A quick trip through openness, freedom and transparency

An introduction for scientists ... and everybody else.

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Disclaimer

- Fasten your seat belts! This will be a rushed journey through a lot of topics that have some important concepts in common.
- It is an introductionary talk:
  - ⇒ just an appetiser
  - ⇒ some simplifications / idealisations / polarisations
- Sometimes techy

Intro

Starting consensus

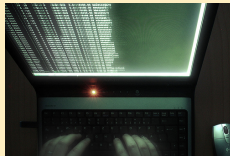- Openness
- Freedom
- Transparency

are essential for a functional and
democratic scientific community and
for society in general.

Open Source Software

What is it?

Open source software is computer software that is published under a license that gives the freedom to use, modify and redistribute it.
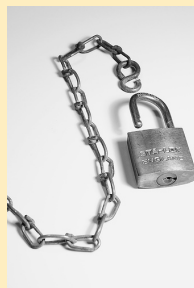
Open Source Software

```
int main (void){               Source code

    int a = 23;
    int b = 42;

    printf("I have %d bananas.\n", a);
    printf("You have %d bananas.\n", b);

}
```

Compiling

```
010000101011110101010101      Binary code
010101010101010010101101010101010100100101010
101010101010101010101011011101110001001011
010101001010101010101101010101010010101010010
101010010101010101010101101010010010000
101010101010100100000101011110101010101001
001010101010101101010101010101010101011011
101010100110101010101010101010101010101011
101100001001011010101001010101010101101010
101001010100101010101001010101010101010101
010100100100001010101010101010100100101010
```

Closed Source Software:
Only the executable program
(binary) is available.

Open Source Software:
Source code and executable
program are available.

Open Source Software

FLOSS/FOSS/OSS licenses

- (**F**ree)/(**L**ibre)/**O**pen-**S**ource **S**oftware
- Make software "free as in freedom, not as in free beer".
- Most important examples:
  - GNU General Public License ("copyleft")
  - BSD License

Open Source Software

Important freedoms that Open Source licenses give

- The freedom to use
- The freedom to copy
- The freedom to make derivatives
- The freedom to redistribute
  (also the modified versions)

Open Source Software

Advantages

- Transparency
- Potentially higher quality/security due to peer-review by the community
- Independence of vendors
- Modification/adaptation to personal needs possible
- Reusablity of code $\Rightarrow$ faster development
- Free/low costs $\Rightarrow$ affordable for everybody

Open Source Software

Some examples you might be familiar with

- Mozilla Firefox (Web browser)
- OpenOffice (Office Suite)
- GNU/Linux (Operating system)
- Gimp (Graphics editor)
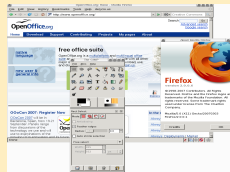
Some less obvious examples that you use for sure

- Apache (Web server)
- BIND (DNS server)
- Google (adapted version of GNU/Linux on their servers)

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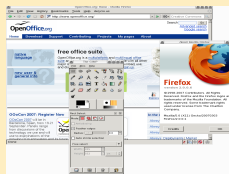
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Open Formats/Standards

What is it?

Open formats are publicly available specification for storing digital data that are free of legal restrictions and free of charge.
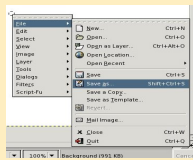
Open Formats/Standards

An analogy – the ISO container

Open Formats/Standards

Examples

proprietary	**open**
doc, xls (also Office Open XML)	Open Document Format
ICQ, MSN, AIM	Jabber/XMPP (Google Talk)
Skype	SIP-based
luckily nothing	HTML/XHTML

Open Formats/Standards

Advantages

- User can choose the application to use – no vendor lock-in
- Possibility to write own applications using that format
- Due to above points safe to be usable also in future

Creative Commons licenses

What is it?

Creative Commons licenses define the spectrum of possibilities between full copyright (*all rights reserved*) and the public domain (*no rights reserved*).

Creative Commons licenses

Why?

The default copyright (© *all rights reserved*) restricts creativity and cultural development in the digital age. Creative Commons licenses make it easy for creators to define the freedom of their creations.

Use for …

- Text
- Images
- Audio
- Video
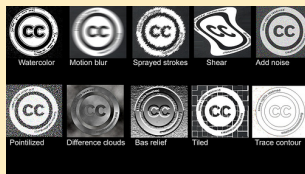
Creative Commons licenses

Select a license by choosing conditions

ⓘ Attribution
⊜ No derivative works
Ⓢ Non-commercial
↻ Share alike

Some examples of CC licenses

ⓘ + ⊜   = Creative Commons Attribution-No Derivative
               Works

ⓘ + Ⓢ   = Creative Commons Attribution-Noncommercial

ⓘ + Ⓢ + ⊜   = Creative Commons Attribution-Noncommercial-
               No Derivative Works

Open Access

What is it?

Open Access is a publishing concept
with immediate, free and unrestricted
online access to scholarly publications.

Open Access

Current closed-access scenario

1. Scientist is paid by the public to do research
2. Scientist writes publication and gives (nearly) all the rights to publisher
3. Other scientists (if they can) buy the publication with public money
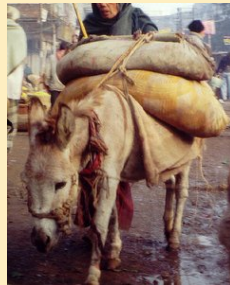

⇒ public pays but loses rights to the publisher

⇒ access to knowledge is limited to people who can pay for it

Open Access

Publishing with Open Access

- Publishing using an Open Access publisher
    - Author keeps rights (often a Creative Commons license is used)
    - Different business models: fee or non-fee-based
- Open access self-archiving
    - In addition to the traditional publication the article is archived in central repository (e.g. arXiv, Nature Precedings)

$\Rightarrow$ Immediate access to the generated knowledge for everybody

Open Access

Advantages

- Knowledge is not locked
- No financial hurdles for readers
- Higher scientific impact
- Computational text analysis possible (necessary due to growing amount of literature)

Open Science / Knowledge

Sometime I have the feeling people forget ...

- that scientists are payed by the public to generate knowledge for the public.
- that delayed/restricted access to results/data/knowledge hampers scientific progress and maybe even costs lives.
- that "negative" results are also results.
- the question if the "paper" is really the optimal form of communicating science in the internet age.

Open Science / Knowledge
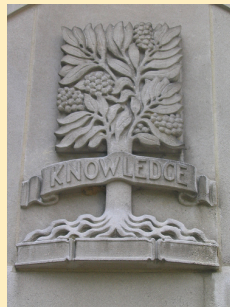
Example 1: PloS One

- An online-only Open Access journal
- Pre-publication peer review but not filtered by scientific relevance ($=$ don't care about impact factor)
- Users can rate and discuss articles after publication

Open Science / Knowledge

Example 2: Science Commons

- Aim is "removing unnecessary legal and technical barriers to scientific collaboration and innovation."
- E.g. *The Biological Materials Transfer Agreement Project* (MTA): lower the costs of transferring physical biological materials (DNA, cell lines, model animals etc.)

Open Science / Knowledge

Example 3: Wikipedia

- ... and family: Wikibooks, Wikiversity etc.
- An easy way of teaching a broad audience and communicate science to the public

Open Science / Knowledge

Example 4: OpenWetWare

- "Sharing of information, know-how, and wisdom among researchers and groups who are working in biology & biological engineering."
- Wiki-based platform

Open Science / Knowledge

Example 5: Open Notebook Science

- Online version of the classical lab notebook
- Making the way of discoveries transparent
- Instant publication of results
- Instant feedback from colleagues
- Also negative results are presented

Open Science / Knowledge

Example 6: Wikiscience

- Article hosted on a wiki
- All versions are stored
- Constantly improving
- Many contributors
- Micropublications

Open Science / Knowledge

Yes, there are currently problems like

- Fear of being scooped as blog/wiki contributions are not official publications
- or not accepted by journals as already published in blogs/wikis
- No credit system for this kind of scientific contribution
⇒ Problems are cultural not technical!
⇒ Luckily there are grass root projects where people start to play around with the new concepts.

Take home messages

- More openness, freedom and transparency can improve a lot of fields.
- Science is one of them and you can help.
    - Learn
    - Test
    - Discuss
    - Spread the word
    - Question the current status

Acknowledgements

Thanks to ...

- An uncountable amount of people who communicat, discuss and test the presented ideas
- Bernd Ahlers who ignited my Open Source fire
- Anne-Marie Glynn for being the test drive audience.

Selected references and Image sources/attribution

Reference

http://www.opensource.org
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A video of the talk can be found on http://konrad.foerstner.org

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Gimp and *Firefox* were used to take screen shots of websites.
All these programs run on *OpenBSD*.

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