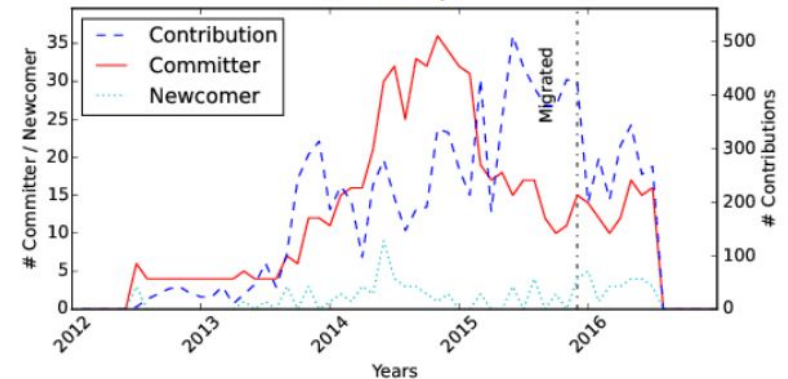
Roslyn



Storm



Plotly



ALL ABOUT COMMUNITY!

- OpenStack:
 - **12.9M** lines of code
 - **37** programming languages (mainly Python)
 - **11.6K+** code contributors
- Mozilla Firefox:
 - **24.5M** lines of code
 - **48** programming languages
 - **8.5K+** contributors (**1K+** in the last 12 months)
- Swift:
 - **800K** lines of code
 - **1K+** contributors



<https://www.openhub.net/p/openstack>
<https://www.openhub.net/p/firefox>
https://www.openhub.net/p/apple_swift