

Open Source

The Church of Emacs

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Overview

Overview

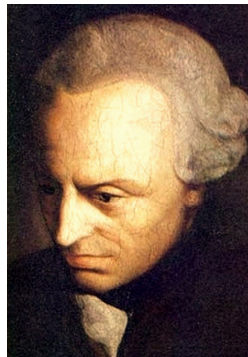
Open Source...

- ▶ Benefits users
 - ▶ Protects liberties
 - ▶ No DRM
- ▶ Is practical
 - ▶ No vendor lock in
 - ▶ Extensible
 - ▶ Repurposable
- ▶ Is good for the economy
 - ▶ Free of cost
 - ▶ Open innovation
 - ▶ Skilled community
- ▶ Is secure
 - ▶ Community of bug fixers
 - ▶ Provably secure instead of obscurity

Analysis

Stallman's Argument: Basis

- ▶ A deontological standpoint
- ▶ Stallman as an ethical essentialist
 - ▶ proprietary software
 - ▶ restricted data formats
 - ▶ internet services
 - ▶ surveillance
- ▶ “always bring up [free software] as an ethical issue” (Stallman, 2011, para. 63)



(Immanuel Kant (painted portrait), 2014)

Stallmans Argument: Logos

- ▶ Deductive reasoning
 - ▶ tobacco and proprietary software comparison (Stallman, 2011, para. 55)
- ▶ Contradictory premises
 - ▶ dismissing economics of free digital society (para. 34)
 - ▶ later addressing economics of digital media (para. 109)

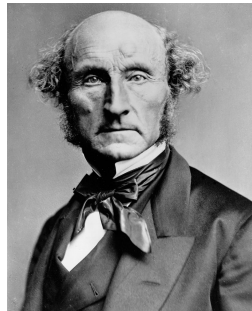
Stallmans Argument: Pathos

- ▶ Use of strong characterizations
 - ▶ “Computers are Stalins dream” (Stallman, 2011, para. 3)
 - ▶ All DRM should be illegal (para. 30)
- ▶ Strong appeals to tradition
 - ▶ values derived from a non-digital society
 - ▶ Amazon Kindle (para. 98)
- ▶ Calls Amazon Kindle (para. 98)
 - ▶ an immediate end to digital surveillance
 - ▶ you cant wait until there is another dictator (para. 13)

Practical Advantages of Open Source

Software for Freedom vs. Freedom for Software

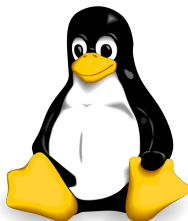
- ▶ Needs fulfilled by free software
 - ▶ a need for software
 - ▶ a need for ethical software and practices
- ▶ Stallman's emphasis on a "free digital society"
- ▶ Consequentialist stance on free software
 - ▶ open source vs. free software
 - ▶ a less radical approach
 - ▶ weighing the utility of open source
 - ▶ need-driven software (Bisson, 2007, p. 17)



(John Stuart Mill by London Stereoscopic Company, 2014)

GNU + Linux, GNU/Linux

- ▶ The GNU operating system
 - ▶ “written for your freedom” (Stallman, 2011, para. 48)
- ▶ The need for a kernel
 - ▶ 1990: GNU Hurd
 - ▶ 1991: Linux
- ▶ Fusion of Linux and GNU
 - ▶ GNU + Linux, or just Linux?
 - ▶ Torvalds vs. Stallman



(*Tux*, 2012), (*Heckert GNU white*, 2011)

Linux: open source success principles

- ▶ Using / creating the best tools for the job
- ▶ Not started with open source in mind (Torvalds, 2016, 3:30)
- ▶ Open source contributions
 - ▶ GPL and copyleft
 - ▶ Collaborative efforts and development
 - ▶ Formation of a communities around open-source code
- ▶ Flexibility
 - ▶ Availability of source code promotes reuse
 - ▶ power saving on Linux cellphone benefit Linux supercomputers (Zemlin, 2013, 11:34)

Another Success Story: Apache HTTP Server

- ▶ Most popular web server since 1995
- ▶ Open source project
- ▶ Inherited the NCSA Common Gateway Interface.
- ▶ Repurposed software components
 - ▶ enabling efficient software development (Bisson, 2007, p. 17)



(*Feather*, n.d.)

Preventing Obsolescence

- ▶ Vendor lock-in
 - ▶ warned against by Stallman (2011, para. 54)
- ▶ Proprietary software creates vendor dependency
 - ▶ maintenance
 - ▶ updates
 - ▶ support
- ▶ Case Study: Electronic voting machines (Colannino, 2012, p. 916)
 - ▶ migration to electronic voting machines
 - ▶ software escrow
 - ▶ code was licensed for testing, not deployment.

Quality Assurance

- ▶ Linus's Law
 - ▶ 6,782 lines of code added/subtracted from Linux daily (Zemlin, 2013, 12:03)
- ▶ Software peer-review
- ▶ Core developers and user developers
- ▶ Mozilla bug reports (Wang, Shih, & Carroll, 2015, p. 352)
 - ▶ value differences
 - ▶ skill differences
 - ▶ reciprocal skill transfer
 - ▶ disorganization preventable



(Mozilla Firefox logo 2013, 2014)

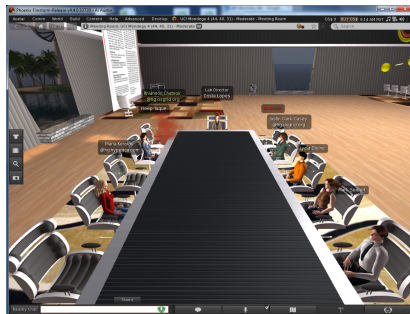
Economic Advantages of Open Source

Apache Web Server

- ▶ 66% of major sites (Powell, 2012, p 696)
- ▶ Web server development is expensive
- ▶ Lowers requirements for web companies
- ▶ Allows publication of ideas and research

Open Simulator

- ▶ Open entrepreneurship case study
- ▶ Powerful developer network
- ▶ Used to start software companies
- ▶ Sharing benefits all parties
- ▶ (Yetis-Larsson, Teigland, & Dovbysh, 2014)



(OSCC13 Track Leaders Meeting in UCI vLab, 2013)

Red Hat

- ▶ \$524M in revenue last quarter (Red Hat Inc., 2015, p. 24)
- ▶ Red Hat Enterprise Linux
 - ▶ “Free” alternative CentOS
- ▶ Support & Certifications
- ▶ Software licensed by GNU GPL
- ▶ Open technologies (ex. GlusterFS)

id Software

- ▶ Creators of Doom and Quake
- ▶ Example of delayed open source
- ▶ Doom engine
 - ▶ Cutting edge technology when released
 - ▶ Eventually outperformed by competitors
 - ▶ Open sourced engine 1997
 - ▶ Continued to sell content packs for engine
 - ▶ (Caulkins et al., 2013, p. 1188)
- ▶ Makes economic sense for companies to open source
- ▶ (Caulkins et al., 2013)

Economic Benefits

- ▶ Efficient use of human resources
- ▶ Reuse of works
- ▶ Shared knowledge
- ▶ Lower costs
- ▶ Greater quality of living
- ▶ Powerful community

Security Differences between Open Source and Closed Source

Security Through Obscurity

- ▶ Malicious hackers cannot see source
- ▶ Any code found is obfuscated
- ▶ In-house code reviews find bugs
- ▶ Developers have time to correct bugs

Security Through Transparency

- ▶ Community will find bugs
- ▶ Developers less likely to inset malicious code
- ▶ Users that find bugs can propose fixes quickly

Microsoft Office and Apache OpenOffice

- ▶ Microsoft Office had 108 total vulnerabilities
- ▶ OpenOffice had only 16
- ▶ Similar number of low severity vulnerabilities as listed by CVE
- ▶ Microsoft had 7 times as many medium and high severity ones
- ▶ Numbers could be influenced by speed of Apache's patches
- ▶ (Schryen, 2009)

Source Dependent Attacks

- ▶ Buffer Overflow
- ▶ SQL Injection
- ▶ Patch Reverse Engineering
- ▶ (Clarke, Dorwin, & Nash, n.d.)



Source Independent Attacks

- ▶ User Participation
- ▶ Brute Force
- ▶ Protocol Vulnerability
- ▶ Inside Jobs
- ▶ (Clarke et al., n.d.)

Conclusion

Practical Advantages

- ▶ Open source has practical advantages
- ▶ Hard to learn about workings of closed source
- ▶ Open source empowers users

Economics

- ▶ Entrepreneurs can build off OSS
- ▶ Lowered entry costs foster innovation
- ▶ Open source business offer value to others
- ▶ Easier maintenance of legacy code

Security

- ▶ Gives users confidence
- ▶ Active community minimizes vulnerabilities
- ▶ Same community deters malicious code

Closing Thoughts

- ▶ Stallman's ideas are not as radical as they seem
- ▶ Open source promotes freedom and learning
- ▶ Gives developers a starting point
- ▶ Suited for tinkerers
- ▶ Helps users feel involved and invested

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