Intellectual and Institutional History

i290M Open Collaboration and Peer Production

Sebastian Benthall

we've
used tools

we've analyzed data

today,
we'll
tell stories

"The movement, as a practice of discussion and argument, is made up of stories. It is a practice of storytelling: affect- and intellect-laden lore that orients existing participants toward a particular problem, contests other histories, parries attacks from outside, and draws in new recruits."

Chris Kelty, *Two Bits: The Cultural Significance of Free Software*

our pedagogical strategy is immersion

There are many different stories about the same thing

Where you start the story matters

Let's start with…
the Internet

Internet *standards*
...the design of the
Internet itself…
is the product of
open collaboration

"In the earliest days of the Internet and its predecessors, almost everyone who used the network was either involved in building it or worked for an organization that had a role in its creation."

Froomkin, M, "Habermas@Discourse. Net: Toward a Critical Theory of Cyberspace."

"There is a community, a shared culture, of expert programmers and networking wizards that traces its history back through decades to the first time-sharing minicomputers and the earliest ARPAnet experiments. The members of this culture originated the term 'hacker'. Hackers built the Internet. Hackers made the Unix operating system what it is today. Hackers make the World Wide Web work. If you are part of this culture, if you have contributed to it and other people in it know who you are and call you a hacker, you're a hacker.."

Raymond, E, "How To Become A Hacker"

"...the founders were starting from scratch, rather than inheriting a system of decisionmaking that created endowments or advantages, and the early participants were graduate students who tended to know each other, shared a common professional socialization, and were relatively equal in (low) status."

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In 1968, the four ARPA computer science contractors (UCLA, SRI, UCSB, University of Utah) for a packet switching network began meeting.

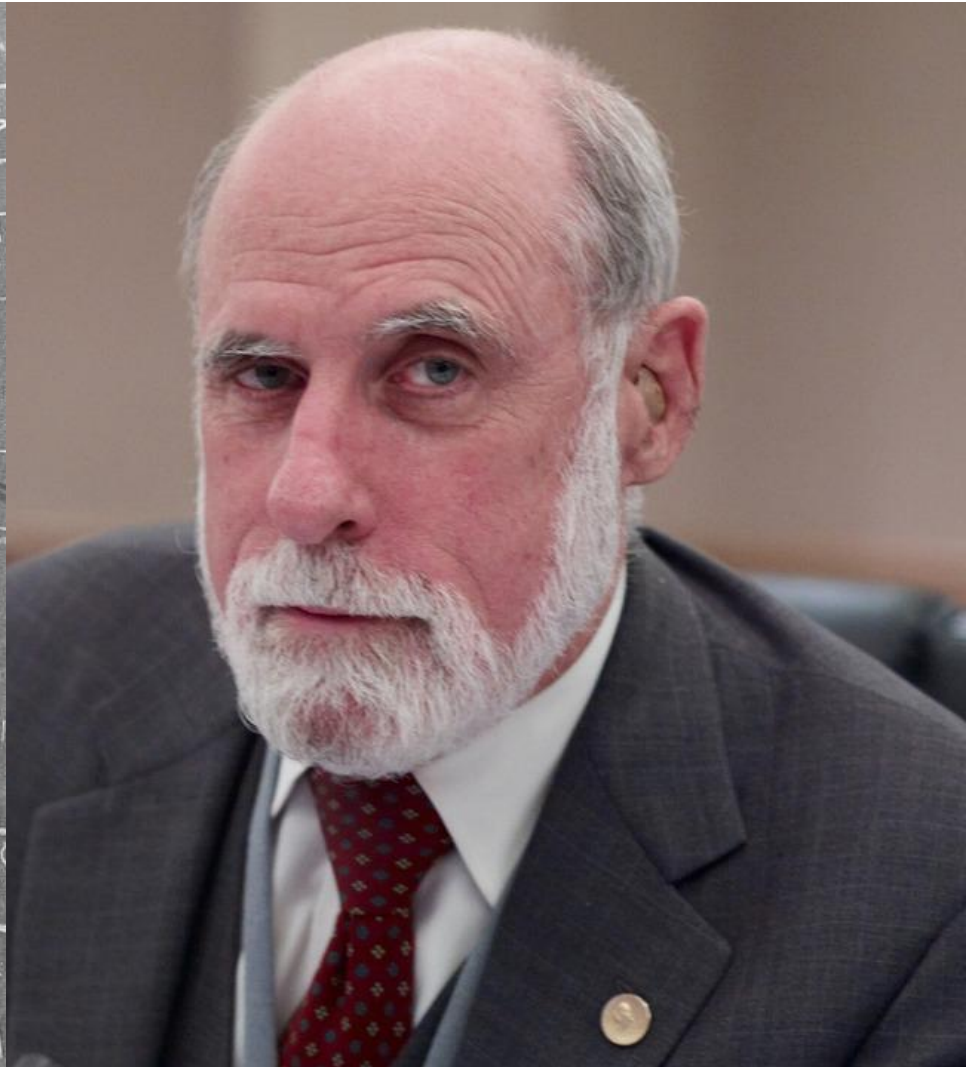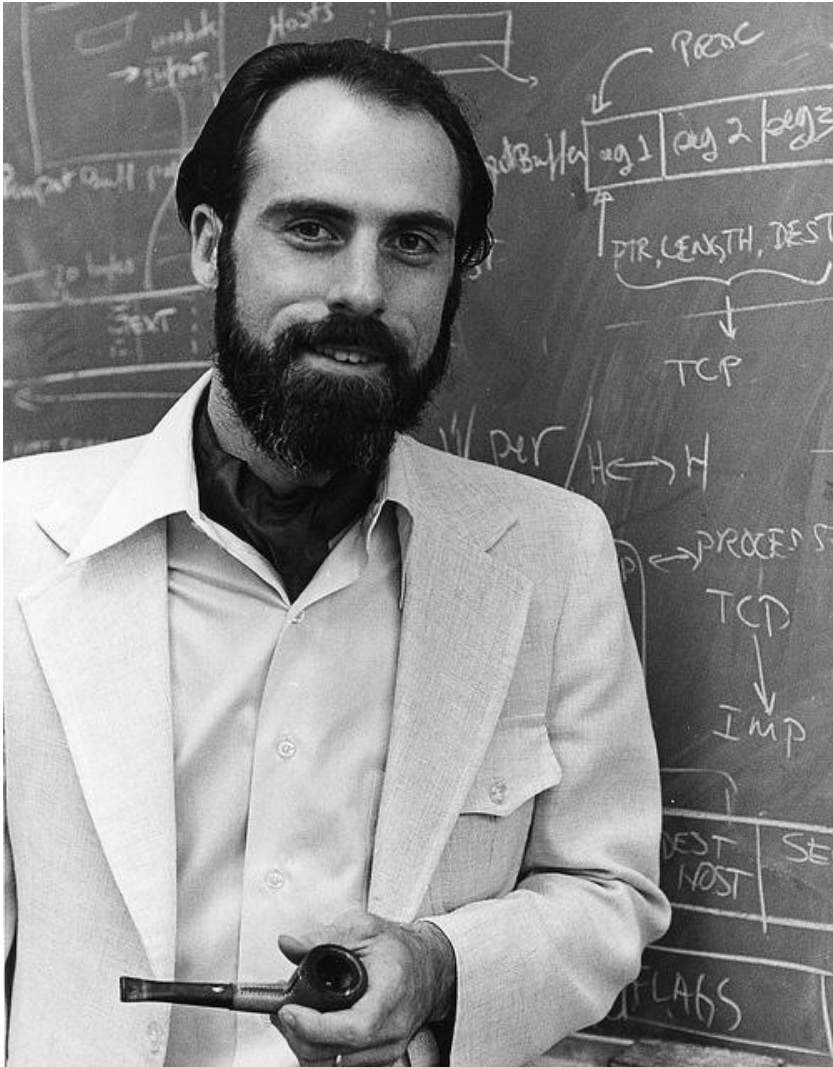Somebody left the graduate students in charge.

Froomkin, M, "Habermas@Discourse. Net: Toward a Critical Theory of Cyberspace."

Network Working Group

Includes Vint Cerf

Lacking authority, they thoroughly and publicly documenting their work and began titling their proposals "Request for Comments", inviting open responses.

As the governance structure formalized, it maintained these practices.

Froomkin, M, "Habermas@Discourse. Net: Toward a Critical Theory of Cyberspace."

DARPA turns control over to
Internet Activities Board (IAB),
which was public but exclusive.

In 1986, It delegates architectural
and protocol issues to
Internet Engineer Task Force
(IETF), which remains open to
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IAB maintained oversight and
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In 1992, Internet Society (ISOC) forms with Vint Cerf as president, and IAB voluntarily becomes subsidiary.

There's a *legitimation crisis* over IAB's rejection of an IETF-recommended standard.

Cerf calls for a working group on standards procedures.

Froomkin, M, "Habermas@Discourse. Net: Toward a Critical Theory of Cyberspace."

Decided that IAB members would be selected by ISOC by those nominees of randomly chosen committee of IETF volunteers.

IETF maintains its RFC system, its openness to volunteer participation, its mailing lists.

Changes are made incrementally.

Froomkin, M, "Habermas@Discourse. Net: Toward a Critical Theory of Cyberspace."

The Internet
begins with
open collaboration
and
peer production

Why peers? Why open?

- Protocol standards require all stakeholders to agree, so meet as peers
- Network is designed to be joined by others, so keep it open
- Openness to objection from anybody makes the consensus *legitimate*

But even before the Internet, there were *computers*

"...for the computer industry in the 1960s, portable source code was largely a moot point. Software and hardware were two sides of single, extremely expensive coin.... Each new machine needed to be different, faster, and, at first, bigger, and then smaller, than the last. The urge to differentiate machines from each other was not driven by academic experiment or aesthetic purity, but by a demand for marketability, competitive advantage, and the transformation of machines and software into products."

Chris Kelty, *Two Bits: The Cultural Significance of Free Software*

"Set against this backdrop, the invention, success, and proliferation of the UNIX operating system seems **quite monstrous, an aberration** of both academic and commercial practice that should have failed in both realms, instead of becoming the most widely used portable operating system in history and the very paradigm of an "operating system" in general."

Chris Kelty, *Two Bits: The Cultural Significance of Free Software*

1969 - Ken Thompson and Dennis Ritchie write UNIX at Bell Telephone Labs

"They were specialists in operating systems, languages, and machine architecture in a research group that had no funding or mandate to pursue these areas."

Chris Kelty, *Two Bits: The Cultural Significance of Free Software*

Ken Thompson and Dennis Ritchie

"In the space of about two years, a complete operating system, a programming language called C, and a host of tools that are still in extremely wide use today. "

Chris Kelty, *Two Bits: The Cultural Significance of Free Software*

- UNIX was proprietary—wholly owned by Bell Labs

- AT&T was a government phone monopoly forbidden to enter the software market.

- AT&T allowed academics and corporations to install and modify UNIX for very low licensing fees.

- The condition: researchers could do what they liked with the software so long as they kept it secret.

- So UNIX was developed ... by users around the world ...

Chris Kelty, *Two Bits: The Cultural Significance of Free Software*

- UNIX distributions *included source code*

- Bug fixes collected on magnetic tape

- Legal ambiguity/bafflement

- "Sharing produced its own form of moral and technical order."

Chris Kelty, *Two Bits: The Cultural Significance of Free Software*

The Lions commentary on UNIX becomes the first widely used textbook on operating systems.

It was illegal to distribute.

Chris Kelty, *Two Bits: The Cultural Significance of Free Software*

The Lions commentary on UNIX becomes the first widely used textbook on operating systems.

"It is important to understand the significance of John's work at that time: for students studying computer science in the 1970s, complex issues ... extremely difficult to teach—there simply wasn't anything available with enough accessibility for students to use as a case study." - Benny Goodheart

Chris Kelty, *Two Bits: The Cultural Significance of Free Software*

Peter Reintjes writes, "We soon came into possession of what looked like a fifth generation photocopy and someone who shall remain nameless spent all night in the copier room spawning a sixth, an act expressly forbidden by a carefully worded disclaimer on the first page. Four remarkable things were happening at the same time. One, we had discovered the first piece of software that would inspire rather than annoy us; two, we had acquired what amounted to a literary criticism of that computer software; **three, we were making the single most significant advancement of our education in computer science by actually reading an entire operating system;** and four, we were breaking the law."

Chris Kelty, *Two Bits: The Cultural Significance of Free Software*

In 1975, Thompson works on a UNIX fork at Berkeley to include the ARPANet TCP/IP Protocol.

BSD (Berkeley Software Distribution) is born.

It's another legal nightmare.

But now, all the UNIX computers can access the Internet.

Chris Kelty, *Two Bits: The Cultural Significance of Free Software*

Modern software *begins* with peer production

Why did they share it?

- A fluke: AT&T invented technology they could not productize directly
- Desire for education/innovation trumped legality

Open collaboration was necessary but legally tenuous

Richard Stallman, a.k.a. RMS

Programmer, software freedom activist, MacArthur Genius Fellow

Founder of GNU Project, Free Software Foundation (FSF)

Developer of GNU Compiler Collection, Emacs

Author of GNU Public License (GPL)

In 1980, Stallman and some other hackers at the AI Lab were refused access to the source code for the software of a newly installed laser printer, the Xerox 9700. Stallman had modified the software for the Lab's previous laser printer (the XGP, Xerographic Printer), so it electronically messaged a user when the person's job was printed, and would message all logged-in users waiting for print jobs if the printer was jammed. Not being able to add these features to the new printer was a major inconvenience, as the printer was on a different floor from most of the users. This experience convinced Stallman of people's need to be free to modify the software they use. - Wikipedia

GNU's Not UNIX

- By 1983, Stallman is mad as hell and can't take it any more
- He writes GNU, a new operating system based on UNIX
- He starts the Free Software Foundation to hire developers to work on it
- He declares the *moral case* for Free Software, inscribing it into the GNU Public License

Four Freedoms

0. The freedom to run the program, for any purpose

1. The freedom to study how the program works, and change it so it does your computing as you wish.

Access to the source code is a precondition for this.

Four Freedoms

2. The freedom to redistribute copies so you can help your neighbor.

3. The freedom to distribute copies of your modified versions to others. By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this.

RMS, "What is free software?"

RMS believes
these freedoms are
moral principles
that transcend law
or economic
pragmatism

The GPL is *copyleft* mandating the release of source code

The GPL is
copyleft
virally transmitting
to derivative works

Why free software?

- Personal technology is an extension of oneself
- Using proprietary software cedes freedom to the software owner
- Free software provides you those you share with self-knowledge and opportunity for growth
- Freedom is an intrinsic moral virtue

Linus Torvalds

Software Engineer

Wrote the Linux kernel, Git

Benevolent Dictator of the Linux project

Linus develops the kernel in 1991
Says he did it all for *fun*

An enthusiastic community grows around the new operating system

It is so fast and robust, it rises in popularity, especially for web servers

Why Linux?

- A free software project benefits from the *intrinsic motivation* of a talented engineer
- A series of historical contingencies has resulted in a competitive, networked software platform

It is so fast and robust, it rises in popularity, especially for web servers

The Internet goes mainstream

New free projects, like Apache, are critical

ESR writes "The Cathedral and the Bazaar" emphasizing decentralized community

There's
a dot-com boom

By 1998, commercial software industry has taken note of free software

Big players,
like Microsoft,
are not happy

Tim O'Reilly

Founder and CEO, O'Reilly Media

Prolific writer and conference organizer

Incidentally, on UCB I School Board of Advisors

In the 1990's, O'
Reilly publishes
high-quality
manuals for free
software projects

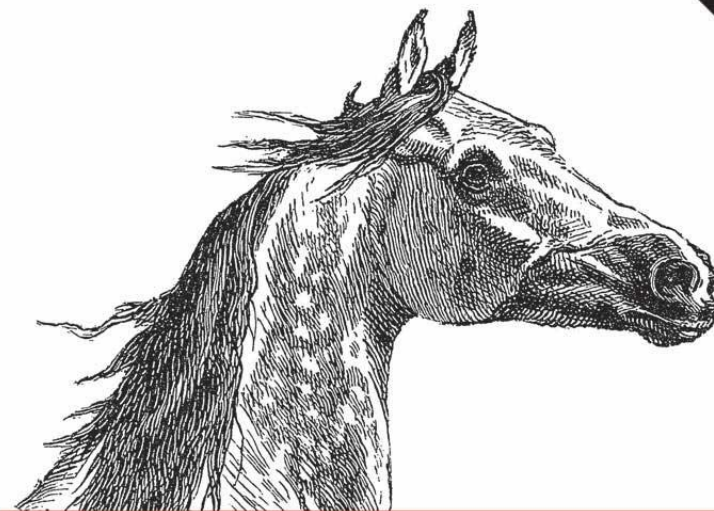UNIX Text Processing

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Revised & Updated

6th Edition

Learning

GNU Emacs

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Debra Cameron, Bill Rosenblatt & Eric Raymond

LINUX
IN A NUTSHELL

A Desktop Quick Reference

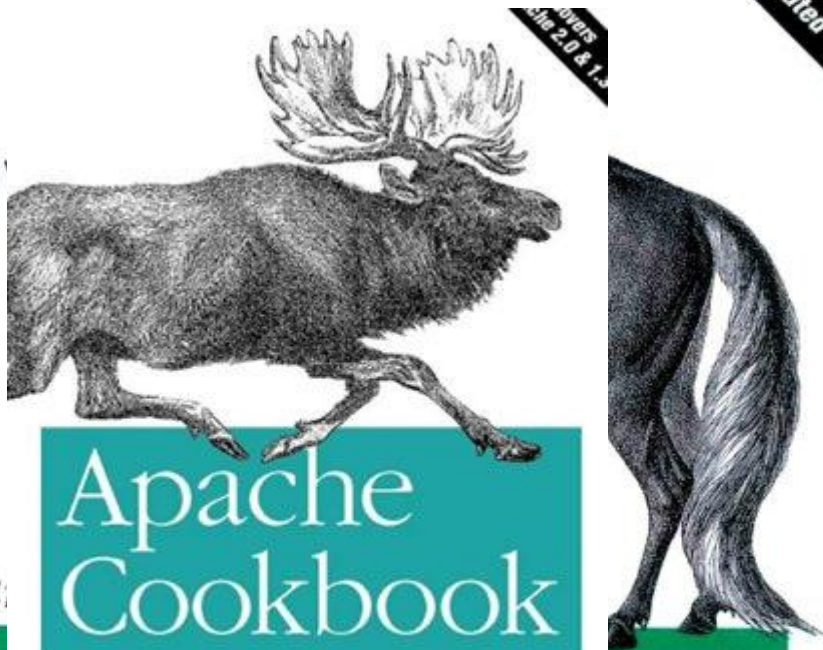**O'REILLY®**

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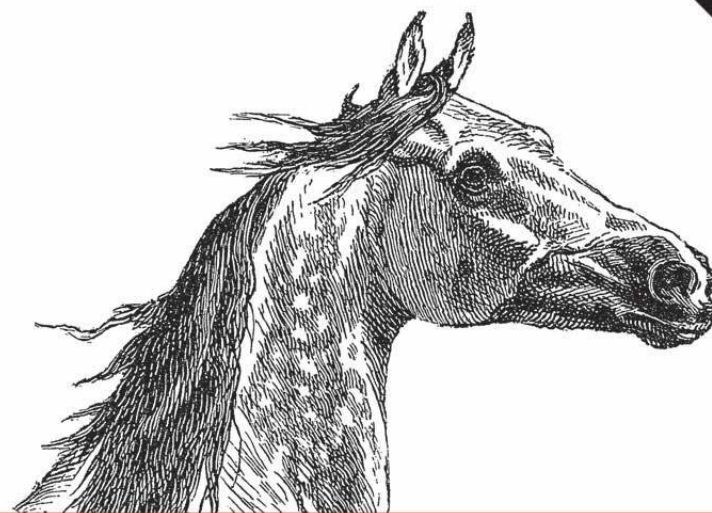Revised & Updated

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Practical C++
Programming

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Steve Oualline

O'REILLY®

Ellen Siever, Stephen Figgins,
Robert Love & Arnold Robbins

"Free Software" rhetoric alienates corporate customers

O'Reilly hosts conference to rename the movement. Stallman is not invited.

"open source"

Raymond starts the Open Source Initiative (OSI)

OSI
claims pragmatic benefits of *open source process*

"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."

Why "open source"?

- Moralizing "free software" rhetoric alienates corporations, is bad marketing
- OSI maintains that the open development process is responsible for success of e.g. Linux
- Peer review exposes bugs
- Transparency of process encourages intrinsic motivations of developers

Meanwhile,
Netscape and
Microsoft are
battling for
the web browser
market

Proprietary browsers threatening to fragment the HTML standard

Microsoft hit by anti-trust case
for bundling IE with Windows

Netscape releases Mozilla browser source code in last ditch effort

Why Mozilla?

- Monopoly power in proprietary segment of web technology (browsers) was overwhelming and threatening standards
- Releasing source code of failing product equalized the playing field
- Though marginal for some time, Mozilla reemerges in 2003 with the Firefox browser, gaining market share

The dot com boom goes bust

...enter the 2000's

The themes of the 90's replay themselves

Illegal peer-to-peer file sharing becomes a big deal

Piracy:
a return of Stallman's
moral order?

Creates a need for legal innovation

Lawrence "Larry" Lessig

Lawyer

Founds Creative Commons in 2001 -- copyleft for content

Popularizes "Free Culture" movement

Later,
Creative Commons
argues its licenses
provide *non-
infringing use* for
Grokster

Smartphones

- Open Handset Alliance
- "Android is intentionally and explicitly an open-source -- as opposed to a free software -- effort; a group of organizations with shared needs has pooled resources to collaborate on a single implementation of a shared product."
- "Jailbreaking" phones

Cloud

- O'Reilly warns Stallman that cloud-based applications make source openness irrelevant
- "Architectures of Participation" as more broad term
- Affero GPL?

"Open Government"

Barack Obama

President of the United States of America

Barack Obama

"My Administration is committed to creating an unprecedented level of openness in Government. We will work together to ensure the public trust and establish a system of transparency, public participation, and collaboration. Openness will strengthen our democracy and promote efficiency and effectiveness in government."

http://www.whitehouse.gov/open

It's a damn good meme

- Too good a meme?
- Discuss.