Intellectual Property and Information Technology

Free and Open Source Software

Free as in Freedom

- A paper jam: the MIT AI Lab printer
- Non-disclosure agreement in Computer Science
- Richard Stallman: «[t]he easy choice was to join the proprietary software world, signing nondisclosure agreements and promising not to help my fellow hacker. Most likely I would also be developing software that was released under nondisclosure agreements, thus adding to the pressure on other people to betray their fellows too.[...] I had already experienced being on the receiving end of a nondisclosure agreement, when someone refused to give me and the MIT AI Lab the source code for the control program for our printer. So I could not tell myself that nondisclosure agreements were innocent. I was very angry when he refused to share with us; I could not turn around and do the same thing to everyone else.»

Free as in Freedom

- 1984: Stallman resigns from MIT AI Lab
- 1985:
  - GNU's Not Unix: the GNU Manifesto
  - Free Software Foundation
  - GNU EMACS with a license that permits:
    - Free (as in beer) redistribution
    - Binary distribution with the offer of the source code
- 1989: GNU General Public License: «[w]hen we speak of free software, we are referring to freedom, not price. Specifically, the General Public License is designed to make sure that you have the freedom to give away or sell copies of free software, that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.»

Free as in Freedom

- GNU General Public License:
  - Based on the EMACS Commune of the mid '70s without the requirement to publish every modification of the code:
    - «[i]t was wrong to require people to publish all changes, it was wrong to require them to be sent to one privileged developer. That kind of centralization and privilege for one was not consistent with a society in which all had equal rights.»
  - Sophisticated use of Copyright Law:
    - «[c]opyleft uses copyright law, but flips it over to serve the opposite of its usual purpose: instead of a means of privatizing software, it becomes a means of keeping software free. The central idea of copyleft is that we give everyone permission to run the program, copy the program, modify the program, and distribute modified versions - but not permission to add restrictions of their own. Thus, the crucial freedoms that define "free software" are guaranteed to everyone who has a copy; they become inalienable rights.»

Free as in Freedom

- GNU General Public License grants:
  - The freedom to run the program, for any purpose (freedom 0).
  - The freedom to study how the program works, and adapt it to your needs (freedom 1). Access to the source code is a precondition for this.
  - The freedom to redistribute copies so you can help your neighbor (freedom 2).
  - The freedom to improve the program, and release your improvements to the public, so that the whole community benefits (freedom 3). Access to the source code is a precondition for this.

Free as in Freedom

- GNU GPL and copyleft:
  - Redistribution of the original work or of a modified version must be done under the terms and conditions of the GNU GPL
  - No further restrictions can be applied to the program

Free as in Freedom

- GNU GPL as a contract:
  - § 5: «You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.»

Free as in Freedom

- GNU GPL exclusion of warranty and limitation of liability:
  - BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.
  - 12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Free as in Freedom

- GNU Library (the Lesser) General Public License:
  - Created for releasing the GNU C Library: «The reason we have a separate public license for some libraries is that they blur the distinction we usually make between modifying or adding to a program and simply using it. Linking a program with a library, without changing the library, is in some sense simply using the library, and is analogous to running a utility program or application program. However, in a textual and legal sense, the linked executable is a combined work, a derivative of the original library, and the ordinary General Public License treats it as such.»

GNU Operating System

- 1991:
  - Emacs, GCC, system libraries and utilities
  - No kernel for the GNU operating system available

GNU and Linux

- 1991:
  - Linus Torvalds releases Linux (October 1991)
  - From version 0.12 Linux is covered by the GNU GPL (5th November 1992)

GNU and Linux

- Linux Development Model:
  - Different from other free software project
  - Informal distributed contribution
  - Use of the Internet (email, patches, etc.)
  - Informal hierarchy

GNU and Linux

- GNU Development Model:
  - Centralized
  - Role of the Free Software Foundation
  - Fiduciary License Agreement: each contribution confers her exclusive rights to the FSF
    - Problem of the enforcement of collaborative works
  - Formal hierarchy

GNU and Linux

- GNU/Linux:
  - The first complete free operating system: Linux kernel and GNU (and BSD system utilities)
  - Linux Distributions to collect the needed components of the operating system and provide the users with a simple installation process:
    - Origins of a GNU/Linux market

Berkeley Software Distribution (BSD)

- University of California at Berkeley: during the '70s a research center deeply involved in the development of Unix related technologies
- 1978:
  - Bill Joy creates the first Berkeley Software Distribution:
    - an editor
    - a PASCAL compiler
  - The BSD was available for systems with a regular AT&T Unix license

Berkeley Software Distribution (BSD)

- 1979:
  - DARPA asks Berkeley to develop a TCP/IP stack for the Unix OS to be used for the Internet
- Creation, at Berkeley, of the Computer Systems Research Group (CSRG):
  - in 1983 BSD 4.2 with a new TCP/IP stack was released (it still required a AT&T license)
  - 1989: release of the Internet stack alone (that doesn't require an AT&T license): BSD Network Release 1as free software
  - 1991: release of the BSD Network Release 2: a complete Unix-like OS, without AT&T code (except for 6 files)
  - 1992: 386/BSD without any AT&T files

Berkeley Software Distribution (BSD)

- Starting form 386/BSD many independent developers start working on their version of BSD:
  - NetBSD (1993)
  - FreeBSD (1993)
  - OpenBSD (1996)
- Berkeley Software Distribution Incorporated (BSDI): in 1992 start selling commercial version of the BSD code as the UNIX operating system:
  - Sued by AT&T for copyright infringement and trademark related issues

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Berkeley Software Distribution (BSD)

- AT&T sells Unix copyright to Novel
- Novel reaches an agreement with Berkeley (1994):
  - BSD is eventually free software

GNU, Linux and BSD

- During the '90s:
  - Porting of the OS to many hardware architectures
  - Free software as a world wide movement:
    - Cheap Internet connection for private individuals
    - Increasing contributions
    - Increasing number of projects: Apache, MySQL, GNOME, KDE, etc.
  - Increasing interest of the business community

Open Source Initiative

- Eric Raymond: «the word *free* makes corporate people nervous...[W]e now have a pragmatic interest in converting these people rather than thumbing our noses at them. There's now a chance we can make serious gains in the mainstream business world without compromising our ideals and commitment to technical excellence - so it's time to reposition. We need a new and better label.»
- Open Source Initiative: instead of adopting a single license, as the FSF, adoption of an Open Source Definition

Open Source Initiative

- Open Source Definition:
  - Proliferation of Free Software Licenses
  - Almost 60 free software licenses approved by the OSI

Open Source Initiative

- Proliferation of Free Software Licenses
  - May jeopardize free software movement:
    - Compatibility issues
    - Difficulties in software reuse

Open Source Initiative

- Proliferation of Free Software Licenses: Compatibility issues
  - Copyleft vs non-copyleft
  - Example: GNU GPL and Apache License