Open Source in Industry: Open Innovation, Copyright Law and Licensing

Legal Heidelberg OSADL Talks, April 28, 2020, Online Session 1

What is Open Innovation, what is Open Source? Basics of international copyright law Principle of a software license What is copyleft, what is a derivative work?





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What is "Open Innovation"?

Joint Research and Development

- Goal of participating companies and institutions: Joint added value
- Underlying concept: Open knowledge economics
- Type of organization: Collaborative environments





What are the possible advantages of Open Innovation?

User and provider

- Standardization of hardware and software interfaces
- Larger base of knowledge, expertise and experience
- Avoiding unnecessary parallel development
- Reduction of development cycles

User

• Participation at the innovation process

Provider

• Satisfied users





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Open Source in Industry: Open Innovation, Copyright Law and Licensing Legal Heidelberg OSADL Talks, April 28, 2020, Online Session 1 Open Source Automation Development Lab (OSADL), Heidelberg



Cost reduction

How old is "Open Innovation"?

- "Open Innovation" is known and actively pursued since the 70s of the last century.
- The term "Open Innovation" has become popular only later.
- Henry Chesbrough contributed a number of books and articles on economical and political aspects of "Open Innovation".















The pyramid of differentiation













The pyramid of differentiation

























What is Open Source software?

- The term "Open Source" looks like if these were English words, but they are not. Instead it is a technical term that never can be translated into another natural language. The original form "Open Source" must always be used irrespective in which context, country or language.
- "Open Source" software denotes a particular software the holders of rights of which have decided to allow everyone
 - to unrestrictedly and unconditionally use, analyze and modify the software
 - to copy and distribute the software under very liberal conditions.
- A particular software may not be called "Open Source", unless the above requirements are fulfilled. Details of these requirements are, for example, given in the Open Source Definition (OSD) released by the Open Source Initiative (OSI, https://opensource.org/OSD).
- Please note: A software may be available in source code form, but this certainly does not mean that it automatically becomes "Open Source" software.





Action	Proprietary software		Open Source software	
	What is needed?	By whom/ why?	What is needed?	By whom/ why?
Run the software	End User License Agreement (EULA)		Access to the software	
Analyze the software	Normally not permitted		Access to the software	
Modify the software	Normally not permitted		Access to the software	





Action	Proprietary software		Open Source software	
	What is needed?	By whom/ why?	What is needed?	By whom/ why?
Run the software	End User License Agreement (EULA)	Drahihitad	Access to the software	Permitted
Analyze the software	Normally not permitted	Prohibited by the authors	Access to the software	by unilateral declaration of will of the
Modify the software	Normally not permitted	dutions	Access to the software	authors





Action	Proprietary software		Open Source software	
	What is needed?	By whom/ why?	What is needed?	By whom/ why?
Run the software	End User License Agreement (EULA)	Dechibited	Access to the software	Permitted
Analyze the software	Normally not permitted	Prohibited by the authors	Access to the software	by unilateral declaration of will of the
Modify the software	Normally not permitted	dutions	Access to the software	authors
Copy and distribute unmodified software	License		License	
Copy and distribute modified versions of the software	Normally not permitted		License	





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	What is needed?	By whom/ why?	What is needed?	By whom/ why?
Run the software	End User License Agreement (EULA)	Drehibited	Access to the software	Permitted
Analyze the software	Normally not permitted	Prohibited by the authors	Access to the software	by unilateral declaration of will of the
Modify the software	Normally not permitted	autions	Access to the software	authors
Copy and distribute unmodified software	License	Prohibited	License	Prohibited
Copy and distribute modified versions of the software	Normally not permitted	by copyright law	License	by copyright law





Action	Proprietary software		Open Source software	
	What is needed?	By whom/ why?	What is needed?	By whom/ why?
Run the software	End User License Agreement (EULA)	Dechibited	Access to the software	Permitted
Analyze the software	Normally not permitted	by the authors	Access to the software	by unilateral declaration of will of the
Modify the software	Normally not permitted	dutions	Access to the software	authors
Copy and distribute unmodified software	License 🚽	Prohibited	License	Prohibited
Copy and distribute modified versions of the software	Normally not permitted	by copyright law	License –	by copyright law





Action	Proprietary software		Open Source software	
	What is needed?	By whom/ why?	What is needed?	By whom/ why?
Run the software	End User License		Access to the	Permitted
	control rules be accepted	by relatively	ense obligations simple to fulfill	by unilateral declaration of will of the
Modify the software	Normally not permitted	authors	Access to the software	authors
Copy and distribute unmodified software	License 🔫	Prohibited	License	Prohibited
Copy and distribute modified versions of the software	Normally not permitted	by copyright law	License –	by copyright law





What is protected by copyright law?

Copyright law protects "works". What is a work?





What is a work?

Question #1: Who is the creator of the work?

- A work protected by copyright must be created by a human being, that is, by a natural person.
- Things created by animals including primates are not considered works in terms of copyright. Same principle applies to things created by a computer by itself.
- Plants, trees or even animal products, e.g. skins or mussels with exceptional designs are not protected by copyright.
- Natural objects, like stones, for instance, are not protected by copyright.





What is a work? (2)

Question #2: Is the work perceptible by human beings?

- The work must be able to be perceived by the senses of a human being.
- The work does not have to be embodied. It can also be a sequence of tones (music) or movements (theater, dance).





What is a work? (3)

Question #3: Is the work a result of individual creativity?

- The work created by an author has to be new or different in order to be protected by copyright.
- The work must reflect a recognizable individuality of the creator.
- In case two very similar or even practically identical works are created accidentally and independently by two different people, both works are protected by copyright – even if in an individual case it might be difficult to correctly determine who is the author of which work.





What has all of this to do with software?

Copyright law protects works of art and literature

- Somebody who writes something is a writer.
- The work of a writer is called literature.
- A person who is programming, writes (software). As a result, software belongs to literature and is protected by copyright law. And copyright law forbids copying and distributing of protected works.
- Therefore, if a (natural or legal) person wants to copy and distribute software, a permission is needed. Such permission is called a license and may be obtained by the holder of the copyright.





Which types of permissions exist?

- 1. Legal permissions
 - a) Backup copies
 - b) Copies made during proper use
- 2. Licenses from holders of exclusive rights of usea) Proprietary run-time licensesb) Open Source licenses





License rules of thumb

- First of all, a license always is a "good" thing, because something is allowed that normally is not permitted.
- Even a license that only grants minimal rights of use is better than no license.
- Without license, the "default" state occurs, this means copyright law applies and any copying and distributing is prohibited.





The creator of a work has two different rights

Exclusive rights of use

• The author of a work has exclusive rights of use. The author may grant rights of use to third parties.

Moral rights of authorship

• Even after the transfer of the rights of use, the author has the right to claim authorship of the work and may object to any modification of the authorship information. In addition, the author may object to any modification of the work that would negatively affect the author's reputation. In Europe and in many other countries, the right of authorship cannot be sold or modified in any way.





Rights of use and right of authorship reflected in the copyright notice

Initially, an author has both the right of use and the right of authorship. Thus, the copyright notice looks like:

Copyright © 2019 John Doe

After the right of use is transferred, e.g. to the employer of John Doe (which happens automatically), the copyright notice may look like:

Copyright $\ensuremath{\mathbb{C}}$ 2019 Employer LLC, author John Doe

John Doe's employer may then sell the software, and the buyer may modify the copyright notice to:

Copyright $\ensuremath{\mathbb{C}}$ 2019 Buyer LLC, author John Doe















International copyright law

Inhalt: Uebereintunft, betreffend die Bildung ber Literatur und Runft. G. 498.	
	g eines internationalen Verbandes zum Schuhe von Werten
	(Ueberfetzung.)
io. 1751.) Convention, concernant la création d'une Union inter- nationale pour la protection des oeuvres littéraires et artistiques.	bung eines internationalen Ver- bandes zum Schutze von Werken
A Majesté l'Empereur d'Allemagne, oi de Prusse, Sa Majesté le Roi es Belges, Sa Majesté Catholique le oi d'Espagne, en Son nom Sa Ma- sté la Reine Régente du Royaume, Président de la République Fran- ise, Sa Majesté la Reine du oyaume-Uni de la Grande-Bre- gne et d'Irlande, Impératrice des ides, le Président de la Répu- lique d'Hařit, Sa Majesté le Roi l'Italie, le Président de la Répu- lique de Libéria, le Conseil Fédéral e la Confédération Suisse, Son Itesse le Bey de Tunis, également nimés du désir de protéger d'ume anière efficace et aussi uniforme ne possible les droits des auteurs r leurs ceuvres littéraires et ar- stiques, ont résolu de conclure une onvention à cet effet, et ont mmé pour Leurs Plénipotentiaires, voir:	König von Preußen, Geine Majeftäl ber König ber Belgier, im Namen Seiner Ratholijchen Majeftäl bes Königse von Spanien Ihre Majeftäl bes Königse Regentin von Spanien, ber Präfibent ber Könign bes Brecinigten Königreichs von Großbritannien und Island, Stafferin von Indien, ber Präfibent ber Nepublit fyätig, Geine Majeftä ber Rönig von Italien, der Präfibent ber Nepublit übera, der Bundestarth ber Schwig rifchen Eidgenoffenichaft, Seine Hohen von Bergen von Lunis, gleichmäßig von dem Bundische befelt, im wirtfauer und möglicht gleichmäßiger Beile das Ur- beberecht an Werten ber Uteratur und Runft gu ichügen, haben den Ubichtuft einer Uebereintumft au beitem Swoch

Berne Convention for the Protection of Literary and Artistic Works

Date	States
December 5, 1887	Belgium, Germany, France, Italy, Switzerland, Spain, Tunisia and United Kingdom
March 1, 1989	USA
As of February 2018	A total of 176 states





Article 5 of the Convention of Berne

- 1) Authors shall enjoy, in respect of works for which they are protected under this Convention, in countries of the Union other than the country of origin, the rights which their respective laws do now or may hereafter grant to their nationals, as well as the rights specially granted by this Convention.
- 2) The enjoyment and the exercise of these rights shall not be subject to any formality; such enjoyment and such exercise shall be independent of the existence of protection in the country of origin of the work.





How does a license look like?

- The licensor grants rights to the licensee.
- The licensee is imposed obligations by the licensor.
- Non-fulfillment of obligations will be sanctioned; in that event and as a general rule, the rights granted will be withdrawn.




Example of a license with rights and obligations

GPLv2, sect. 1:

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.





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The license usually becomes void, if license obligations are not fulfilled

GPLv2, sect. 4:

You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License.

Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License.





The license usually becomes void, if license obligations are not fulfilled

GPLv2, sect. 4:

You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License.

Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License.





What are the rights of the licensor in case of copyright violations?

- The copyright law regulates the claims a right holder may assert against a licensee in the event of non-fulfillment:
 - Injunctive relief, e.g. to no longer copy and distribute
 - Obligation to inform all customers to whom the unauthorized copies have been conveyed
 - Provision of complete customer lists
 - Physical destruction of unauthorized copies
- Penalties may be imposed for infringement of copyright law.





GPLv2, sect. 1 and 4 for programmers ...

```
/* Default by copyright law */
copyright = distributionright = 0;
```

```
if (add_copyright_notices_to_manual() &&
    add_disclaimer_of_warranty_to_manual() &&
    add_license_text_to_manual()) {
        copyright = distributionright = 1;
    }
}
```

```
}
```

}

```
if ((!copyright || !distributionright) && copy() && distribute()) {
    bank_balance[holder_of_rights] += huge_amount;
    bank_balance[you] -= huge_amount;
    if (negligence >= gross && judge >= strong)
        goto jail;
```





Please do not forget:

- Software is protected by copyright law.
- Whoever wants to copy software needs a permission (license).
- Copying software without license violates copyright law and may entail serious consequences.





What is Free Software?

"Free Software" is – at least legally – identical to "Open Source" software.

Therefore, it is sometimes proposed to use the term "Free and Open Source Software" (FOSS).

However, the two terms originate from two very different political, social and economical movements.

































Who wrote the GPL?

""", "GPL" or "GNU GPL" is the abbreviation of "GNU General Public License". The GPL was developed originally by Richard Stallman.

GPLv1: January 1989 by Richard Stallman

GPLv2: June 1991 by Richard Stallman

GPLv3: June 2007 by Richard Stallman, legal support from Prof. Eben Moglen (Columbia University, New York City) and the Software Freedom Law Center







Example of a successful GPL project (2)

Linus Torvalds, 1997: "Making Linux GPL'd was definitely the best thing I ever did"

Date	Linux version	Lines of code
August 1991	Start of development	
March 1994	1.0	176,250
March 1995	1.2	310,950
January 1999	2.2	1,800,847
January 2001	2.4	3,377,902
December 2003	2.6	5,929,913
August 2008	2.6.26.3-rt3	8,817,595
March 2014	3.12.19-rt30	17,208,147
February 2019	4.19.25-rt16	26,337,928





Example of a successful GPL project (3)

<u>Linus Torvalds, 1997</u>: "Making Linux GPL'd was definitely the best thing I ever did"



Linux Kernel

Date





How Open Source may not work ...

Project lead: "We need to get someone to develop a Linux driver for our new machine controller. Here's a purchase order for the work."

Purchase department: "Okay. Let me check the purchase order to make sure it follows our standard procedure: NDA to be executed, source going into company's safe ... "

Project lead: "Nope, we're going with Open Source - source gets published to the Internet."

Purchase department. "What? We're paying for the development but the source code goes out to the Internet? If **everybody** can use the source code, why are **we** the only ones paying for this? No way this can fly!"







... but there is OSADL

OSADL initially was a purchase community of "Open Source" Software.

OSADL promotes and coordinates the development of Open Source software for the machine, machine tool, and automation industry.

Today, OSADL uses the principle of "Open Innovation" for a lot more services:

- Legal support, legal assessment, best practices, audits
- Quality assessment and assurance of Open Source software, technical support
- Safety certification
- Networking, training courses, seminars
- Marketing





OSADL also has associate and academic members









OSADL members over time







OSADL Member Industries







Why Open Source?

The principle of "Open Source" is successful, since it is economically and technologically successful.

- "Open Source" is using the principle of "Open Innovation" for the development of software base components.
- However, before deciding to use a particular "Open Source" software under a particular license, an analysis must be undertaken to ensure that any involved proprietary company software may stay proprietary, if this is desired.





You need more than just the source code

- To successfully deploy software, more than source code may be needed such as
 - Maintenance, tools
 - Quality assessment and assurance
 - Installation
 - Training, documentation
 - Legal advice
 - Safety certification
 - Patent clearance
- Open Source software is just the code, anything else must be provided by the user, but this does not need to be done individually.
- Companies are well advised to join in a community to get access to everything that is needed to successfully deploy Open Source software.





Let's have a deeper look into a license

A number of obligations must be fulfilled when copying and distributing a work that is licensed, for example, under the GPL v2 (GPL-2.0):

- Information obligations
- Disclosure obligations
- Licensing obligations





GPLv2 and information obligations (distributing unmodified software)

1. **You may** copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, **provided that** you conspicuously and appropriately <u>publish on each copy</u> an appropriate copyright notice and disclaimer of warranty; keep intact all the <u>notices that</u> refer to this License and to the <u>absence of any warranty</u>; and give any other recipients of the Program a <u>copy of this License</u> along with the Program.





GPLv3 and information obligations (distributing unmodified software)

You may convey verbatim copies of the Program's source code as you receive it, in any medium, **provided that you** conspicuously and appropriately <u>publish on each copy an</u> appropriate copyright notice; keep intact all notices stating that this License and any non-permissive terms added in accord with section 7 apply to the code; keep intact all notices of the absence of any warranty; and give all recipients a <u>copy of this License</u> along with the Program.

You may charge <u>any price or no price</u> for each copy that you convey, and **you may** <u>offer</u> <u>support or warranty protection for a fee</u>.





GPLv2 and information obligations (distributing modified software)

a) **You must** cause the modified files to <u>carry prominent notices stating that you changed the</u> <u>files and the date of any change</u>.

b) ...

c) If the modified program normally reads commands interactively when run, **you must** cause it, when started running for such interactive use in the most ordinary way, <u>to print or display</u> an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)





GPLv3 and information obligations (distributing modified software)

a) The work **must** carry <u>prominent notices stating that you modified it</u>, and giving a relevant <u>date</u>.

b) The work **must** carry prominent notices stating that it is released under this License and any conditions added under section 7. This requirement modifies the requirement in section 4 to "keep intact all notices".

c) ...

d) If the work <u>has interactive user interfaces</u>, each **must** display Appropriate Legal Notices; however, if the Program has interactive interfaces that do not display Appropriate Legal Notices, your work need not make them do so.





GPL and information obligations (**Recommendations**)

- Non-interactive program
 - License notice and copyright notices in the manual
 - GPL text in the appendix of the manual

- Interactive program
 - License notice and copyright notices in the manual
 - Reference in "About box"
 - GPL text in the appendix of the manual





GPLv2 and source code disclosure

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

a) Accompany it with the <u>complete corresponding machine-readable source code</u>, which must be distributed under the terms of Sections 1 and 2 above <u>on a medium customarily used for</u> <u>software interchange</u>; or,

b) Accompany it with a written offer, valid for <u>at least three years</u>, to give <u>any third party</u>, for a charge <u>no more than your cost</u> of physically performing source distribution, a <u>complete</u> <u>machine-readable copy of the corresponding source code</u>, to be distributed under the terms of Sections 1 and 2 above on a <u>medium customarily used for software interchange [..]</u>





GPLv3 and source code disclosure (1)

You may convey a covered work in object code form under the terms of sections 4 and 5, **provided that you** also convey the <u>machine-readable Corresponding Source</u> under the terms of this License, in one of these ways:

a) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), <u>accompanied by the Corresponding Source</u> fixed on a <u>durable</u> <u>physical medium customarily used for software interchange</u>.





GPLv3 and source code disclosure (2)

b) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source for all source from a network server at no charge.





GPL and source code disclosure (Recommendations)

- **Option 1** "Accompany with every delivered device"
 - simple
 - safe
 - may technically not be feasible
 - recommended (whenever possible)

- **Option 2** "Make it available on request"
 - for 3 years (GPLv2)
 - for 3 years + duration of device support (GPLv3)
 - relatively expensive
 - recommended, if option 1 not possible





GPL and derivative work (1)

What is "derivative work"?

The term "derivative work" relates to the fact that a work may contain significant elements of another work. If this is the case, the new work is called "derivative" of the other work, and the copyright of the original author must be recognized. Otherwise, the work is an original new work, and the author may independently decide under which condition, if any, the work is licensed.







GPL and derivative work (2)

What is the significance of "derivative work" in the context of the GPL?

If a particular software project forms a combined work with existing software that is licensed under a GPL, this project must be licensed under the same or compatible GPL, *i.e.* all information and disclosure obligations must be obeyed.

If this is not the case, the author may independently decide how the project is licensed.





Linux, GPLv2 and derivative work (3)



Linux driver:

Is considered derivative work, since it

- runs in the same memory space
- uses exclusive kernel interfaces

Application with POSIX interface:

Is not considered derivative work, since it

- runs in a different memory space
- is assigned as such by the author





GPL and derivative work (Recommendations)

Project	Requires	GPL of the project?
Application	Linux kernel	No
Driver	Linux kernel	Yes
Application	GPL library	Yes
Application	LGPL library	No
Application	GPL compiler	No
Web application	GPL web server	No





Conclusion

"Open Source software" is short for "software that is licensed under a listed or otherwise verified Open Source license".

Whoever is copying and distributing "Open Source" software, must know the license conditions and obey the contractual obligations – this is not different from proprietary software.

The source code of Open Source software is developed in a community – everything else that is needed to successfully deploy Open Source software should also be developed in a community.





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 - The quick link URL is **osadl.org/AQ** (AskQuestion), same as osadl.org/?id=3321
- You may join an online discussion on all topics of today at 4 pm
 - The quick link URL is **osadl.org/OD** (OnlineDiscussion), same as jitsi.osadl.org
 - Meeting name **OSADLLegaIHOT**
 - Username and password will be displayed here after the last presentation



