Engineering Law, Ethics and Professionalism

BCIT – Engineering – Mech 8260 & Elex7880

Software, Computer and Internet Ethics

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January 15 2018

Topics Covered

- What is Open Source Software?
- A One-Slide History of Open Source Software
- The Open Source Development Model
- Why Companies Use (and Don't Use) Open Source Software
- Open Source Licensing Strategies
- Open Source Licenses and "Copyleft"
- Open Source Issues in Corporate Transactions
- Relevant Cases and Disputes
- Open source vs. Freeware vs. Shareware
- Site Licensing
- Software Maintenance
- Computer and Internet Ethics

What is Open Source Software?

Open Source software is software licensed under an agreement that conforms to the *Open Source Definition*

- Access to Source Code
- Freedom to Redistribute
- Freedom to Modify
- Non-Discriminatory Licensing (licensee/product)
- Integrity of Authorship
- Redistribution in accordance with the Open Source License Agreement

What is Open Source Software?

Any developer/licensor can draft an agreement that conforms to the OSD, though most licensors use existing agreements

- GNU Public License ("GPL")
- Lesser/Library GNU Public License ("LGPL")
- Mozilla Public License
- Berkeley Software Distribution license ("BSD")
- Apache Software License
- MIT X11 License
- See complete list at <u>www.opensource.org/licenses</u>

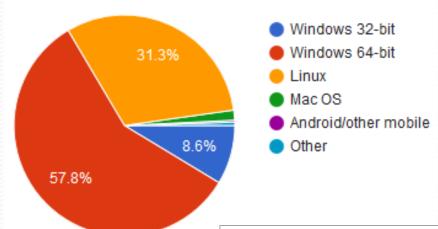
Examples of Open Source Software

- Linux (operating system kernel substitutes for proprietary UNIX)
- Apache Web Server (web server for UNIX systems)
- MySQL(Structured Query Language competes with Oracle)
- Cloudscape, Eclipse (IBM contributions)
- OpenOffice(Microsoft Office Alternate)
- SciLab, FreeMat and Octave (Powerful Matlab alternate)
- Gimp, Krita, Piant.net, ChocoFlop, CinePaint,
 Pixia(Photoshop Alternates)

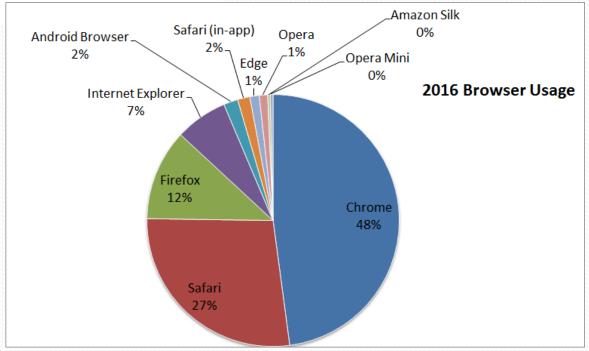
A One-sided History of Open Source Software

- 1984 Richard Stallman founds the Free Software Foundation ("FSF") (www.fsf.org) in 1985 to develop "free" version of a UNIX operating system Promulgates GNU Public License ("GPL") 1994 – Linux 1.0 is release under the GPL by LinusTorvalds
- 1998 Open Source Initiative ("OSI") is founded <u>www.opensource.org</u>
- Coins term "Open Source" Certifies and lists open source licenses that conform to the OSD
- 2003 Linux OS/Apache Web Server are mainstream (27% and 70% of markets, respectively)
- http://www.opensource.org/licenses/alphabetical

Operating System and Browser Users



Source: https://www.palemoon.org/survey2017/



Proprietary vs. Open Source Licensing Models

Proprietary Model	Open Source Model
Licensor distributes object code only; source code is kept a trade secret	Licensor distributes source code
Modifications are prohibited	Modifications are permitted
All upgrades, support and development are done by licensor	Licensee may do its own development and support or hire any third party to do it
Fees are for the software license, maintenance, and upgrades	Fees, if any, are for integration, packaging, support, and consulting
Sublicensing is prohibited, or is a very limited right	Sublicensing is permitted; licensee may have to distribute the source code to program and modifications

Why Some Companies Use Open Source Software

- Cost savings
- Stability
- No forced upgrades
- Access and broad rights to source code
- Access to skilled community of developers
- Ability to define and expedite new development

Why Some Companies Don't Use Open Source Software

- "Free like a puppy"
- Migration costs
- Uncertainty about open development model
- Lack of IP warranties and indemnities
- Lack of performance warranties
- Copyleft provisions of GPL, LGPL and similar licenses

Open Source Licensing Strategies

- Support & Maintenance
- Patronage
- Dual License
- Consulting
- Web-Based Services
- Monetize Code from '99?

Open Source Licenses

- Over 50 approved open source approved licenses <u>https://opensource.org/licenses/alphabetical</u>
- The following OSI-approved licenses are popular, widely used, or have strong communities:
- Apache License 2.0
- BSD 3-Clause "New" or "Revised" license
- BSD 2-Clause "Simplified" or "FreeBSD" license
- GNU General Public License (GPL)
- GNU Library or "Lesser" General Public License (LGPL)
- MIT license
- Mozilla Public License 2.0
- Common Development and Distribution License
- Eclipse Public License

Two widely used open source licenses have "Copyleft" provisions

- GNU Public License ("GPL")
- Lesser GNU Public License or Library GNU PublicLicense ("LGPL"

License Rights Granted under the GPL

- Licensee may <u>run</u> the Program
- Licensee may <u>copy and distribute</u> verbatim copies of the Program's source code
- Licensee may <u>create "derivative works"</u> of the Program
- Licensee may <u>distribute such derivative works</u>

 If a licensee of a Program distributes that Program, or any "work based on the Program," such licensee must:

- also distribute the source code for the Program and for the work based on the Program, and
- cause such works to be licensed at no charge under the terms of the GPL

A "work based on the Program" is:

- the Program itself, and
- "any derivative work under copyright law; that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language"

 Exceptions: works that are not "works based on the Program"

- "identifiable sections of [a] work ... not derived from the [GPL'ed software] ... that can be reasonably considered independent and separate works in themselves ... when you distribute them as separate works"
- "mere aggregation of another work not based on the Program ... on a volume of a storage or distribution medium

Key Lesser General Public License ("LGPL") Terms

- Very similar to the GPL
- Intent is to promote use of certain Libraries in conjunction with "non-free" programs
- Contains exception for linking "works that use the library" to proprietary programs, which mitigates some Copyleft concerns

Copyleft under the LGPL

The LGPL has the same Copyleft obligations as the GPL, except:

- A work that uses only "numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines . . . or less)" is not subject to Copyleft obligations
- a work that contains no derivative of any portion of the [GPL'd] Library, but is designed to work with the Library by being compiled or linked with the Program, is not subject to Copyleft obligations

Other Open Source Licenses

Permissive Approach – Berkeley Software Distribution ("BSD")/Apache Software License

- Modifications may be proprietary
- Distribution in source code or object code permitted, provided . . .
 - Copyright notice & liability disclaimer included
 - Contributors' names are not used to endorse products

Other Open Source Licenses

Moderate Approach: Mozilla Public License

- Can combine open source and proprietary software without tainting proprietary software
- Must keep proprietary and open source code in separate files
- Contributors grant an express patent license to patents that cover the original MPL code and any modifications used by that contributor
- License terminates if a licensee commences patent litigation against the initial developer or a contributor with respect to (1) the MPL code, or (2) any other software/hardware/device of such parties

Enforcement and Remedies

Enforcement

- Diffuse set of licensors makes enforcement difficult
- Developers may assign their copyrights to the FSF
- FSF takes "enforcement actions," but has not litigated a case
- Interpretation of GPL/LGPL is difficult
- Litigation is increasing

Remedies

- Termination of license rights
- Injunction; possibly statutory damages.
- Public condemnation by Open Source community

Managing Open Source Software (Inbound)

Manage the Code Base

- Keep a log of all third party software
- Track all Open Source licenses
- Review Open Source licenses for modifications
- Audit and update records regularly— Be prepared for the next investor/acquiror

Empower the Engineers

- Conduct license training
- Include license descriptions on company intranet
- Establish categories of risk and clear procedures

Call In Legal

Managing Open Source Software (Outbound)

- Audit lineage of code base
- Determine Open Source strategy
- Choose appropriate license
- Appoint maintainer and other team members to guide developer community
- Establish listserv or website for developer community

Open Source Issues in Corporate Transactions

Buyer/Investor Concerns:

- Does target use any Open Source software?
- Where and how is the Open Source software used?
 - Internal systems only often OK
 - Products it distributes requires further investigation
- Which licenses is the target subject to?
- What resources would be required to replace the code subject to Copyleft?

Open Source Comparison

Capabilities (Without Application Licensing Restriction)	GPL (Linux)	Dual-GPL (MySQL)	LGPL/MPL (OpenOffice, Firefox)	Apache/BSD (Apache, FreeBST)
1) Download	1	✓	✓	✓
2) Evaluate	1	1	1	1
3) Deploy	1	1	✓	✓
4) Redistribute	⊘ ¹	√ 3	1	✓
5) Modify	⊘ ²	⊘²	⊘²	✓ ⁴

- 1) Application needs to be licensed under GPL if redistributed with the GPL asset.
- Library code modifications need to be licensed under the same license as the originating asset.
- 3) Usually requires a commercial license from the copyright holder.
- Although much more permissive than an OSI license, some BSD based licenses, such as Apache V2, still have some copyleft materials.

Relevant Cases & Disputes

SCO (a Canopy Group company formerly called Caldera Systems and Caldera International) vs. IBM

Highlights risk of distributing third party code under an Open Source license

Computer Assoc. Int'l Inc. v. Quest Software Inc. (N.D. Ill., 02 C 4721, order 8/3/04) Output of GPL-licensed code is not necessarily subject to GPL

Shareware

A type of software where the software rights are copyrighted by the programmer/company, and the usage:

- Disabled features or more commonly, time bomb.
- Nag screen when the evaluation time is up, asking you to purchase OR You must uninstall it.
- Source code is not available, as it is proprietary to the company/developer who coded it.
- Normally, with smaller programs, the application will still function fully, but nag you until you buy or uninstall it.
- With larger commercial products, the application will typically stop functioning, and uninstalling it and re-installing it doesn't make a difference!

Some examples:

- Winzip, WinRar,
- Office Viewer
- Apache Office, Libre office, NeoOffice,
- http://en.wikipedia.org/wiki/Freeware

Freeware

- A type of software where the software rights are copyrighted by the programmer/company, but use of said software is free with no financial obligation.
- In many cases, the freeware software might be a stripped down version (but not limited by time, and requires no obligation to the developer/company) of a full-featured commercial product offered by the company.
- In many other cases, however, the software is offered for free because either the company has other products that make their money as their industry focus, or the developer is a freelancer who writes code for fun.

Some examples:

- Mozilla Firefox, Google Chrome.
- The voice-over-IP service Skype, PDF file reader Adobe Acrobat.
- Octave, Scilab, FreeCAD, nanoCAD,
- AVG Anti-Virus Free, Microsoft Security Essentials.
- https://www.google.ca/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=freeware%20exasmples

WAREZ

Microsoft Windows

The system has recovered from a serious error.

A log of this error has been created.

Please tell Microsoft about this problem.

We have created an error report that you can send to help us improve Microsoft Windows. We will treat this report as confidential and anonymous.

To see what data this error report contains, click here.

Send Error Report



WARNING!

The system is either busy or has become unstable. You can wait and see if it becomes available again, or you can restart your computer.

- * Press any key to return to Windows and wait.
- * Press CTRL+ALT+DEL again to restart your computer. You will lose unsaved information in any programs that are running.

Press any key to continue



WARNING! Your system is infected. It is necessary to improve PC security.

A problem has been detected and windows has been shut down to prevent damage to your computer.

IRQL_NOT_LESS_OR_EQUAL

If this is the first time you've seen this Stop error screen, restart your computer. If this screen appears again, follow these steps:

Check to make sure any new hardware or software is properly installed. If this is a new installation, ask your hardware or software manufacturer for any windows updates you might need.

If problems continue, disable or remove any newly installed hardware or software. Disable BIOS memory options such as caching or shadowing. If you need to use Safe Mode to remove or disable components, restart your computer, press F8 to select Advanced Startup Options, and then select Safe Mode.

Technical information:

Collecting data for crash dump ...
Initializing disk for crash dump ...
Beginning dump of physical memory.
Dumping physical memory to disk: 95

MIT License (X11 license or MIT X license)

- The MIT License (also known as the X11 license or MIT X license) is a <u>software</u> license that was originally developed at the Massachusetts Institute of Technology.
- It is similar to the <u>BSD license</u>, which was first used for the *Berkeley Source Distribution*, a version of <u>UNIX</u> that was developed at the University of California at Berkeley (UCB).
- The *main difference* is that BSD-style licenses sometimes contain a clause prohibiting the use of the name of the copyright holder in promotions without permission.
- Both the MIT and BSD licenses are considered to be more liberal than the <u>GNU</u> Public License (GPL), which is by far the most frequently used <u>free software</u> license. The reason for this is that the GPL requires that:
 - (1) all software derived from GPL-licensed software must also be released under the GPL license and
 - (2) all re-distributions of GPL-licensed software, including modified versions or software derived from GPL-licensed software, must make the full <u>source</u> <u>code</u> freely available.

Freeware Vs Shareware

	Freeware	Shareware
About	Freeware refers to software that anyone can download from the Internet and use for free.	Sharewares give users a chance to try the software before buying it.
Inception	The term freeware was first used by Andrew Fluegelman in 1982, when he wanted to sell a communications program named PC-Talk.	In 1982, Bob Wallace produced PC-Write, a word processor, and distributed it as a shareware. The term was first used in 1970, in InfoWorld magazine.
License and Copyright	User license or EULA (End User License Agreement) is an important part of freeware. Each license is specific to the freeware. Copyright laws are also applicable to Freeware.	Copyright laws also apply to Shareware but the copyright holder or author holds all the rights, with a few specific exceptions.
Features	All the features are free.	Most of the times, all features are not available, or have limited use. To use all the features of the software, user has to purchase the software.
Distribution	Freeware programs can be distributed free of cost.	Shareware may or may not be distributed freely. In many cases, author's permission is needed, to distribute the shareware.
Example	Adobe PDF, Google Talk, yahoo messenger, MSN messenger	Winzip, Cuteftp, Getright
Advantage	Freeware is free, and is covered by copyright	Shareware is free, can be copied and is covered by copyright.
Disadvantage	You can't sell freeware software and modified software must be freeware.	Shareware cannot be modified, and it may be either a cut down or temporary version.

Software Licensing

Site License

- A site license is a type of software license and a legal agreement that:
- Allows all users to run a software package simultaneously.
- The name originally derives from the practice of restricting the use of a particular
 piece of software by physical site rather than by, for instance, the number of copies in
 use.
- The term "site license" is now commonly used to describe licensing of software to a particular entity which is unrestricted by number, regardless of the physical locations where the software may be used.
- A site license is used when purchasing software for single site usages but with multiple users. It denotes the usage of purchased, rights-protected work used by multiple users at a single location. These users are granted permission to access copy protected work, but only at that particular location.
- Agreements of site licenses sometimes include a set of limitations on the number of software copies made by end users. Simultaneous computer usage of copyrighted digital information is made possible by site licensure.
- Site licensing is less costly than purchasing multiple copies of protected works.
 However, users cannot take copies of the digital media outside of the location
 specified in the site license. Site license agreements must be observed for license
 holders to protect themselves against liability.
- BCIT has a site license for many software packages and will be held liable if any of the faculty/students take it home and install on personal computers.

Licensing and Software Maintenance

- Why purchase Software Maintenance?
- How Software Maintenance works
- What happens if my Software Maintenance expires?
- Software Maintenance Pricing
- User count increase and Software Maintenance
- How do I register my Software Maintenance?
- Can I change or move a registered license to another system?
- Are there any limitations to the software with a trial license?

Updates, hotfix, patches, Service Pack

<u>Updae?</u>

 Incremental update between service packs or software versions to fix multiple outstanding issues

Hotfix?

- A hotfix is a single, cumulative package that includes one or more files that are used to address a problem in a software product (i.e. a software bug).
- Typically, hotfixes are made to address a specific customer situation and may not be distributed outside the customer organization, not always publicly released.

Patch?

Publicly released update to fix a known bug/issue

Service Pack?

 Service Pack - Large Update that fixes many outstanding issues, normally includes all Patches, Hotfixes, Maintenance releases that predate the service pack

Computer and Internet Ethics

Ten Commandments of Computer Ethics

- Do not use a computer to harm other people.
- Do not interfere with other people's computer work.
- Do not snoop around in other people's computer files.
- Do not use a computer to steal.
- Do not use a computer to bear false witness
- Do not copy or use proprietary software for which you have not paid.
- Do not use other people's computer resources without authorization or proper compensation.
- Do not appropriate other people's intellectual output.
- Do think about the social consequences of the program you are writing or the system you are designing.
- Do always use a computer in ways that ensure consideration and respect for your fellow humans.

Do not use a computer in ways that may harm other people.

- This commandment says that it is unethical to use a computer to harm another user.
- It is not limited to physical injury. It includes harming or corrupting other users' data or files.
- It is wrong to use a computer to steal someone's personal information.
- Manipulating or destroying files of other users is ethically wrong.
- It is unethical to write programs, which on execution lead to stealing, copying or gaining unauthorized access to other users' data.
- Being involved in practices like hacking, spamming, phishing or cyber bullying does not conform to computer ethics.

Do not use computer technology to cause interference in other users' work.

- Computer software can be used in ways that disturb other users or disrupt their work. Viruses, for example, are programs meant to harm useful computer programs or interfere with the normal functioning of a computer.
- Malicious software can disrupt the functioning of computers in more ways than one. It may overload computer memory through excessive consumption of computer resources, thus slowing its functioning. It may cause a computer to function wrongly or even stop working.
- Using malicious software to attack a computer is unethical.

Commandment 3 Do not spy on another person's computer data.

- We know it is wrong to read someone's personal letters.
- On the same lines, it is wrong to read someone else's email messages or files.
- Obtaining data from another person's private files is nothing less than breaking into someone's room.
- Snooping around in another person's files or reading someone else's personal messages is the invasion of his privacy.
- There are exceptions to this. For example, spying is necessary
 and cannot be called unethical when it is done against
 illegitimate use of computers. For example, intelligence agencies
 working on cybercrime cases need to spy on the internet activity
 of suspects.

Commandment 4 Do not use computer technology to steal information.

- Stealing sensitive information or leaking confidential information is as good as robbery.
- It is wrong to acquire personal information of employees from an employee database or patient history from a hospital database or other such information that is meant to be confidential.
- Similarly, breaking into a bank account to collect information about the account or account holder is wrong.
- Illegal electronic transfer of funds is a type of fraud. With the use of technology, stealing of information is much easier.
 Computers can be used to store stolen information.

Commandment 5 Do not contribute to the spread of misinformation using computer technology.

- Spread of information has become viral today, because of the Internet. This also means that false news or rumors can spread speedily through social networking sites or emails.
- Being involved in the circulation of incorrect information is unethical.
- Mails and pop-ups are commonly used to spread the wrong information or give false alerts with the only intent of selling products. Mails from untrusted sources advertising certain products or spreading some hard-to-believe information, are not uncommon.
- Direct or indirect involvement in the circulation of false information is ethically wrong.

Refrain from copying software or buying pirated copies. Pay for software unless it is free.

- Like any other artistic or literary work, software is copyrighted.
- A piece of code is the original work of the individual who created it. It is copyrighted in his name.
- In case of a developer writing software for the organization he works for, the organization holds the copyright for it.
- Copyright holds true unless its creators announce it is not.
 Obtaining illegal copies of copyrighted software is unethical.

Commandment 7 Do not use someone else's computer resources unless authorized to.

- Multi-user systems have user specific passwords. Breaking into some other user's password, thus intruding his private space is unethical.
- It is not ethical to hack passwords for gaining unauthorized access to a password-protected computer system.
- Accessing data that you are not authorized to access or gaining access to another user's computer without his permission is not ethical.

It is wrong to claim ownership on a work which is the output of someone else's intellect.

- Programs developed by a software developer are his/her property. If he is working with an organization, they are the organization's property.
- Copying them and propagating them in one's own name is unethical.
- This applies to any creative work, program or design.
- Establishing ownership on a work which is not yours is ethically wrong.

Commandment 9 Before developing a software, think about the social impact it can have.

- Looking at the social consequences that a program can have, describes a broader perspective of looking at technology.
- A computer software on release, reaches millions. Software like video games and animations or educational software can have a social impact on their users.
- When working on animation films or designing video games, for example, it is the programmer's responsibility to understand his target audience/users and the effect it may have on them. For example, a computer game for kids should not have content that can influence them negatively.
- Similarly, writing malicious software is ethically wrong. A software developer/development firm should consider the influence their code can have on the society at large.

Commandment 10 In using computers for communication, be respectful and courteous with the fellow members.

- The communication etiquette we follow in the real world applies to communication over computers as well.
- While communicating over the Internet, one should treat others with respect.
- One should not intrude others' private space, use abusive language, make false statements or pass irresponsible remarks about others.
- One should be courteous while communicating over the web and should respect others' time and resources. Also, one should be considerate with a novice computer user.

Internet Law - Overview

• Internet law:

- Is probably changing as you are reading this.
- This changing face of the internet and laws affects everything from e-commerce, software, intellectual property, media and communications, privacy and defamation.
- Multi-disciplinary nature of the Internet itself.
- Need To watch out for:
 - Should we download or NOT !! OR until get caught !!
 - Web Cams !!
 - Computer gets taken over by someone? Too Slow?
 - Clean your computer for free.
 - Click here for best results !!
 - Java Update !! Can confirm the author BUT !!
 - Additional items installed when installing stuff: Adobe, ccleaner, AVG for free.

Canadian Laws - What's the latest



Can the authority/Govt get to you?

- If there is a breach of something .. Monitor your Internet habits? Sites visited? Patter of stored images? Hard drive? Cloud?
- Get your IP Address? Then Get your MAC address?
- Can also trap using wireless access (WiSpy)
- Just show up at your door? Middle of the night?
- Sasktel's director of external communications, who added they expect to give out 100 notices a day. He added the majority of people who are served notices actually stop downloading material illegally. (Source: Global News, December 10, 2014 3:52 pm)
- Don't bother deleting quickly .. Looks even worse.
- Forensics makes pulling data possible from even dead-drives.
- Time stamps of everything you do and then need a lawyer and lots of \$\$\$.
- May be ... just May be it's not you ? Recall yesterday Royank fiasco on News?



http://www.huffingtonp ost.ca/news/canadainternet-law/



http://www.cbc.ca/news/technology/internet-users-privacy-upheld-by-canada-s-top-court-1.2673823

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