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Free Software

An Adequate Form of Software for Research and Education in Informatics?

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4 Apologies

Rather boring title

More slides than Georg

Talk not on DVD

I don't throw penguins

Motivation

“We choose SourceMage because of the GPL” - why is that important?

“Attached the minutes of the meeting” - everyday obstacles for GNU/Linux users

“We want an Open Source X” - Who, why, what, and how?

“Software for free cannot work” - for whom?

“Universities have to change” - in which direction?

Contents

What is Science?

What is Technology?

Excursion: What is something worth?

What is Informatics?

The technological discipline's dilemma.

What is Free Software?

Why to use Free Software?

Wrap Up & Discussion.

Contents

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What is Technology?

Excursion: What is something worth?

What is Informatics?

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What is Free Software?

Why to use Free Software?

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Science: Criteria I

Robert Merton's Demarcation Criteria

- **Universalism**

Truth not bound on [social|economic|...] conditions

- **Disinterestedness**

Knowledge the goal, not profit, not liberation

- **Organized Skepticism**

Peer review, results can be reproduced

- **Communism**

Results free for everyone

Science: Criteria II

Communism “in the nontechnical and extended sense of common ownership of goods” (Merton)

“The communism of the scientific ethos is incompatible with the definition of technology as 'private property' in a capitalistic economy” (Merton)

Contents

What is Science?

What is Technology?

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What is Informatics?

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Why to use Free Software?

Wrap Up & Discussion.

Science vs. Technology I

Science: Interested in the fundamental questions

Engineering or technological disciplines: building of artifacts

Systematically: role of the latter is to apply the results of the former to construct artifacts

Distinction arguably difficult to find in real world disciplines

Science vs. Technology II

Physics, Biology are Sciences, Informatics is a Technology?

Solid state physics largely technology

Molecular Biology largely technology

Theoretical Informatics very close to Mathematics and Logics

Distinction obsolete?

Distinctive characterization!

Contents

What is Science?

What is Technology?

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What is Informatics?

The technological discipline's dilemma.

What is Free Software?

Why to use Free Software?

Wrap Up & Discussion.

Worth of things

First: Why is something worth something?

Ascription of “worth” nothing natural

Sparse goods exist (land, water, clean air)

In industrialized countries, we have
“enough” of most things

That you have to buy your computer is a
societal construct, but it exists

In capitalistic economy, worth is defined by
amount of direct and indirect labor involved

T-Shirts and Software

You cannot have my T-Shirt...

- It exists only once
- Amount of labor involved approximately constant

... but you can have my code.

- Easy copy process
- Amount of labor involved per piece decreases with number of copies

Artificial Restrictions

Because of its immaterial nature,
knowledge cannot be privatized
("easy copy process")

Artificial means used: "Intellectual Property
Rights", Patents

→ evidence for a problem in the concept

Contents

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What is Technology?

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Wrap Up & Discussion.

Definitions: Informatics

Hundreds of inconsistent definitions out there...

- Information processing in nature and technology
- Social science of use of computers
- Fundamental discipline like Mathematics

... but “better ones” honor artifact production

- Systematic modeling and building of information and knowledge processing artifacts

New Production of Knowledge

Gibbons et al.:

“In Mode 1 problems are set and solved in a context governed by the, largely academic, interests of a specific community. By contrast, Mode 2 knowledge is carried out in a context of application. Mode 1 is disciplinary while Mode 2 is transdisciplinary. Mode 1 is characterised by homogeneity, Mode 2 by heterogeneity. [...] In comparison with Mode 1, Mode 2 is more socially accountable and reflexive. It includes a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localised context.”

Informatics in Mode 2

A “transdisciplinary discipline” a contradiction in adjecto

But Informatics is the one discipline with competence in producing software artifacts

Informatics as a technological component in a transdisciplinary process with focus on the “artefactual”

Whole process involves competence from different disciplines

Informatics in capitalism

Remember excursion?

Informatics as technology a means for the advancement of production of surplus value

- Produce new markets (for which IT technology is a necessary precondition)
- improve realization in given segments (economization)

But the products have to be “protected” by artificial means (Licenses)

Contents

What is Science?

What is Technology?

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Why to use Free Software?

Wrap Up & Discussion.

Science as Common Work

Scientific work is abstract and common work

As such, its results belong to everyone

Everyday practice in publications, conferences, sharing of results

In technological disciplines: results are often closed (use by companies, “Intellectual Property”)

In Informatics, these results are software

Dilemma

“The communism of the scientific ethos is incompatible with the definition of technology as 'private property' in a capitalistic economy” (Merton)

Struggle with different objectives:

- To advance profit
- To be a Science

Contents

What is Science?

What is Technology?

Excursion: What is something worth?

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Non-Free Software

Proprietary Software

- You pay a license fee for use of binaries (Oracle DBMS)

Freeware

- You are allowed to use binaries (Adobe Acrobat reader)

Public Domain

- The source belongs to everyone (ID3 Decision Tree)

Free Software

Free Software grants the user certain freedoms:

- Freedom to run the program
- Freedom to study how the program works and adapt it to own needs
- Freedom to redistribute
- Freedom to improve and redistribute

Non-free Open Source Software does not grant all these rights
(Apple Darwin Streaming Media Server)

Free or Open Source

- Open Source Software as a term in 1998
- Open Source: *more* development method
- Free Software: *more* social movement
- Often both consensus and collaboration in practical aspects
- Free and Open Source Software in common against Proprietary Software

Contents

What is Science?

What is Technology?

Excursion: What is something worth?

What is Informatics?

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Wrap Up & Discussion.

Moral Duties

A scientist stays a scientist also “after hours”

Brecht's Galileo Galilei: take the telescope out of the hands of the scientist and target the oppressors

Moral duty of the scientist: apply scientific ethos where possible

→ Free Software is a moral duty!

Why Free Software?

The use of Free Software licenses is adequate in two perspectives:

- As a **goal**:

 - “Freeing” the found knowledge in the sense of common, abstract work

- As a **means** (in an engineering discipline):

 - Partly overcoming Merton's problems
(movement of informatics towards sciences)

In Research

Participating in a common, abstract process

Sharing of results like elsewhere in the scientific process (papers, conferences)

Supporting the inherent skepticism

Free as in speech, but also as in beer

Research: Example I

Machine Learning: Automatic Building of Classifiers (e.g. Gene Classification)

Standard Topic: Building better Classifiers (computational time, accuracy)

Need for benchmarking

Easiest and best with original code

Existing tool sets with several Classifiers (e.g. WEKA)

Research: Example II

But: commercialization of products

Quinlan's original ID3 algorithm unrestricted

Next version C4.5 only available with book

Later versions commercial closed source

Original work not patented :-)

Now used: Tools with free and non-free re-implementations (WEKA)

In Education

“Moral argument” counts as well

Unity of research and education

In Informatics: the students can actually look into the code and see how it is done

In informatics: not learn to use specific tools, but generic concepts

Education: Example

Concept of using an IDE more important than knowledge of Visual Studio

When used to one IDE, it's easier to learn to how to a second one

When using software like Eclipse (CPL) or Kdevelop (GPL), the users get both an usable example and source code to understand the underlying concepts

Obstacles

Accumulation of Intellectual Property as success criteria (EU)

Close contact to closed source companies

Future change in universities: Need for spin offs to get money?

→ Political work is to be done

Obstacles: Example

I work with knowledge-intensive Case-Based Reasoning (CBR)

No common tool out there, existing:
Ontology Editors (Protege, license: MPL),
Ontologies, (knowledge-poor CBR shells)

We have: CREEK framework

But: Development partly funded by private company

For over 2 years try to convince to use GPL

Obstacles: Example (worse)

At NTNU, administration works with
Microsoft Windows

Documents from administration often in
Microsoft Word format

Disadvantage for GNU/Linux users

Partly solved: Bugging them until they
started sending at least RTF (not ideal)

The use of OpenOffice.org's nice import
functions can fire back!

Obstacles: Example (worst)

Norwegian state administration also trapped in Microsoft world

Recommended form for reimbursement of travel expenses comes in form of a Microsoft Windows executable

Other options would be:

- Webforms (advantage: update data)
- Java program (but Java an issue)
- PDF Forms (but PDF an issue)

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Wrap Up

Science and Technology

Science as common and abstract work

Technology as application of results

Moral duties and practical aspects

Motivation for the term Free Software

Argued for Free Software from the
“scientist's perspective”

Argued for necessity of political work

Q & A?

Discussion!

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