

CS499 - OPEN SOURCE SOFTWARE DEVELOPMENT

Lecture #02: Basics about open source software

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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"



QUESTIONS

- What is Open Source about?



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 - Price?



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QUESTIONS

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



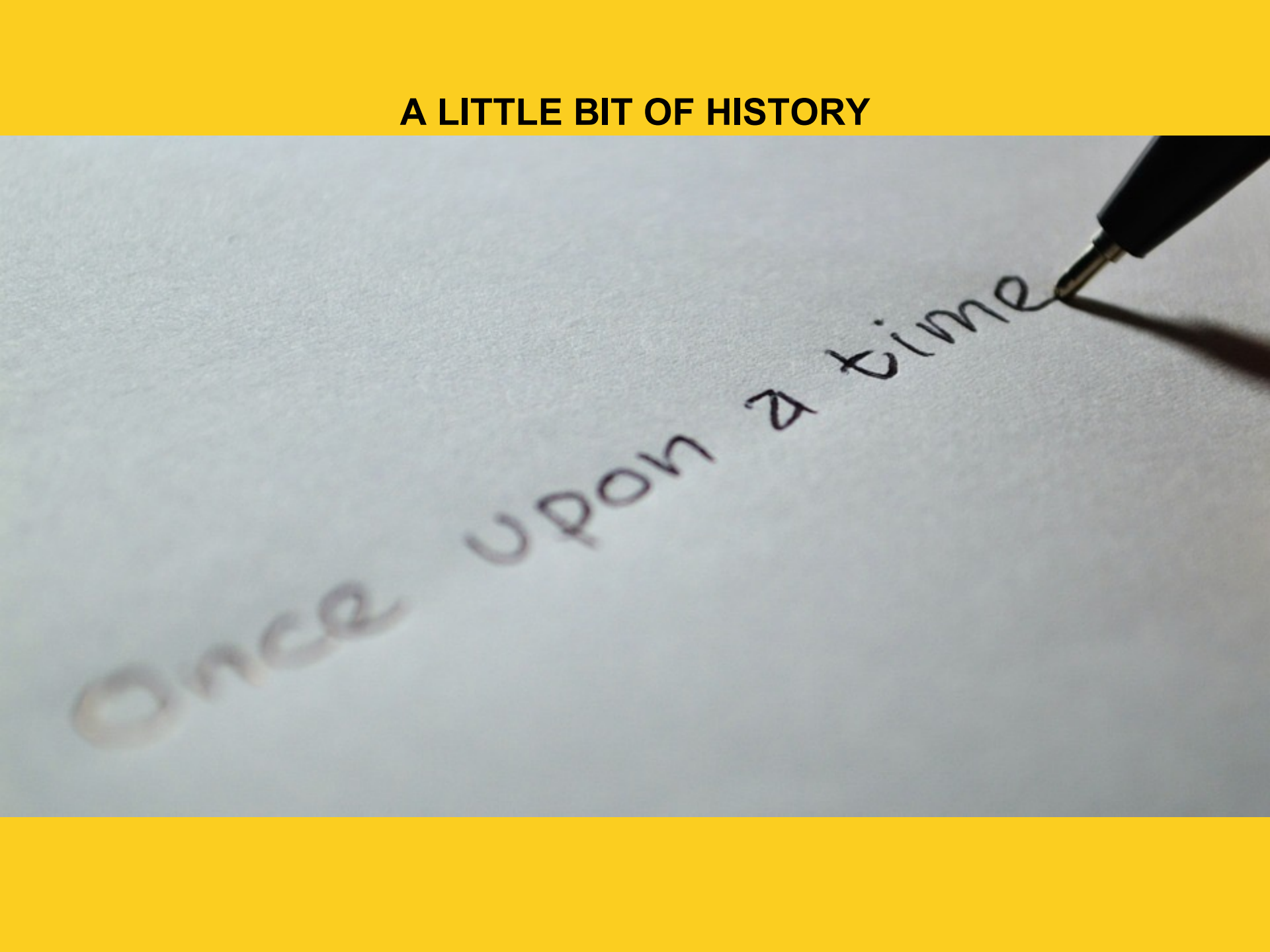
So...

- 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?

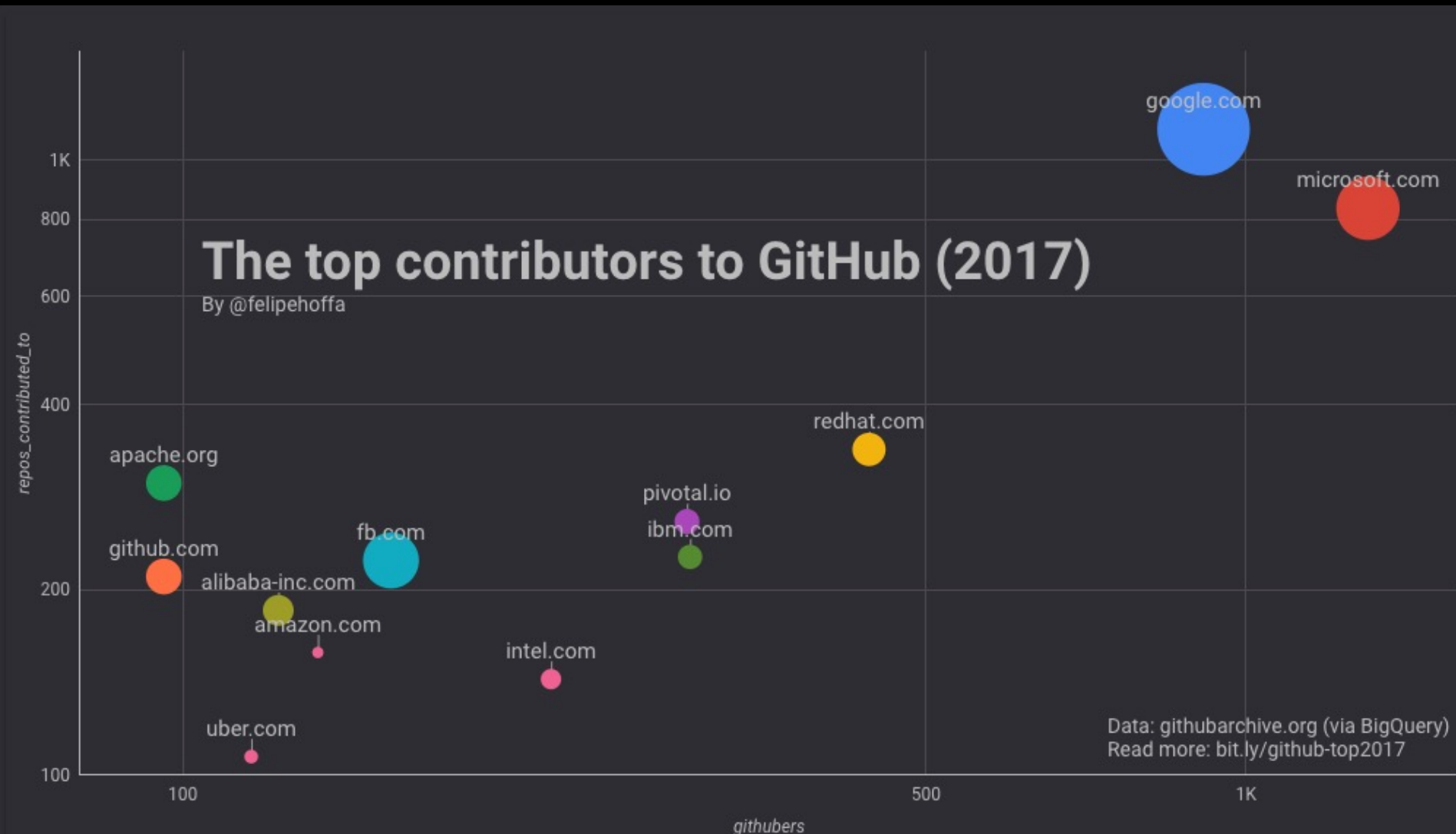
- Incentive to collaboration → human relationship
- Technical education
- “Low-cost” access to “high-end” technology
- Decentralizes the “power” of the software
- Government → knowledge and transparency

WHY OPEN SOURCE?

- Less duplicated code (and cost)
- Less bugs → More quality
 - *“Given enough eye-balls all bugs are shallow”*
- Customization and improvements
- Competition for support

FINAL FACTS

AND... OPEN SOURCE LEADS THE WAY



Why are companies Open-sourcing?



Open
Source

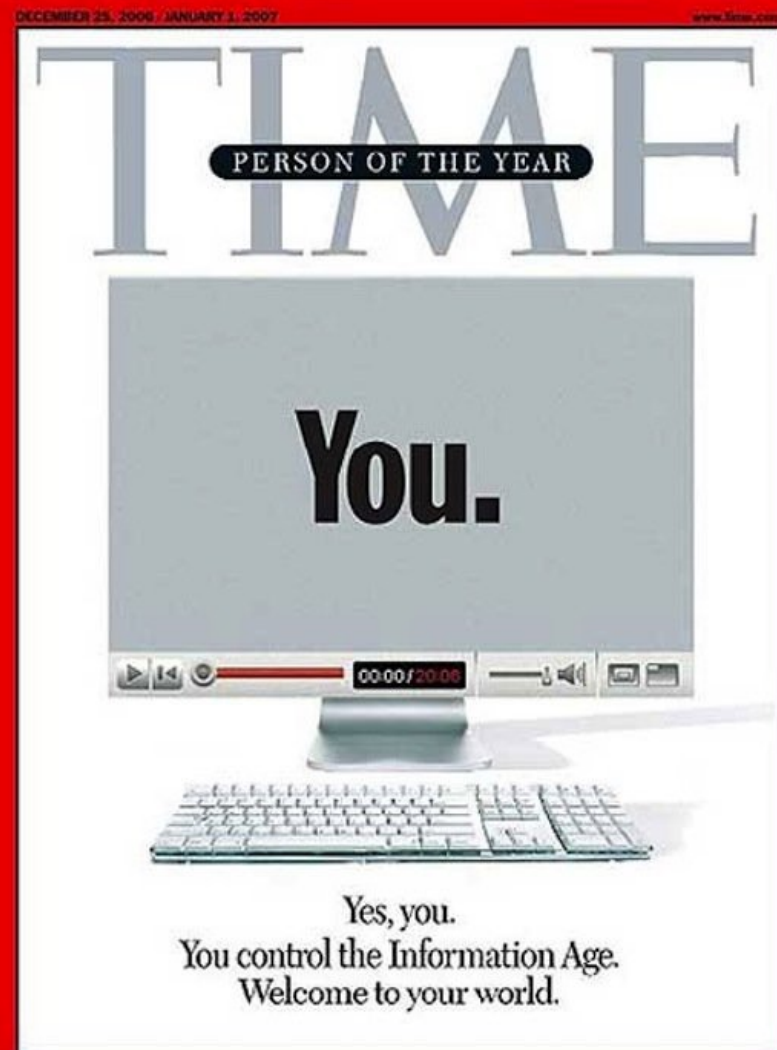
LEVERAGING THE CROWD

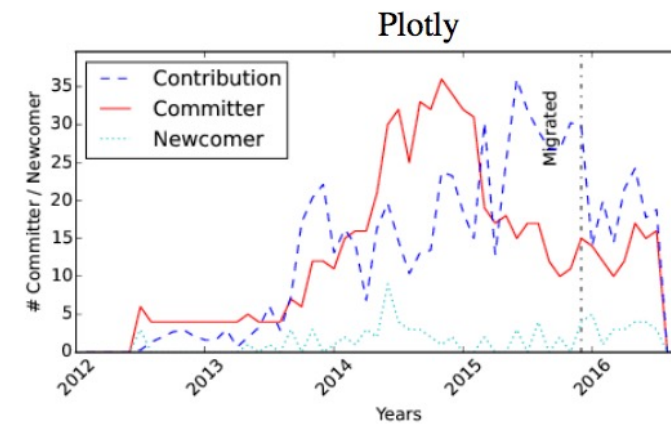
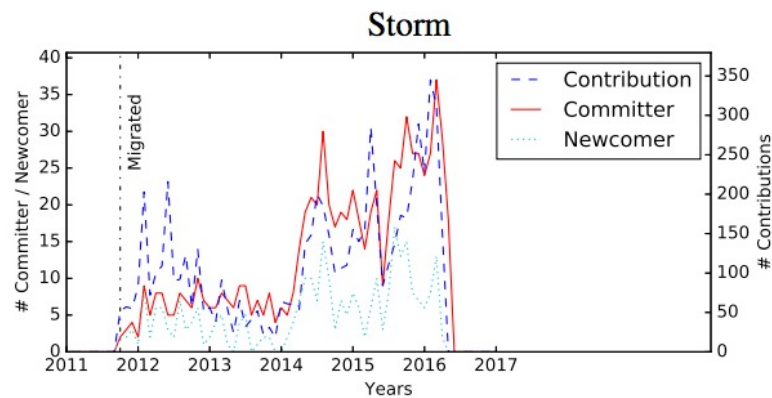
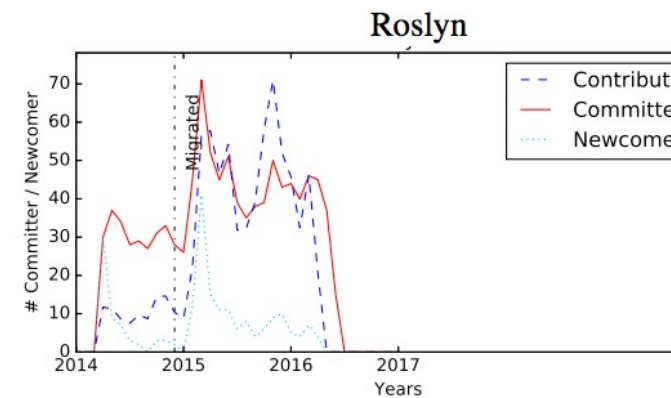
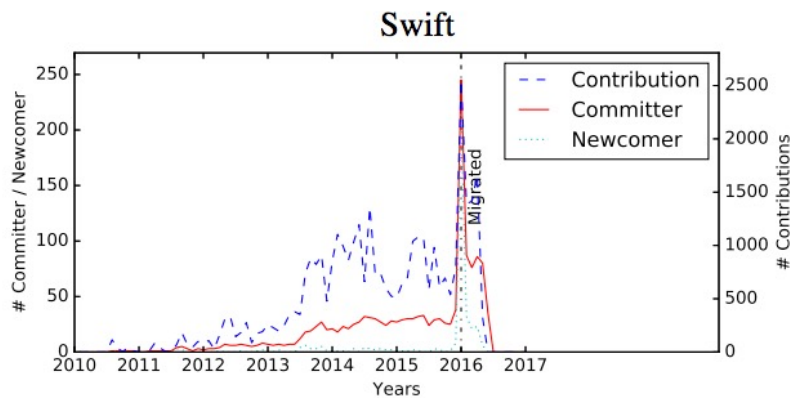
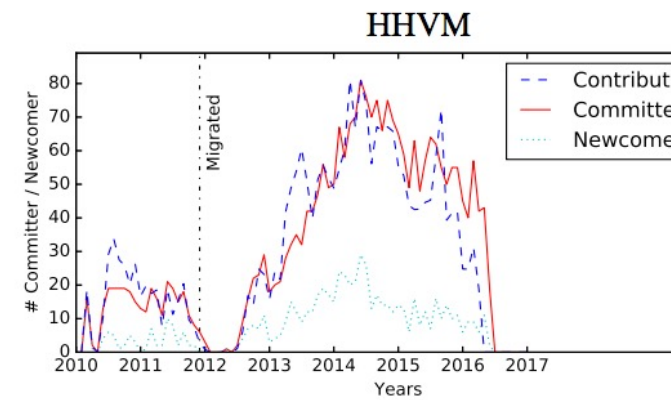
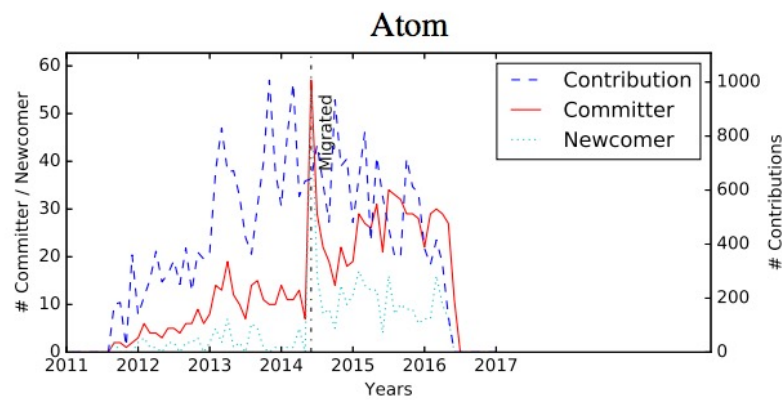
“The World Wide Web became a tool for bringing together the small contributions of millions of people and making them matter”

Collaboration in large-scale



WIKIPEDIA
The Free Encyclopedia





Pinto, Steinmacher, Dias and Gerosa, On the Challenges of Open-Sourcing Proprietary Software, **Empirical Software Engineering**, 2018

ALL ABOUT COMMUNITY!

- OpenStack:
 - **1.7M** lines of code
 - **19** programming languages
 - **17K** community members
 - **5K+** code contributors
 - **38K** e-mail messages
- Mozilla Firefox:
 - **13.5M** lines of code
 - **37** programming languages
 - **4K+** contributors (**1K+** in the last 12 months)
 - **4,231** years of effort (COCOMO model) - first commit in 2002
- Swift:
 - **445K** lines of code
 - Over the past 12 months, **400+** developers



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

<https://opensource.com/business/14/6/openstack-numbers>

https://www.openhub.net/p/apple_swift