Open Source Overview and History

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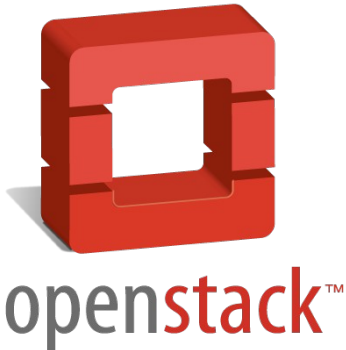
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FOSS B01

Free / Libre and
Open Source Software

Examples of Open Source Software

- **Legal definition**
  - **Free software**
  - **Open source software**

- **Process definition**

Free Software Definition

- Software is **free software** if the user receives

  - the necessary rights to use, study, modify, and distribute the software
  - free of charge and other restrictions

- Free ("... as in freedom, not free as in beer")

  - is freedom of the software, not of people
  - Free software comes with obligations

- Free software is realized by way of free software licenses

  - Details on licensing and intellectual property later

Open Source Software (Legal Definition)

- Open source software is software whose license fulfills
    - these ten requirements https://opensource.org/osd [O10]; it must
        - not restrict redistribution
        - require inclusion of source code
        - allow modifications and derived works
        - preserve the integrity of the author's source code
        - not discriminate against persons or groups
        - not discriminate against fields of endeavor
        - not require additional license execution
        - not be specific to a product
        - not restrict other software distributed alongside
        - be technology neutral

    - and has been approved by the Open Source Initiative

- Open source was established partly in reaction to free software
    - Philosophical stance of free software created a rift with many practitioners
    - Focus is on the freedom of people, not the software
    - Ultimately, by and large compatible

"Open source is a **development method** for software that harnesses the power of **distributed peer review** and **transparency of process**. The promise of open source is **better quality, higher reliability, more flexibility, lower cost**, and an **end to predatory vendor lock-in**." [O10]

The Cathedral and the Bazaar [R99]

- The Cathedral

  - Carefully crafted work
    - Performed by small group
    - Evolves slowly

  - Bugs and problems are tricky, require deep analysis

  - Project is led by command and control approach

  - No early releases nor beta

- The Bazaar

  - Incremental work
    - Performed by large group
    - Evolves rapidly

  - Linus' law: "Given enough eyeballs, all bugs are shallow"

  - Project is lead by convincing people, nudging them on

  - "Release early, release often"

The Apache Way [A10]

- Apache's **meritocracy** ("government by merit")

  - grew out of the original http demon (httpd) i.e. the Apache web server
  - codified the values of collaboration in that initial then growing group
  - The httpd led to the creation of the Apache Software Foundation (ASF)

- The ASF's governance

  - Led to the creation of a "career ladder" i.e. multiple stages
    - Developers earn committer position by proving their merit over time
    - Developers can rise to the ranks of managing whole industry platforms

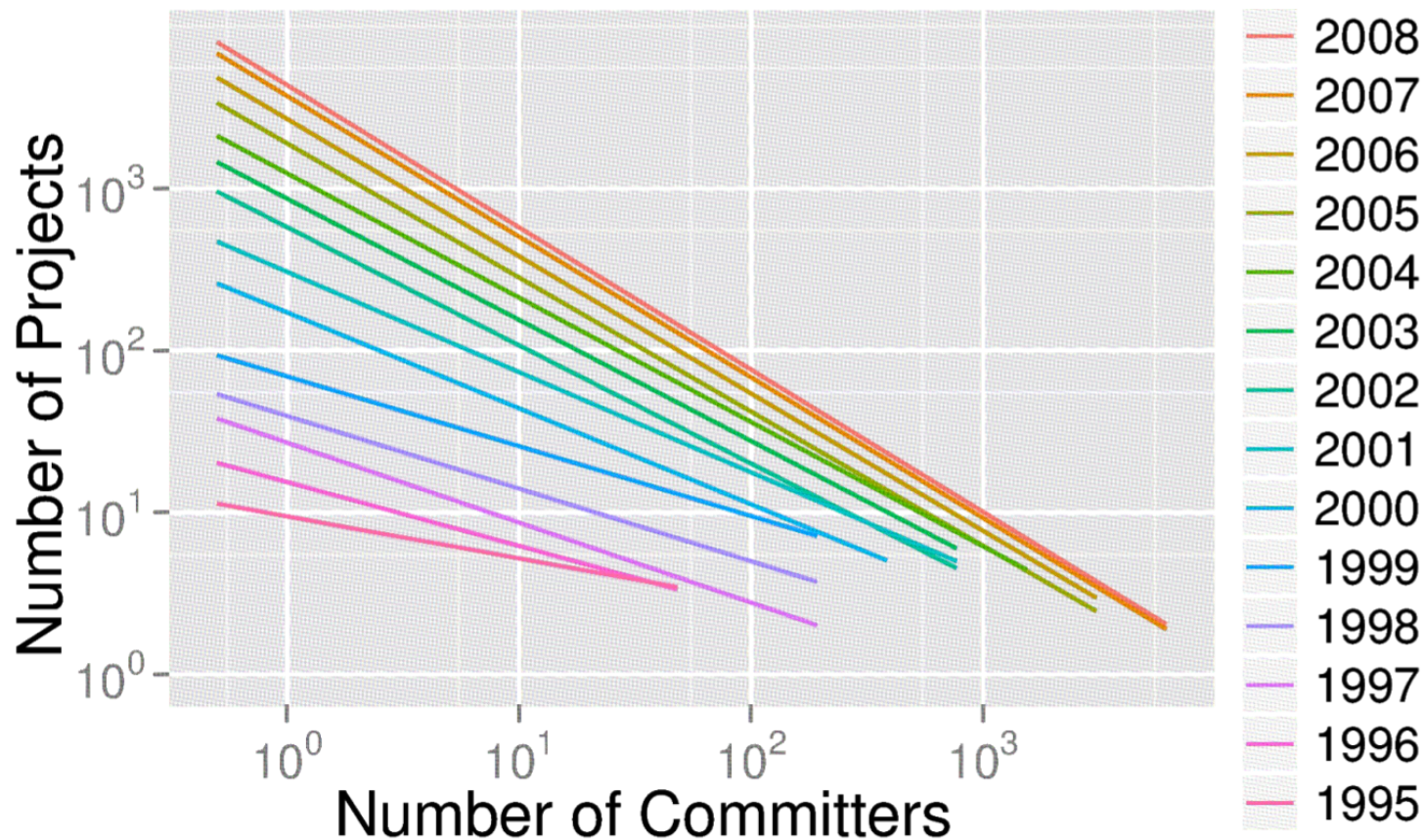 - Focuses on "community over code" (ASF slogan)

- **Open Collaboration**

  - **Egalitarian**

    - Open for contribution
    - Everyone can contribute

  - **Meritocratic**

    - Public discussion process
    - Decisions based on merit

  - **Self-organizing**

    - People find their process
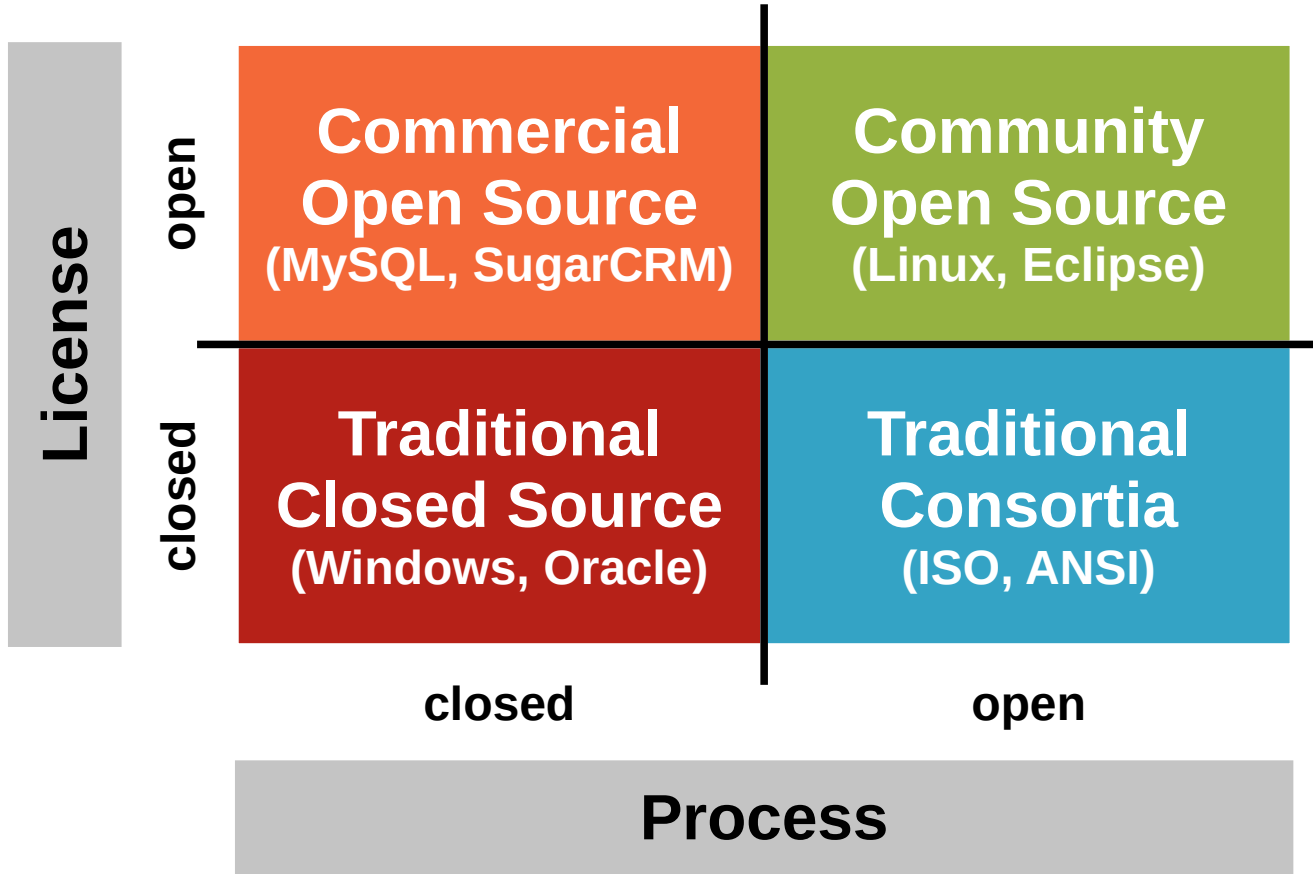   - People find their project

- Traditional Work

  - Hierarchical

    - Closed and hidden silos
    - Assigned to project

  - Status-based

    - Public + private discussions
    - Hierarchical status decides

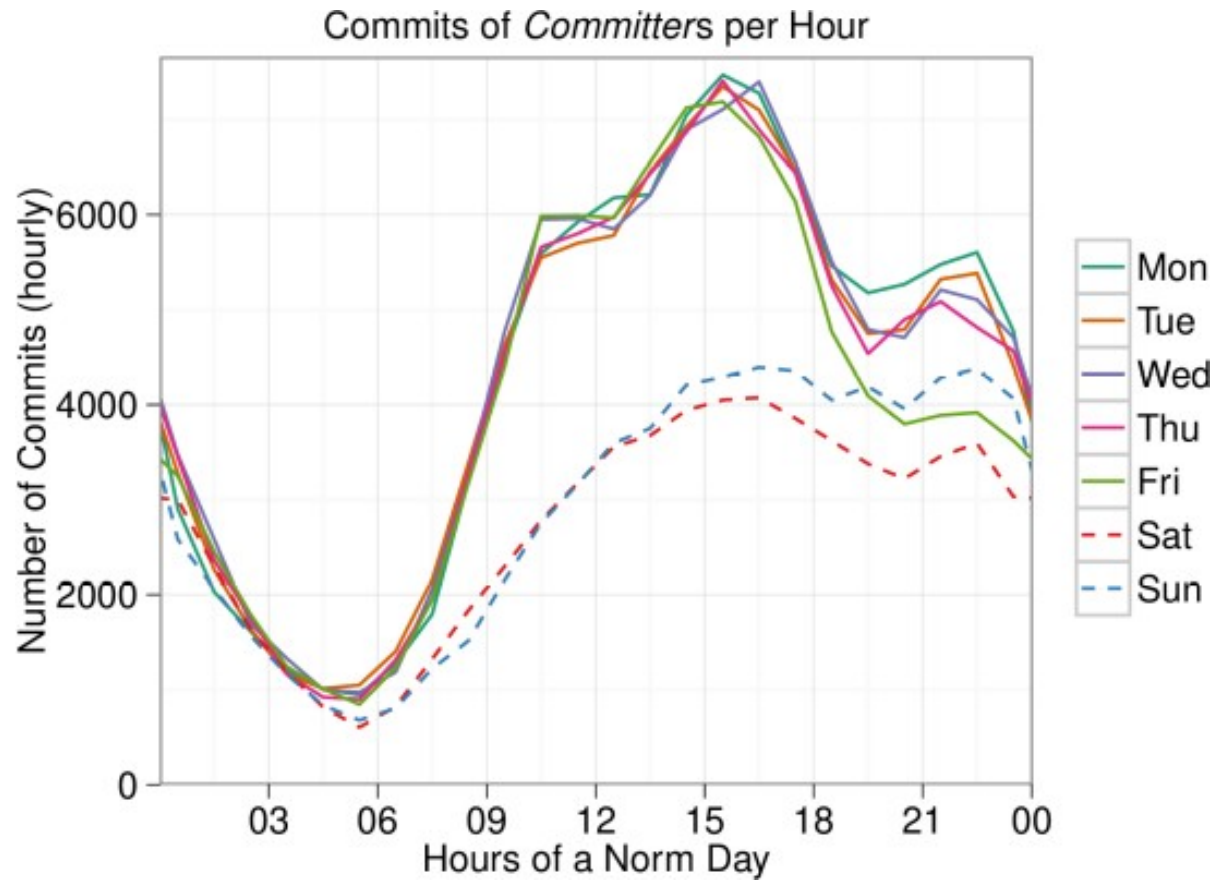 - Assigned tasks

    - Prescribed process
    - Prescribed jobs

Open Source is Scale-free (Hypothesis)

Open vs. Closed License / Process

License

open · closed

Commercial Open Source (MySQL, SugarCRM)

Community Open Source (Linux, Eclipse)

Traditional Closed Source (Windows, Oracle)

Traditional Consortia (ISO, ANSI)

closed · open

Process

12

Commits of *Committer*s per Hour

"At least 65% of the code which went into 2.6.20 was created by people working for companies." [C07]

Growth of Open Source Projects [DR08]
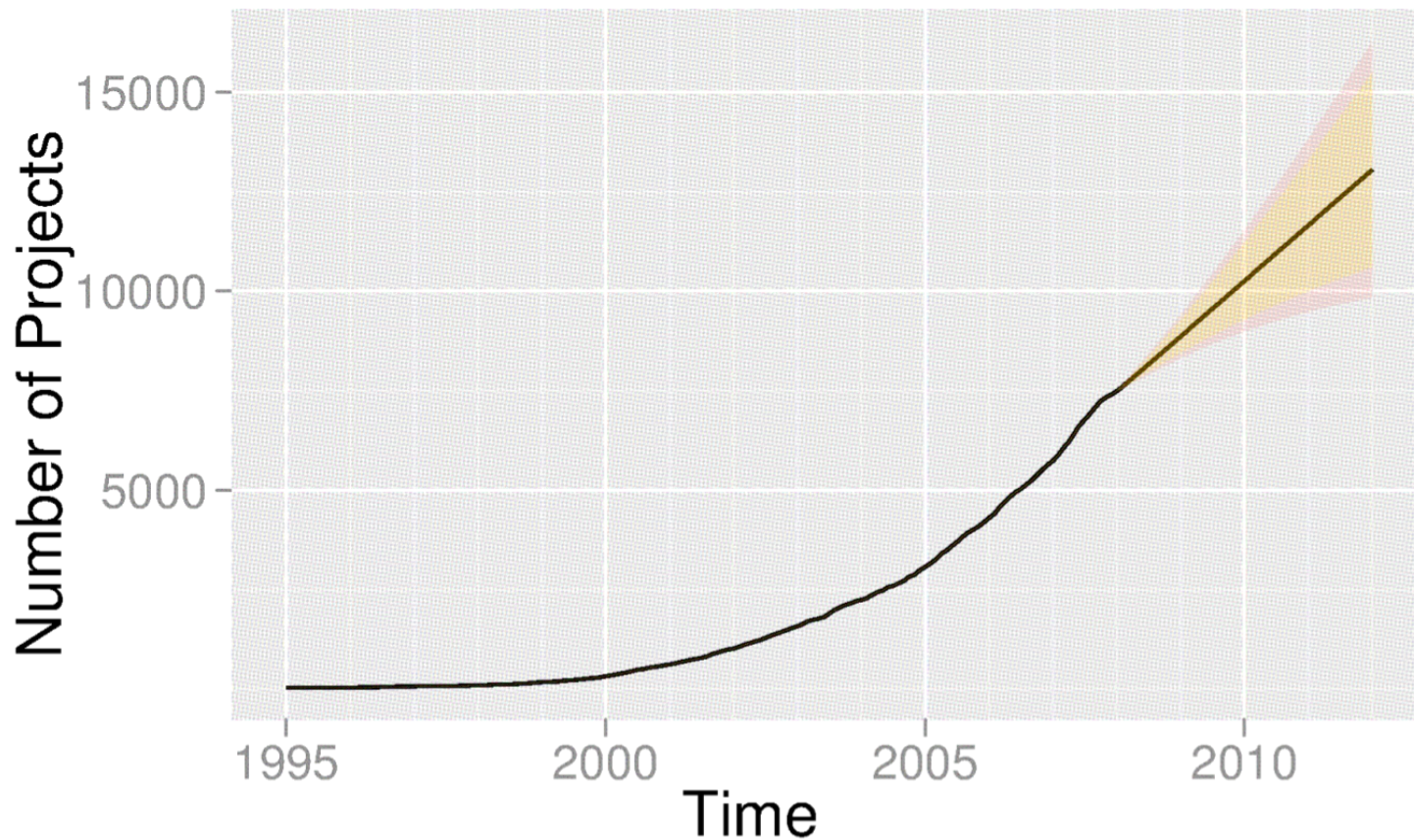
Industrial Use of Open Source

- Open source is in wide use in enterprises [H09]

  - In a large 2009 survey, Forrester Research found that 46% of all responding enterprises were using or implementing open source software

- Most software firms use open source in products [G09]

  - In 2009 Gartner Group estimated that by 2012, at least 80% of all software product firms will use open source software in their products

- Revenues from open source products growing [S06] [I06]

  - In 2006, open source held $1.8B / $235B = 0.8% of total packaged product market revenue; will reach $5.8B by 2011 (26% CAGR 2006-11)

1. **Use**

2. **Contribute**

3. **Create and lead**

Increasing Open Source **Investment Pace**

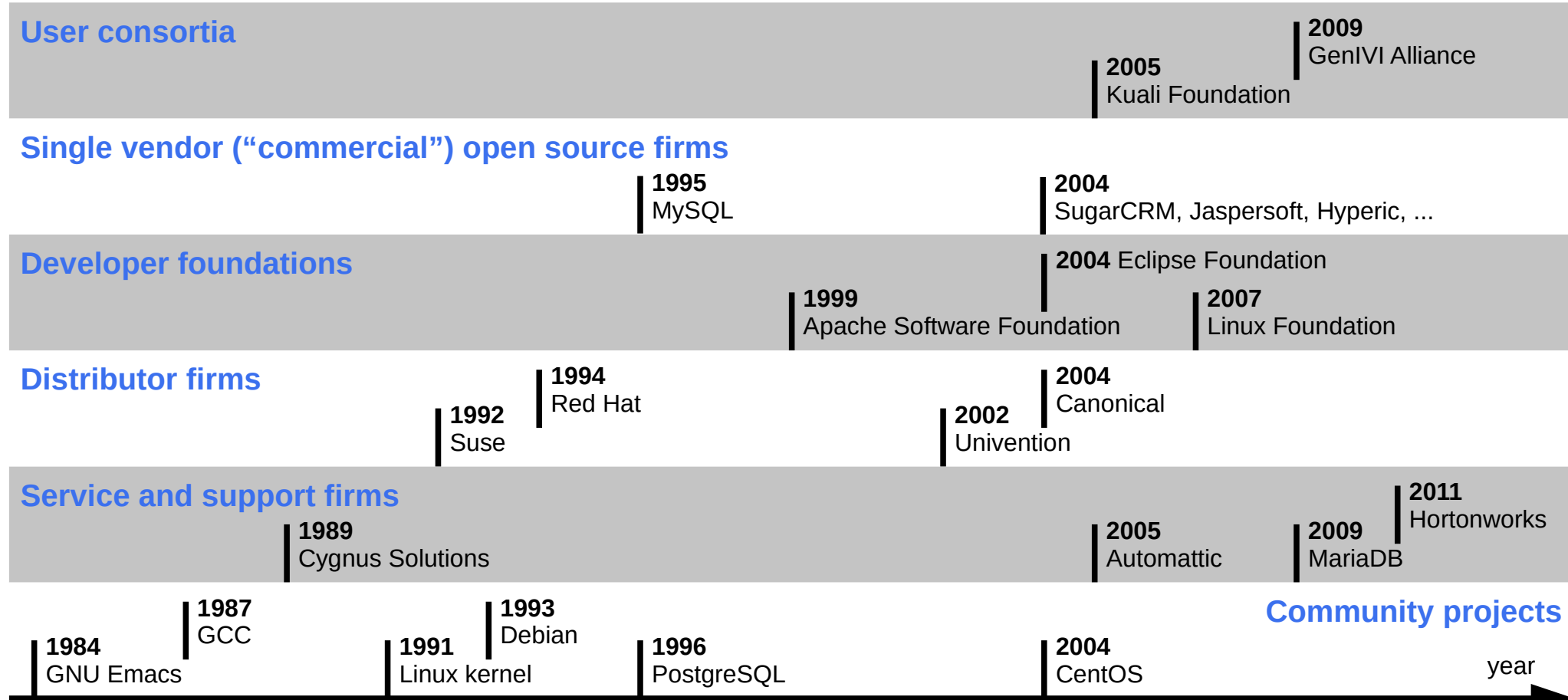|	<5 YEARS	5-10 YRS	>10 YEARS	AGGREGATE
OSS COMPANIES FOUNDED (1ST INST. INV.)	31	19	8	58
VC INVESTMENT BY FOUNDING VINTAGE ($M)	$1,802	$2,847	$255	$4,904
VC INVESTMENT BY YEAR BUCKET ($M)	$4,237	$506	$161	$4,904
VALUATION BY FOUNDING VINTAGE ($M)	$8,174	$12,719	$16,992	$37,886
EXCL. RED HAT			$1,938	$22,832

"It is actually open source software that's eating the world." [V15]

"When we look at a start-up, we look at the GitHub repositories, we look at Ohloh.net. **We drill down to the level of individual developers. It informs our investment decision.** That fact alone gives open source software developers significant leverage when negotiating their position, salary, and benefits with startups. [Rachel Chalmers, Ignition Partners]

Short History of Open Source

1. **1960-1979: Not-born-yet (the first era) [LT02]**
   - Little or no recognition of software as intellectual property
   - Free sharing of source code, allowing for rapid diffusion and innovation

2. **1980-1989: Philosophy (the second era)**
   - Founding of the **Free Software Foundation** by **Richard Stallman** in 1985
   - Invention of **GNU public license** for regulating collaboration

3. **1990-1999: Pragmatism (the third era)**
   - Founding of **Open Source Initiative** in 1998, increased pragmatism
   - Explosion in number of projects as well as open source licenses

4. **2000-2009: Professionalization (the fourth era)**
   - Professionalization of open source, away from pure volunteerism
   - Increased focus on commercialization

5. **2010-today: Mainstream (the current era)**
   - "The future is already here, it is just not evenly distributed yet" (Gibson)

Evolution of Open Source Projects

User consortia

2009 GenIVI Alliance

2005 Kuali Foundation

Single vendor ("commercial") open source firms

1995 MySQL

2004 SugarCRM, Jaspersoft, Hyperic, ...

Developer foundations

2004 Eclipse Foundation

1999 Apache Software Foundation

2007 Linux Foundation

Distributor firms

1994 Red Hat

1992 Suse

2002 Univention

2004 Canonical

Service and support firms

2011 Hortonworks

1989 Cygnus Solutions

2005 Automattic

2009 MariaDB

Community projects

1987 GCC

1984 GNU Emacs

1991 Linux kernel

1993 Debian

1996 PostgreSQL

2004 CentOS

year

1. **Legal innovation**

2. **Process innovation**

3. **Software tool innovation**

4. **Business model innovation**

Free Software and Richard Stallman

- Richard Stallman
  - Research scientist at MIT
  - Originator of the GPL license family
  - Defined the "essential four freedoms"
  - Original author of GNU emacs

- Free Software Foundation
  - Founded by Richard Stallman
  - Home and protector of free software

Legal Innovation

- Copyleft

The Linux Kernel and Linus Thorvalds

- Linus Thorvalds
    - Software developer
    - Originator of the Linux Kernel
    - Hierarchical development model

- Linux Foundation
    - Is a U.S.-based 501(c)(6) foundation
        - Founded to protect and stabilize Linux
        - Founded to rally against Microsoft

    - Is a major home for open source

A "Patchy" Web Server and the ASF

- The Apache Web Server

  - is the most widely used http demon (> 50% market share)

  - gave rise to a new development model, codified as the Apache way

- The Apache Software Foundation

  - Is a 501(c)(3) foundation "in the public interest" here open source

  - To stabilize and protect the Apache open source software

The Open Source Initiative

- The Open Source Initiative
  - Is a U.S.-based 501(c)(3) foundation
  - Home to the open source definition
  - Founded to broadly support open source
    - Beyond (what today is the) Linux Foundation
    - Beyond the Apache Software Foundation projects
    - Responding to Netscape open sourcing Navigator
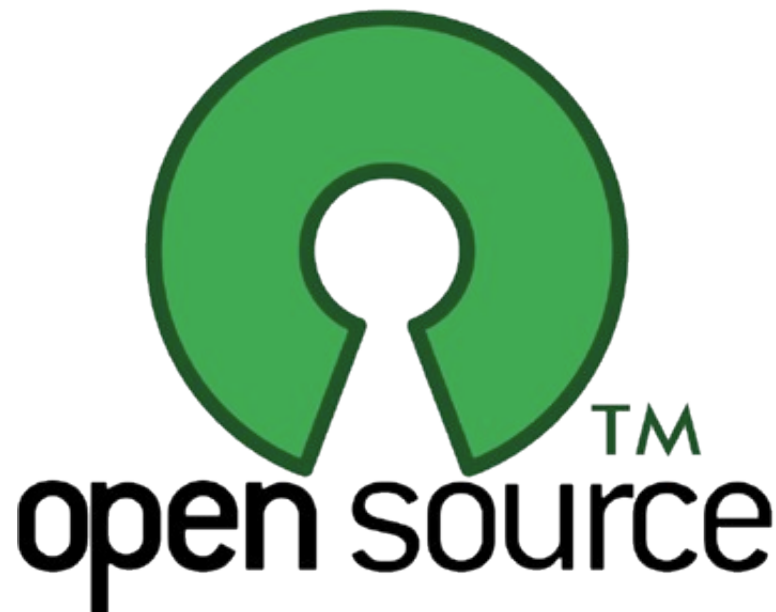
Process Innovation

- Open processes
    - Apache's Meritocracy
    - Open Collaboration

Two Common Misconceptions

- As visitor to the project, you can request a service
  - No, you can't
    - There is no moral or legal obligation to serve you

- As a leader of the project, you can command your followers
  - No, you can't
    - They are volunteers: If you command too much, they will leave

Free vs. Open Source Software

- Free Software

  - Free software movement
    - Free software philosophy summarized as "free as in 'free speech' not as in 'free beer'"
    - Initiated (and still led) by Richard Stallman (MIT) in the 1980ties to free software (from being closed)

  - Free Software Foundation
    - Is a U.S. 501(c) non-profit organization, see http://www.fsf.org

- Open Source Software

  - Open source movement
    - "The Cathedral and the Bazaar" describes open source as a development method [R99]
    - Formalized 1998 to address perceived anti-commerce bias of "free software"

  - Open Source Initiative
    - Is a U.S. 501(c) non-profit organization, see http://www.opensource.org
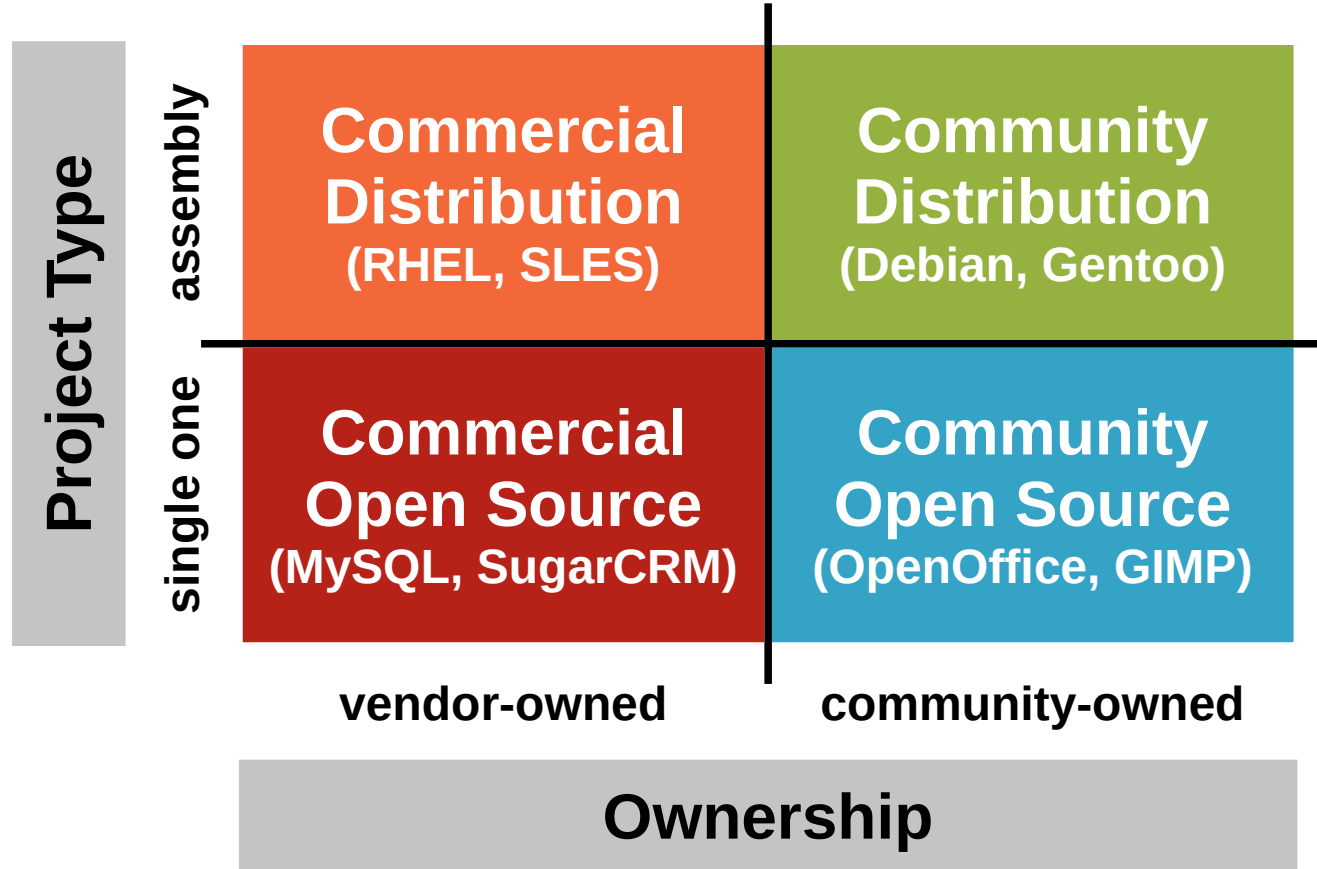
SourceForge in 2000

GitHub in 2016

Software Tool Innovation

- Software forges (SourceForge, GitHub, …)
- Distributed configuration management (git, hg, ...)

"Some people spend time to save money, some spend money to save time." [M10]

Vendor-owned vs. Community-owned Open Source Software

Project Type

assembly

Commercial Distribution
(RHEL, SLES)

Community Distribution
(Debian, Gentoo)

single one

Commercial Open Source
(MySQL, SugarCRM)

Community Open Source
(OpenOffice, GIMP)

vendor-owned

community-owned

Ownership

Review / Summary of Session

- Open source definition
  - Free / libre vs. open source
  - Legal and process definition

- Significance of open source
  - History and growth of open source
  - Developer careers

- Open source innovation
  - Legal, process, tooling, and business models
  - Explained using examples

Thank you! Questions?

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