

Beyond OpenSource Software



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Outline



- 1 Open and Free Software
- 2 The BCS OSSG
- 3 My Experience
- 4 Summary

Free(dom) Software



Definition of the Free Software Foundation (FSF)

- *Software which may be used, copied, studied, modified and redistributed ("free as in free speech"), but is not necessarily available for no charge [Wikipedia]*
- Source code **must** be open
- Various licenses are permissive like GPL, MIT, and Creative Commons (CC)

Ecosystem of free software (Example)

- The GNU Project is a free-software mass-collaboration project
 - ▶ Collection of useful software tools
 - ▶ Announced 1983 by Richard Stallman at MIT
 - ▶ Aim: to give computer users freedom and control in their use of their computers and computing devices

Why does Open/Freedom Matter for us?



Regarding Software

- Gives us liberty to work with software
 - ▶ Training: learn from others
 - ▶ Patch bugs
 - ▶ Enhance functionality/port it to other hardware
 - ▶ Quick prototyping of anything: stand on the shoulder of giants
- Increases trust into software
 - ▶ Is the software correct?
 - ▶ Does it respect my privacy?
- Prevent vendor lock-in: handle unwilling/bankrupt companies
 - ▶ Theoretically, provide unlimited support for software!
 - ▶ Switch support contract for software if you are not satisfied

Freedom matters for other material as well

Relevance of Freedom for other Artefacts



- Immaterial
 - ▶ Books, songs, video, **certification**
- Hardware
 - ▶ RISC-V (CPU), pacemaker, gas heater
- The license terms matter
 - ▶ Public domain
 - ▶ Open/permissive license
 - ▶ Proprietary
- Examples:
 - ▶ Wikipedia
 - ▶ Fan works (pics/texts/videos)
- Legislation is not keeping up with need
 - ▶ Derived work is often gray area
 - ▶ Books become public domain 50+y



Figure: A Non-Free Picture

The Open Source Initiative (OSI)



- Similar to FSF, formed 1998, but valuing commercial idea more
- Purpose: convince companies to see benefit of open source
- In contrast, FSF is concerned about ethic implications of freedom
 - ▶ Against threats to computer user freedom (DRM/software patents)
 - ▶ Dislikes a single non-free software piece (e.g., firmware)

Example that are open source but not free* software

- TiVo digital recorder ships with apps derived from open source
 - ▶ But users cannot modify it (signed software execution, like "secure boot")!

Truth About Open Source¹



- Open source is **secure!**
 - ▶ Security by obscurity is a typical misconception
- Open source is **licensed/legal** (albeit it may be free)
- **Big software companies** use open source
 - ▶ Actually: The **government** and **NHS** encourages open source!
- Open source comes with **support** (albeit enhanced support may cost sth.)
- Often, open source software is **reliable and has a high quality**
- Open source companies **own their intellectual property** but **share it!**
- Open source software is often **compatible** with proprietary

¹See also: <https://www.totara.lms.com/blog/10-common-myths-about-open-source>

Which Companies Use and Contribute to Open Source?²



- Adobe (250+ public repositories)
- Automaticc (Wordpress; powers 28% of the Internet)
- Canonical (Ubuntu, OpenStack)
- Cloudera, Hortonworks (Big Data company around Hadoop)
- Facebook (React; 15,682 contributors on GitHub)
- Microsoft (.NET development, Visual Studio, GitHub)
 - ▶ Windows 10 uses/becomes more and more Linux (WSL2+...)
- Google (2000 open source projects, Android, Chromium, Tensorflow)
- IBM (e.g. WebSphere)
- Intel
- NetFlix

²<https://www.datamation.com/open-source/35-top-open-source-companies-1.html>

Companies and Open Source



How to Make Money with OSS?

- Offer of an additional professional version (more features)
- Providing support
 - ▶ Very important for any commercial organization that depends on a product
- Sell products generated using OSS (e.g., GIMP, blender)
- Sell something that comes with OSS (Cloud, Android, Service model)
- Advertisement (on webpages or in the software)

Benefit for the companies by using OSS

- Contributions from externals
- Increased trust
- Train developers that may become future employees

Popular Open Source: The Linux kernel



- First Linux kernel release: September 17, 1991
- Available on <http://www.kernel.org>
- LOC: 20 Million!³

Management

- Clear maintenance policies⁴
- Managed using the Git version control system
- Maintainers: 1308+ for different subsystems
- Sometimes rough developers discussions (lately a Code of Conduct)

³<https://www.linuxcounter.net/statistics/kernel>

⁴<https://github.com/torvalds/linux/blob/master/MAINTAINERS>

Relevance of Linux



Market Share

- Desktop < 2% (a shame)
- Mobile 80% Android with Linux kernel !
- Embedded systems: most systems use Linux! (Windows < 8%)
- High-performance computing 100%
- Servers: widely used; even Azure cloud is now dominated by Linux

Reasons for the use of GNU/Linux

- Linux + most distributions are free as in freedom and cost nothing
- Long term maintenance, 20 year old programs can still be used
- Maturity of code
- Flexible and capable to run on any hardware system
- Rich ecosystem

British Computer Society's Open Source Specialist Group

The BCS OSSG aims to

- Educate and inform of Open Source and its implications
- Provide a reliable, honest and independent view of Open Source
- Encourage debate and examination of Open Source practice
- Reduce professional uncertainty around the subject of Open Source
- Act as a centre of expertise



Open Source Specialist Group

<https://ossg.bcs.org/>

Activities of the OSSG



- Organization of events
 - ▶ Monthly evening streamed meetings
 - ▶ Some all day workshops
 - ▶ Conference OSHCamp in August/September
 - ▶ Open for Business Conference Series
- Joined efforts
 - ▶ London Open Source Meetup
 - ▶ Quarterly RISC-V Meetups
 - ▶ OpenUK engagement
 - ▶ Trying to grow further: LLVM Meetups, ...
- Maintaining our web presence <https://ossg.bcs.org/>

About the OSSG



Members

- Members: 1600+
- Entrepreneurial leaders
 - ▶ Most common job title: "director" followed by "Senior Software Engineer"

Advocacy

- Blog on the webpage
 - ▶ Anyone welcome to submit articles revolving around open *
- YouTube [Channel](#)
- Twitter handle: @BCSOSSG
- Some surveys to understand our members' needs better

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My Experience with Free*



History

- Around 1998: First experience with SUSE Linux
- 2001-2004: Tried to replace Windows, used dual boot
- 2005: Only used Linux, if really needed: Windows in a VM
 - ▶ Distributions: Debian, SUSE, Gentoo, Slackware, Ubuntu (now)
 - ▶ I liked the moral implications of open source software
- Several minor patches to various open source repositories
- 2009+: I develop all useful software (openly) on GitHub
- Since then contributions to various open source projects
 - ▶ Companies look at code contributions (e.g., in GitHub) for hirings
- Involved in free/open certification of competencies in HPC

My Experience: The Bad



Open source development

- Sometimes difficult discussions with peers
- Dealing with licenses can be non-trivial

Using Linux and Open Source Software

- Sometimes time consuming when setting up new systems
 - ▶ Missing drivers (e.g., printers)
 - ▶ Unsupported hardware (but mostly not needed capabilities)
- Sometimes annoying dealing with relics from proprietary software
 - ▶ Using formats like CPT, DOCX, incompatibilities, ...
- Only fraction of PC games supported

My Experience: The Good



- Became more capable computer scientist
 - ▶ Better understanding; taking control of software and systems
 - ▶ Automation of literally all PC work that I dislike
 - ▶ Various programming languages + command line
 - ▶ Can resolve pretty much any hardware/software issue
- High productivity
 - ▶ Professional letters, CV, presentations, ...
 - ▶ Higher focus on content instead of layout
 - ▶ Updates to a new Linux distribution: 1 hour: everything works
- Never lost any data since switching to Linux and open source
 - ▶ Also no confusion with inaccessible file formats
- All software I use is free* and also costs nothing
 - ▶ I do not miss a single program from MS-world, replacements are out there
- I contributed to software that is used world-wide (motivating!)

Creation of this Slide Deck Used only Free Software



- Linux distribution: Ubuntu 20.04
- LaTeX Beamer for text setting
 - ▶ Had to create a template similar to UoR PPTX template first
 - ▶ Released the template under a permissive license
- Text editor: Atom
- Version management/backup: Git

Summary



- FSF and OSI support open source software
- Open source typically does not cost money directly
 - ▶ But please contribute patches to public development
 - Hidden costs is your time and devotion!
 - ▶ If you can't code but make quite some money using open source
 - Hire a company that contributes to open source
- I strongly believe in Open Source/Free* for any Artefact
 - ▶ Code is: transparent, secure, reliable, compatible, business-relevant
 - ▶ I dream of a world where digital data is accessible/free for everyone
 - Where training and certification is open as well...
 - ▶ Content creators shows patreon can work instead of Copyright...
- Join local activities
 - ▶ BCS Open Source Specialist group (it is free to attend meetings!)
<https://ossg.bcs.org>
 - ▶ OpenUK: open source software, open source hardware and open data
<https://openuk.uk/>

Useful Links



- Running Linux inside a VirtualBox: <https://www.lifewire.com/run-ubuntu-within-windows-virtualbox-2202098>
- Linux distro discussion for beginners: <https://itsfoss.com/best-linux-beginners/>
- Command line: <https://maker.pro/linux/tutorial/basic-linux-commands-for-beginners>
- Alternative software:
 - ▶ <https://opensource.com/alternatives>
 - ▶ <https://alternativeto.net/>
 - ▶ <https://www.datamation.com/open-source/78-open-source-replacements-for-expensive-applications-1.html>
 - ▶ <http://guides.library.kumc.edu/freeware/popware>
- <https://opensource.org/osd>
- <https://openuk.uk/>