Open Source Hardware Seminar
Licenses and standards in OSH

Julieta Arancio, Robert Mies

Technische Universität Berlin, Institute for Machine Tools and Factory Management, Chair of Quality Science

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Licences

QUALITÄTS-WISSENSCHAFT

Licences

What are open source licences?

Basic concepts and definitions

- Legal instruments aimed at protecting open source freedoms
- Reverse of intellectual property: granting rights for collaboration instead of restricting rights
- They express the moral and legal interests of open source communities

"*The open licence agreement is a privately ordered, contractual instrument with a dual role.*

On the one hand, it governs the community and ***ensures its cohesion and collaborative, non-competitive spirit****.*

On the other, it ***allocates IP rights and permissions*** *relating to the knowledge generated among contracting parties, i.e., to members of the community" (Beldiman, 2018)*

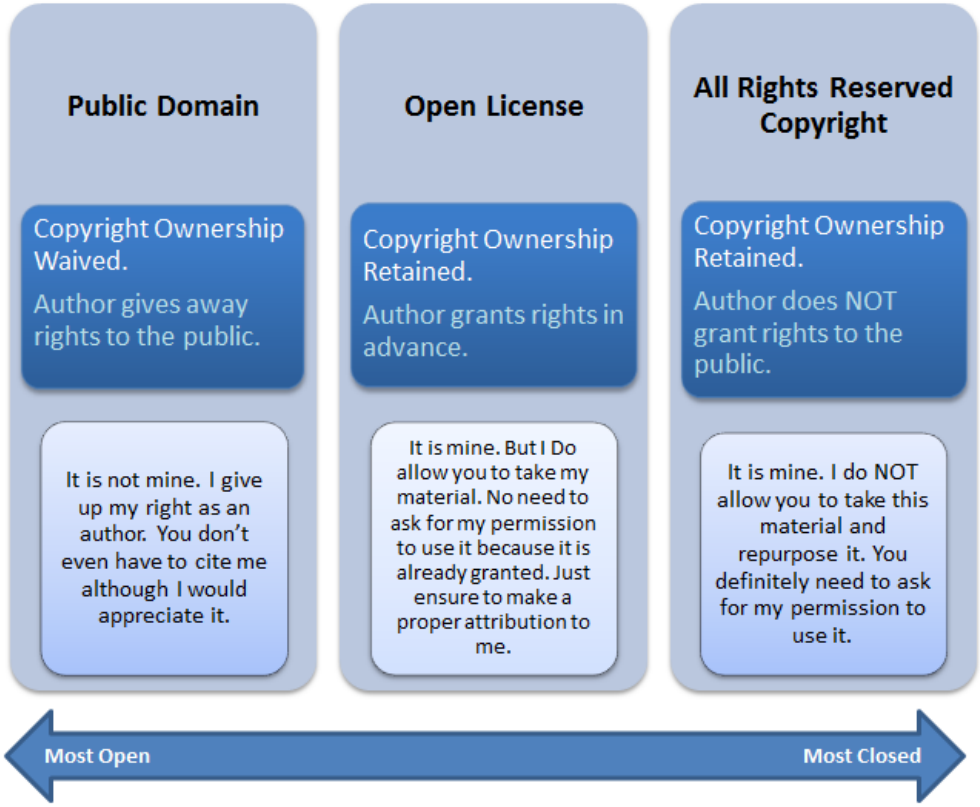
Beldiman, D. 2018. "From Bits to Atoms: Does the Open Source Software Model Translate to Open Source Hardware?" In: Santa Clara High Technology Law Journal, 35(2), 32.

Licences

What are open source licences?

Why are they important for the community?

- With no licence, all rights remain with authors
- An open license means the author gives consent to use, copy, modify and distribute their work
- Without a license the work is unusable by the open source community
- Without a proper it's too risky for downstream users to implement or add to an invention without fear of legal liability



Boyoung Chae. 2014. Difference between open license, public domain and all rights reserved copyright. CC BY via Wikimedia Commons.

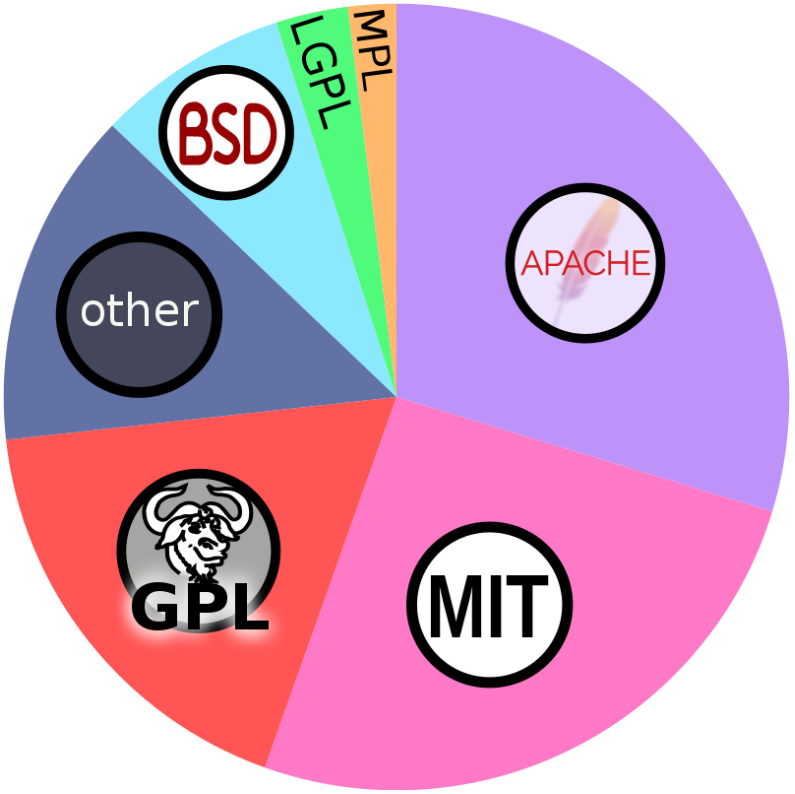
Source: https://commons.wikimedia.org/wiki/File:Difference_between_open_license,_public_domain_and_all_rights_reserved_copyright.png

Licences

Precedents in FOSS

Origins of open source licences

- Open hardware licences have precursors in open source software definitions and licences
- Definitions are relevant because licences must comply with the terms of definitions to ensure a work is “open”
- Hardware vs Software challenges
  - More complex
  - Multiple elements to protect
  - Various regimes
  - Non-zero reproduction costs



Rjjiii, 2023. Most popular open source software licences in 2021 based on a survey by mend.io

Source: https://en.wikipedia.org/wiki/Open-source_license#/media/File:Open-source-license-chart.svg

https://www.mend.io/blog/open-source-licenses-trends-and-predictions/

Licences

Precedents in OSH

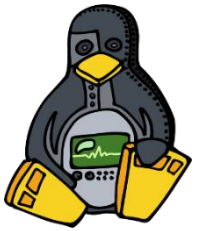
Brief history

2007:
TAPR Open Hardware Licence

2008:
Open Hardware and Design Alliance (OHANDA, discontinued)

2010:
Open Source Hardware Definition

2011:
CERN OHL first version



2012:
Solderpad Licence

2022:
CERN OHL v2

Sources:
https://tapr.org/the-tapr-open-hardware-license/
https://en.wikipedia.org/wiki/Open_Hardware_and_Design_Alliance#/media/File:OHANDA_logo.svg
https://www.oshwa.org/open-source-hardware-logo/
https://cds.cern.ch/record/1357331
http://solderpad.org/
https://ohwr.org/cernohl

Licences

What can be licensed?

Intellectual property and hardware inventions

IP Regime	Scope	Hardware
Copyright	“Original works of authorship” meaning creative, not functional elements	Most elements are functional, not creative and therefore not protected
Trademarks	“Source identifiers”: brand names, product names, logos	Trademarks can be used in hardware, but don’t protect the physical object
Patents	“Novel” and “nonobvious” inventions	Expensive and restrictive

Open Source Hardware Association. Open hardware certification program. Source: https://certification.oshwa.org/process/hardware.html

Licences

What can be licensed?

Multiple components, multiple licences

Component	Description	Requirement
Hardware	Hardware designs	CERN OHL, Solderpad or TAPR
Software	Any code or firmware connected to your hardware is protected by copyright, and can therefore be released under an open source licenses	Use an OSI-approved software licence
Documentation	All written or drawn materials that allow others to reuse your hardware	Use a licence for content, from the Creative Commons suite
Branding	Unique brand names, product names, and logos	Can be open or protected. If protected under Trademark law, others can't user your brand

Open Source Hardware Association. Open hardware certification program. Source: https://certification.oshwa.org/process/hardware.html

Licences

Copyleft and permissive options

What is copyleft?

Copyleft is a legal technique for granting rights over otherwise copyrighted work, but requiring that derivatives use the same licence as the original

Permissive licences allow users to apply any kind of protection to derivative works, even if these are proprietary

Copyleft symbol, public domain. Source: https://en.wikipedia.org/wiki/Copyleft#/media/File:Copyleft.svg

Licences

Copyleft and permissive options

Permission overview for software licences

	Copyleft		Permissive	Proprietary
	Strong	**Weak**		
Use for anything	Yes	Yes	Yes	Sometimes
Private changes	Yes	Yes	Yes	Rarely
Distribute original	Same license, with source	Same license, with source	Same license, also binary-only[1]	Rarely
Distribute modified	Same license, with source	Same license, with source[2]	Any license, also binary-only	Rarely
Distribute combined	Same license, with source	Any license, binary additions	Any license, also binary-only	Rarely

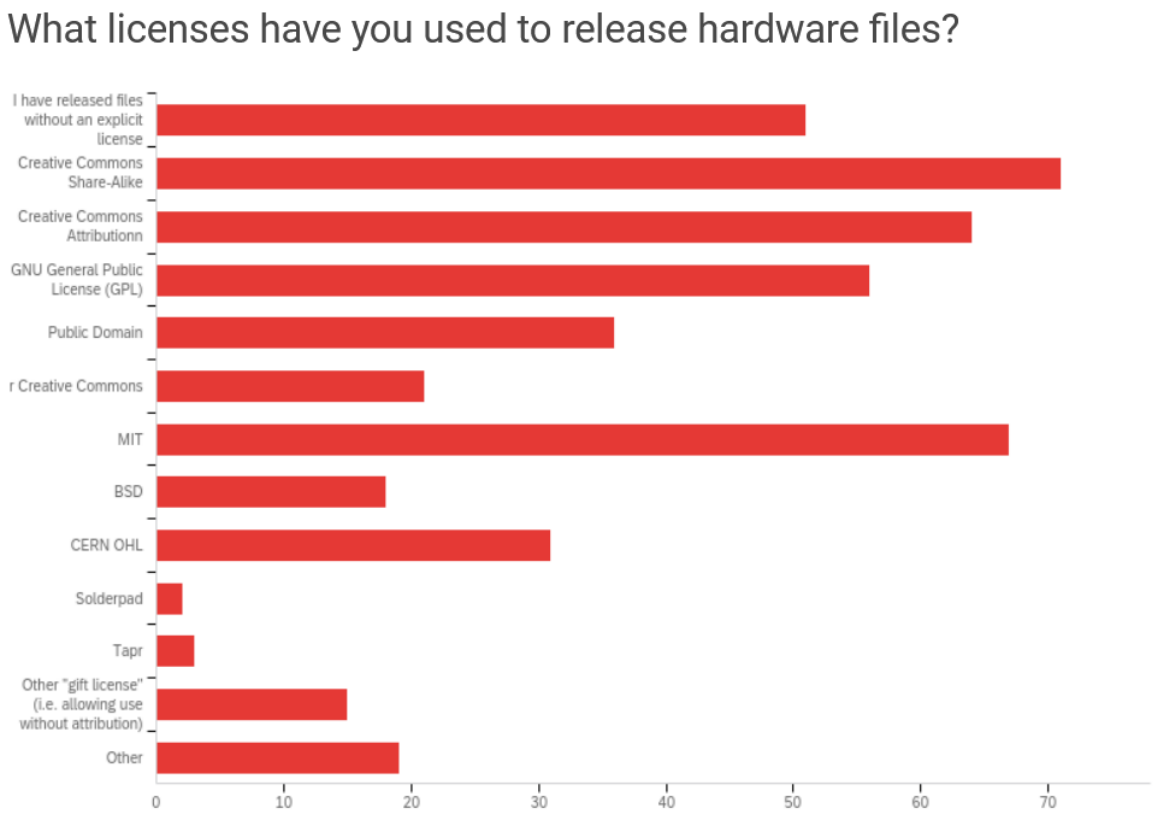
[1]Under any license for the MIT license [2]Relicensing LGPL to GPL is allowed

The Turing Way 2023 Licensing software

Source: https://the-turing-way.netlify.app/reproducible-research/licensing/licensing-software.html

Licences

Comparing OSH licences



RECOMMENDED LICENSES FOR HARDWARE

CERN-OHL-P-2.0

CERN-OHL-S-2.0

CERN-OHL-W-2.0

Solderpad

TAPR

Open Source Hardware Association. Community Survey 2020. Source: https://www.oshwa.org/2020/10/16/oshw-community-survey-2020/

Licences

Comparing OSH licences

Main features of recommended OSH licences

	TAPR OHL (v.1.0)	CERN OHL (v.1.2)	TDPL (v. 1.2)	Solderpad (v. 2.0)
1. Allows proprietary derivatives	No	No	No	**Yes**
2. Allows unmodified redistribution	**Yes**	**Yes**	**Yes**	**Yes**
3. Allows redistribution under a different licence	No	No	No	**Yes**
4. Allows changing the text of the licence	No	No	No	**Yes**
5. Requires notifying changes	**Yes**	**Yes**	**Yes**	**Yes**
6. Requires providing the location for the documentation	**Yes**	**Yes**	**Yes**	**Yes**
7. Requires providing a copy of the licence	**Yes**	**Yes**	**Yes**	**Yes**
8. Requires contacting upstream licensor when distributing modified documentation	*Best effort attempt*	No	No	No
9. Requires contacting the upstream licensor when producing and distributing products	*Best effort attempt*	*Optional*	No	No

Murillo et al 2019. Open Hardware Licences: parallels and contrasts. European Commission. Source: https://core.ac.uk/download/pdf/287760857.pdf

Licences

Comparing OSH licences

Main features of recommended licences (cont.)

	TAPR OHL (v.1.0)	CERN OHL (v.1.2)	TDPL (v. 1.2)	Solderpad (v. 2.0)
10. Requires including the old files with the new, modified files in the documentation	**Yes**	No	No	No
11. Requires copyright notice to be kept in documentation files	**Yes**	**Yes**	**Yes**	**Yes**
12. Requires copyright notice to be kept on products	**Yes**	**Yes**	**Yes**	No
13. Grants non-exclusive patent licence	**Yes**	**Yes**	**Yes**	**Yes**
14. Extends patent litigation immunity to owners of OH-based products	**Yes**	No	**Yes**	No
15. Includes patent retaliation clause in event of litigation	No	No	No	**Yes**
16. Includes grace period for bringing the infringing party into compliance	No	No	No	No
17. Grants trademark licence	No	No	No	No
18. Provides no warranty or guarantee of fitness for any use or purpose	**Yes**, but with one exception	**Yes**	**Yes**	**Yes**

Murillo et al 2019. Open Hardware Licences: parallels and contrasts. European Commission. Source: https://core.ac.uk/download/pdf/287760857.pdf

Licences

Implications of licence choice

How to make a choice?

- Derivatives: is there any licensing requirement for derivative work?
- Attribution: Should/must original authors be attributed or not by this licence?
- Scope: Is the project allowed to be used in any domains or do exclusions exist, e.g. no harm clauses?
- Commercialisation: can the project be used for commercial purposes under this licence?

Source: https://choosealicense.com

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Standards

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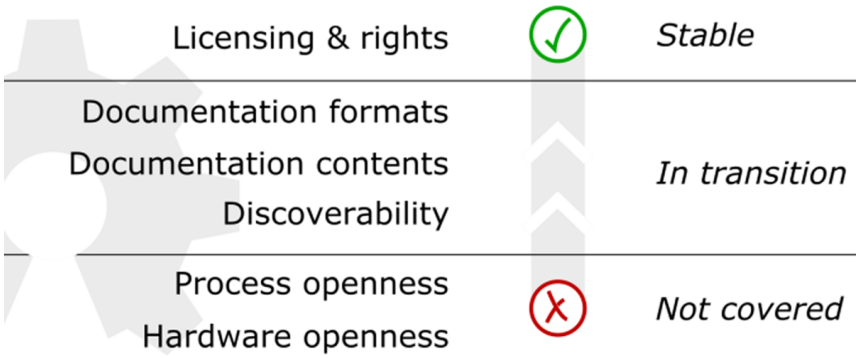
Standards

Why standards matter in OSH

Challenges and current efforts

- Multi-faceted nature and different interpretations of openness in OSH
- Need for settlement of harmonised practices (relatively young field)
- *De jure* standard setting procedures *versus de facto* standards being adopted later (e.g. HTML, etc.)



Building standards demands significant collective organisational efforts; these should encompass a broad spectrum of community members with a common interest, and include a set of rules to facilitate discussion and reach consensus

Bonvoisin, J., Molloy, J., Häuer, M., & Wenzel, T. (2020). Standardisation of Practices in Open Source Hardware. *Journal of Open Hardware*, *4*(1), 2. DOI: 10.5334/joh.22

Standards

Self-certification

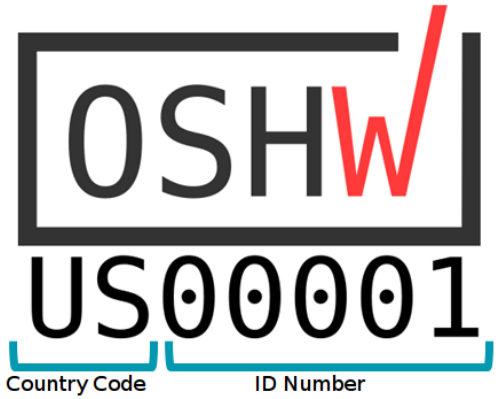
Open Source Hardware Certification programme

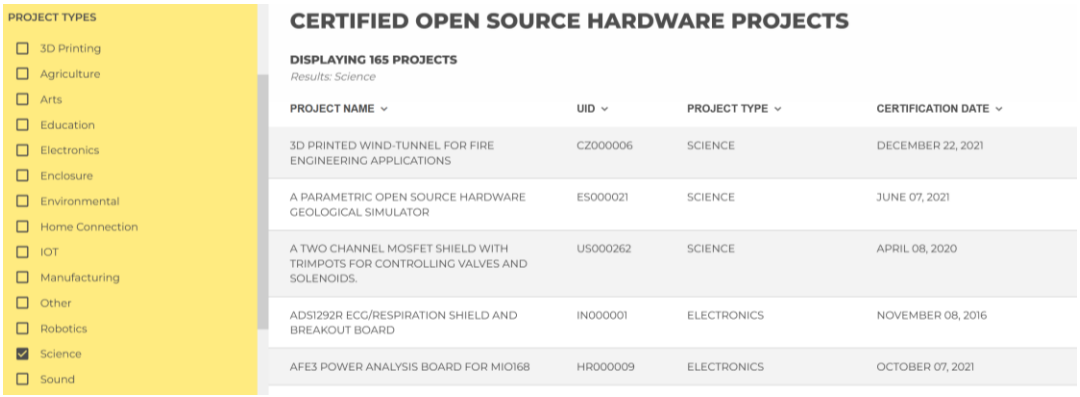
Self-certification scheme that permits usage the OSHWA certification logo (see below)

- "[…] for producers to indicate that their products meet a uniform and well-defined standard for open-source compliance"
- generated identifier to help users find open source hardware projects along with their documentation

Four main elements:

- Hardware - The physical functional components/elements of the product (i.e. the product itself) (required)
- Software - Any code, firmware, or software involved in product's function
- Documentation - Design files, schematics, instructions, etc. (required)
- Branding - Brand names, product names, logos, and product designs (optional, but recommended)





Standards

Documentation standards

The DIN SPEC 3105

Scope	Goal	
Technical documentation	Provide an explicit and enforceable definition of the term “open source hardware”	Takes the OSHWA guidelines for documentation into concrete requirements
Community-based assessment	Define a new kind of assessment process	Between self-assessment and third-party evaluation, goes for a peer-review style assessment. Advantages: transparency, reduces costs.

Boivoisin, 2020. DIN SPEC 3105 explained. Blog of the Journal of Open Hardware.

Source: https://journalopenhw.medium.com/din-spec-3105-explained-2cce6134c207

Standards

Findability standards

The Open Know-How initiative

- Problem: hardware designs are hosted in multiple platforms and formats, therefore are difficult to find
- Solution proposed: an open data model for sharing hardware designs and documentation online
  - Discoverable
  - Portable
  - Interactive
- Implementation: generates a manifest file via https://okh.makernet.org/form that can be added to any open hardware repository

Internet of Production Alliance

Open Know-How
INITIATIVE

Open Know-How initiative, by the Internet of Production Alliance. Source: https://www.internetofproduction.org/openknowhow

Summary

- Open licences reflect consent from the author to grant rights of use, modification, distribution; they are key for ensuring collaborative work in open source
- Open hardware licences have an origin in definitions and instruments from the Free and Open Source Software community
- Hardware is more complex than software and as a result projects need to combine multiple licences for hardware, software, documentation
- Open licences can be categorised in copyleft or permissive, depending on the licensing requirements they demand for derivative work
- Recommended OSH licences are CERN OHL (in its three flavours), Solderpad and TAPR
- When choosing a licence it's important to consider: attribution, derivatives, commercialisation and scope; this avoids future compatibility and usability problems
- Today the OSH community has standards for self-certification (OSHWA), documentation (DIN SPEC 3105) and findability (Open Know-How)

Thank you for your attention!