

The Hows, Whys and Wherefores of Open Source

or

Open source as a market reaction to regulation of the software industry

or

Why everything you've ever been told about IP is wrong.

Brendan Scott
Open Source Law
www.opensourcelaw.biz
0414 339 227



Overview



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- Intro
- Economic justifications for software copyright
- Counter examples, analysis, should theory be reconsidered?
- Some figures on software industry and why
- Have we seen any of this before?
- Thoughts on property, free software and liberty

Software Copyright?



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- Bill Gates' letter to Hobbyists 1976

“As the majority of hobbyists must be aware, most of you steal your software.... Who cares if the people who worked on it get paid?... Is this fair? ...One thing you do do is prevent good software from being written. Who can afford to do professional work for nothing?”

http://en.wikipedia.org/wiki/Image:Bill_Gates_Letter_to_Hobbyists.jpg

- CONTU Report 1978

<http://digital-law-online.info/CONTU/PDF/index.html>

- Apple Case (1983)
- Changes to the Copyright Act effected within 6 months of the decision
- Did not wait for the High Court appeal (1986 – affirmed the decision).

Part 1 – The Funding Problem



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- Collective Consumption
- Excludability
- Public Goods

Collective Consumption Goods



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- Consumption by one consumer does not reduce consumption by any other
- Also “non rivalrous”
- Television broadcast
- Theatre?

Excludability

- How easy is it to exclude others from using a good once it is produced?
- Nonexcludable = difficult to exclude others from use
 - Matter of degree
 - National defence
 - Software?
- If a good is nonexcludable each person has incentive to consume without paying for production or maintenance (as it will be available to them anyway)
- “free riding”
- Tragedy of the Commons

Public Goods



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Public Goods

- Goods which are:
 - Non rivalrous or collective consumption and
 - Non excludable
- Incentive to free ride creates financing problem
- Results in “Market Failure” - ie underproduction of the good
- photo: cc-by Tony the Misfit
<http://www.flickr.com/photos/tonythemisfit/3052219034/sizes/l/>

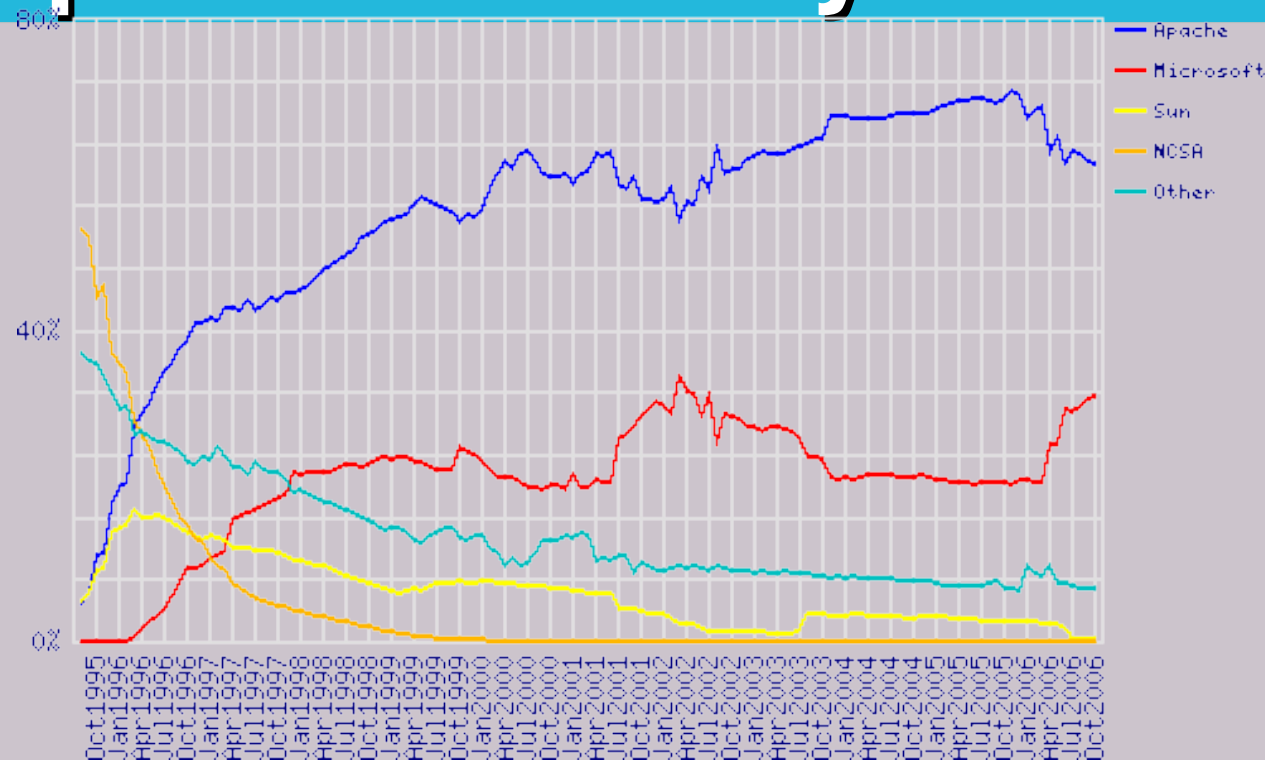
Therefore and Some Ethics



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- Software is capital intensive (could be \$\$billions)
- Software is indivisible - what use is half an accounting package?
- So if people are able to copy software for free no one will write software
- Economists typically aren't concerned with the ethics of the economy, only with how to make total production bigger (~ "efficiency").
 - efficiency is to be traded off against other benefits
 - equity of distribution of benefits of production

Part 2 – Counter Examples and Analysis



- Web server software, Available at no charge, FOSS
- Runs 61.44% of all internet sites (Netcraft October 06) NB: upswing in April 06 from Microsoft agreement with GoDaddy to park inactive domain names on Windows Server 2003

http://news.netcraft.com/archives/web_server_survey.html

Some examples of things which don't exist



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- Linux, Apache, MySQL, PHP, Email
- Internet protocols
- the Internet
 - compare its closed predecessors
Compuserve/AOL/Prodigy/MSN
- How is their existence possible - even in theory?
- Once created, how can they compete with closed source?
- Is there something wrong with the theory?

Part 3 – Rethinking the Theory



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- Software development assumption – indivisibility:
 - Driven by firms (ie non-collaborative, in house at one software developer)
 - Speculative/“big bang” model?

Assumptions – Development Driven by Firms?



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- Coase's Theory of the Firm
- Firms arise as a response to transaction costs in market.
http://people.bu.edu/vaguirre/courses/bu332/nature_firm.pdf
- Coase's arguments about firms implicitly assumed
- Do they remain true in a networked world?
- Coase's penguin
<http://www.benkler.org/CoasesPenguin.PDF>
- Need for a firm is a *consequence of and not a justification* for imposition of copyright (as copyrights create transaction costs)

Assumptions about IP – Speculative Model/ Big Bang



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- Linux kernel estimated at US\$200 million-US\$600 million to code from scratch (kernel represents about 50MB of the 2.4GB of a typical generalist GNU/Linux distribution)
- Debian Sarge 3.1 estimated at USD\$8Billion (year 2000 USD) worth of development
<http://www.upgrade-cepis.org/issues/2005/3/upgrade-vol-VI-3.html>
- Clearly can develop very expensive systems without the need for amortising development costs into licence fees.
- Software:
 - is *highly* divisible and
 - may be recombined in different configurations
- Funding problem from public goods analysis is therefore questionable.

Part 4 - Consequences of Current Approach



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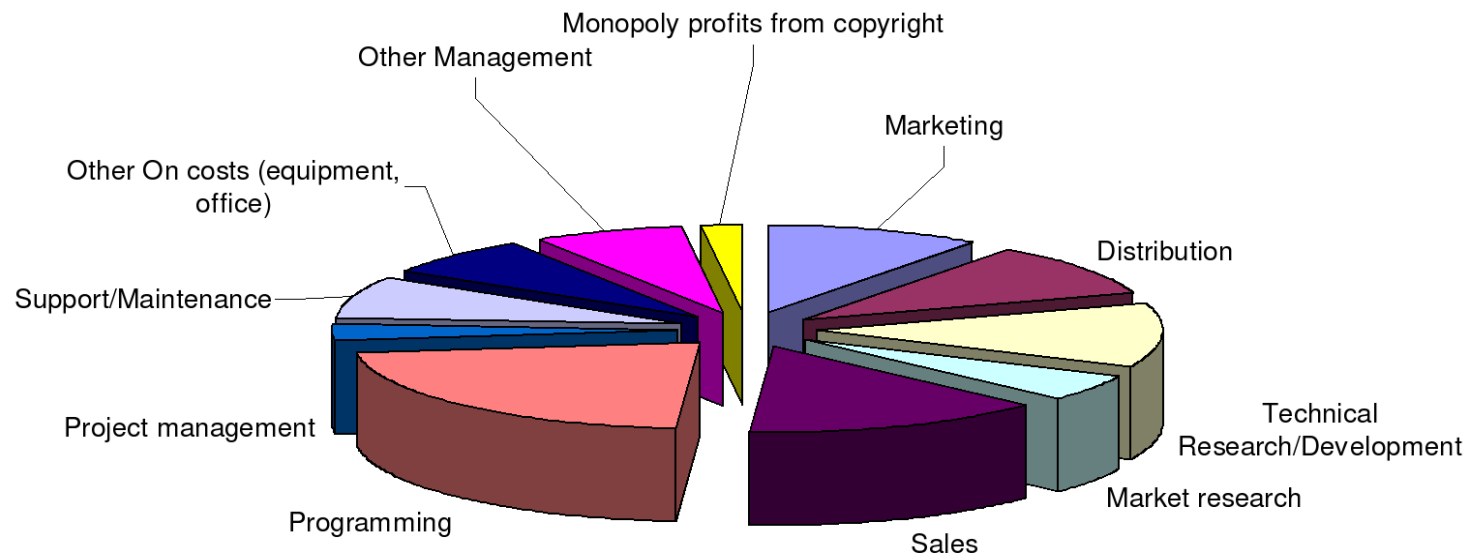
- Record of copyright in
 - producing software?
 - creating a competitive software market?
 - productivity?

Hypothetical Breakdown of Software Sale Price



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Hypothetical Breakdown of Software Sale Price

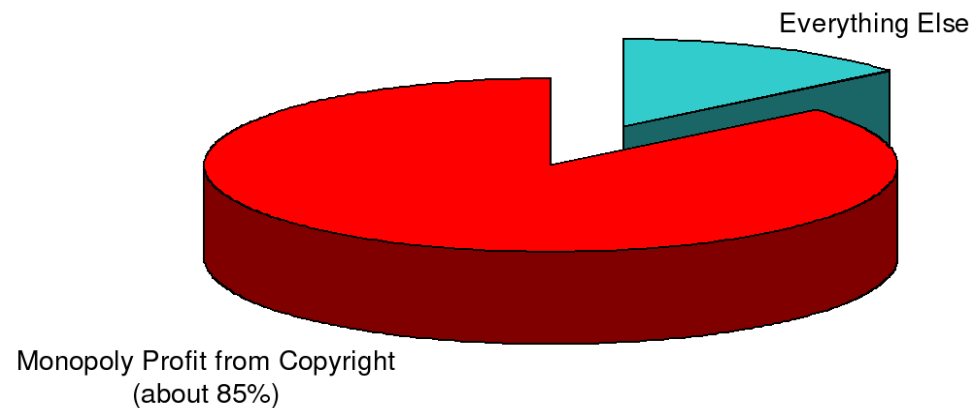


Actual Breakdown of Software Sale Price



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Actual Breakdown (Microsoft Office, SEC filing 2002)

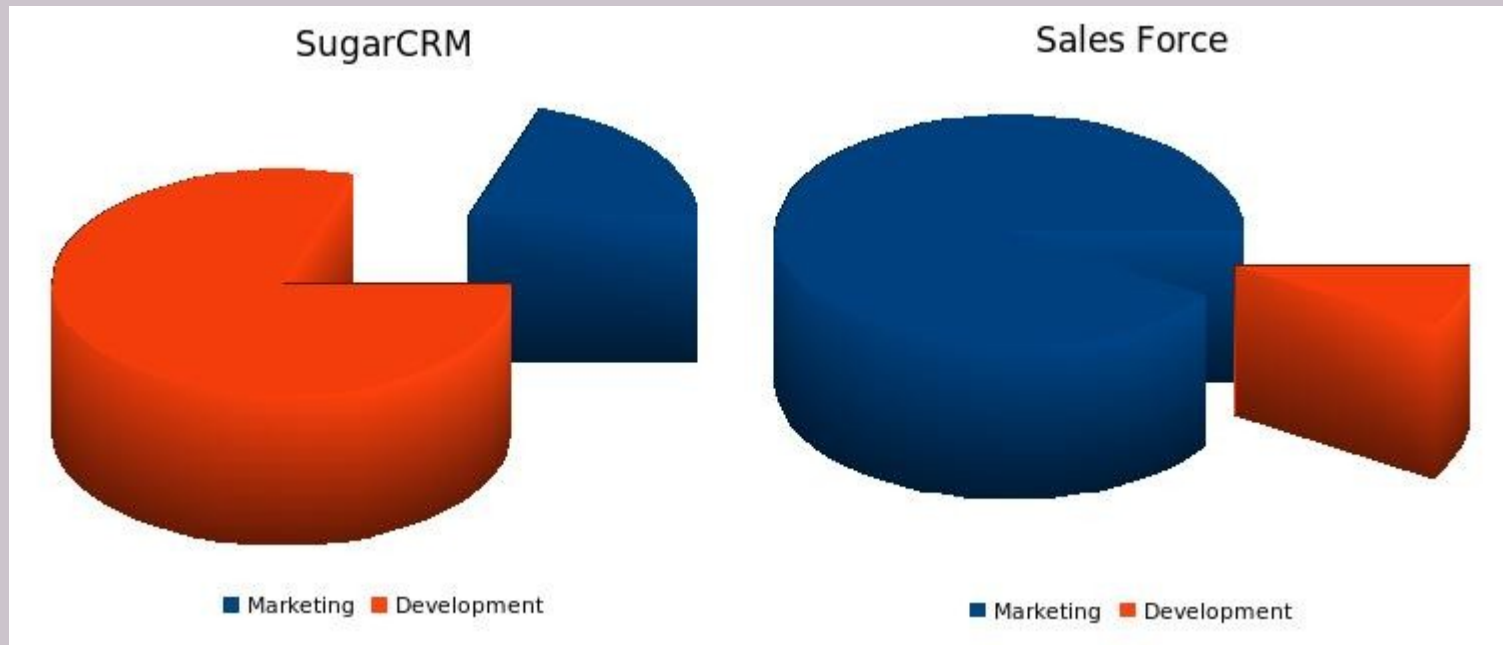


Reference: <http://zdnet.com.com/2100-1104-966219.html> (November 2002)

John Roberts on Development Spend



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Closed source (Sales Force): For every \$1 spent on software development, \$10 is spent on marketing

Open Source (SugarCRM): for every \$4 spent on development, \$1 is spent on marketing (so \$110 for Sugar buys \$88 of development and for Sales force buys \$10 of development – leverage of about 9 to 1)

Source: John Roberts at OSBC 2006, quoted in

<http://asay.blogspot.com/2006/02/john-roberts-osbc-keynote-commercial.html>

Part 5 – What Could Go Wrong?



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- Natural Monopolies
- Network Effects/Externalities
- Lack of Contestability

The Software market today



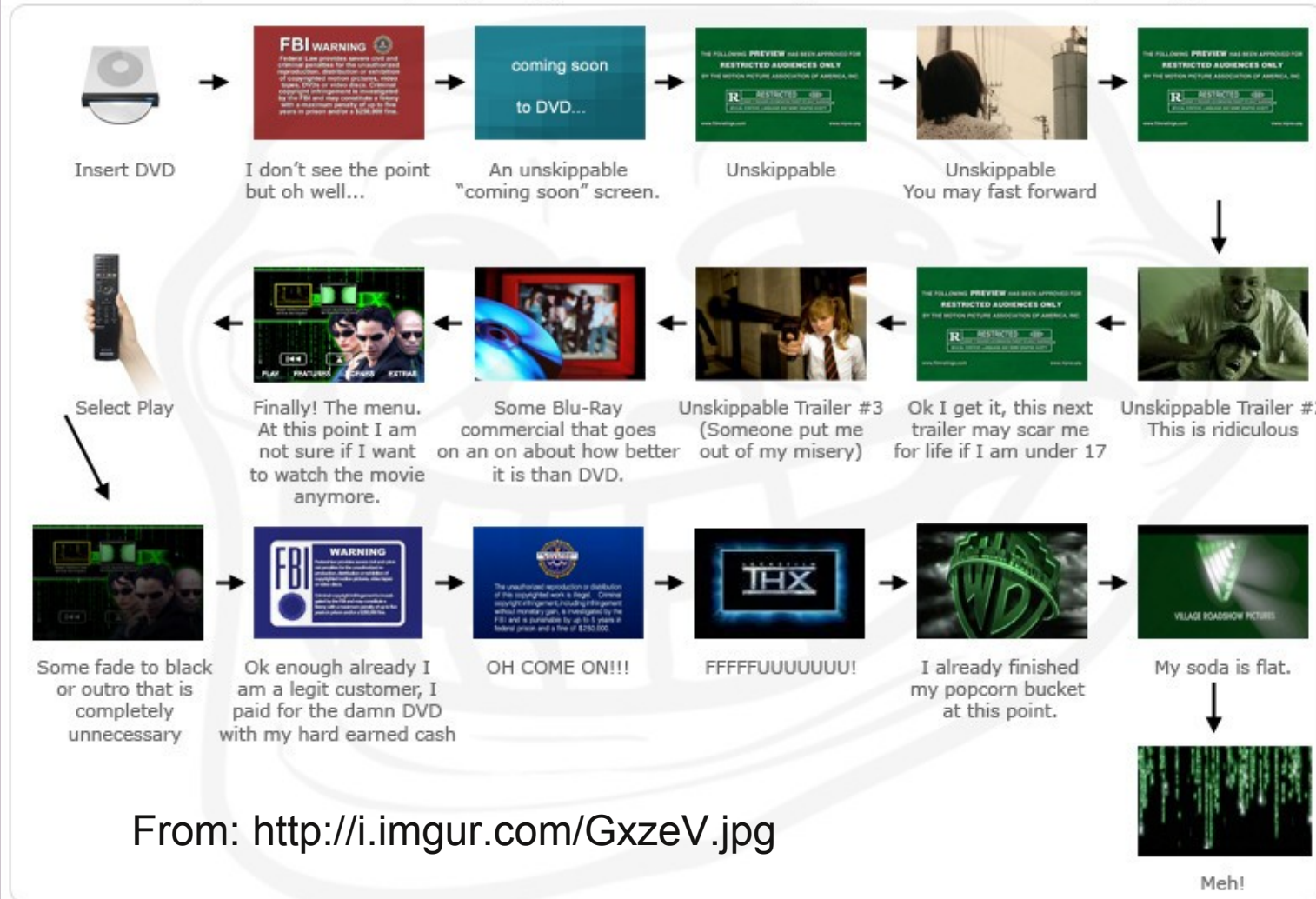
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- Natural Monopoly: Where average cost decreases with increasing demand
http://en.wikipedia.org/wiki/Natural_monopoly
- Network Externalities: Other people's use of good increases good's utility
- Tends to:
 - be a winner take all game
 - (may prefer first movers, tends to entrench position of incumbents)
- Little contestability in software markets
- Customer lock in, high switching costs

If you are a **pirate** this is what you get:



but if you are a **paying customer**, this is what you get:



From: <http://i.imgur.com/GxzeV.jpg>

And then they wonder why people don't buy their movies, **vote with your wallet.**

Nobel Prize

Winners' Views



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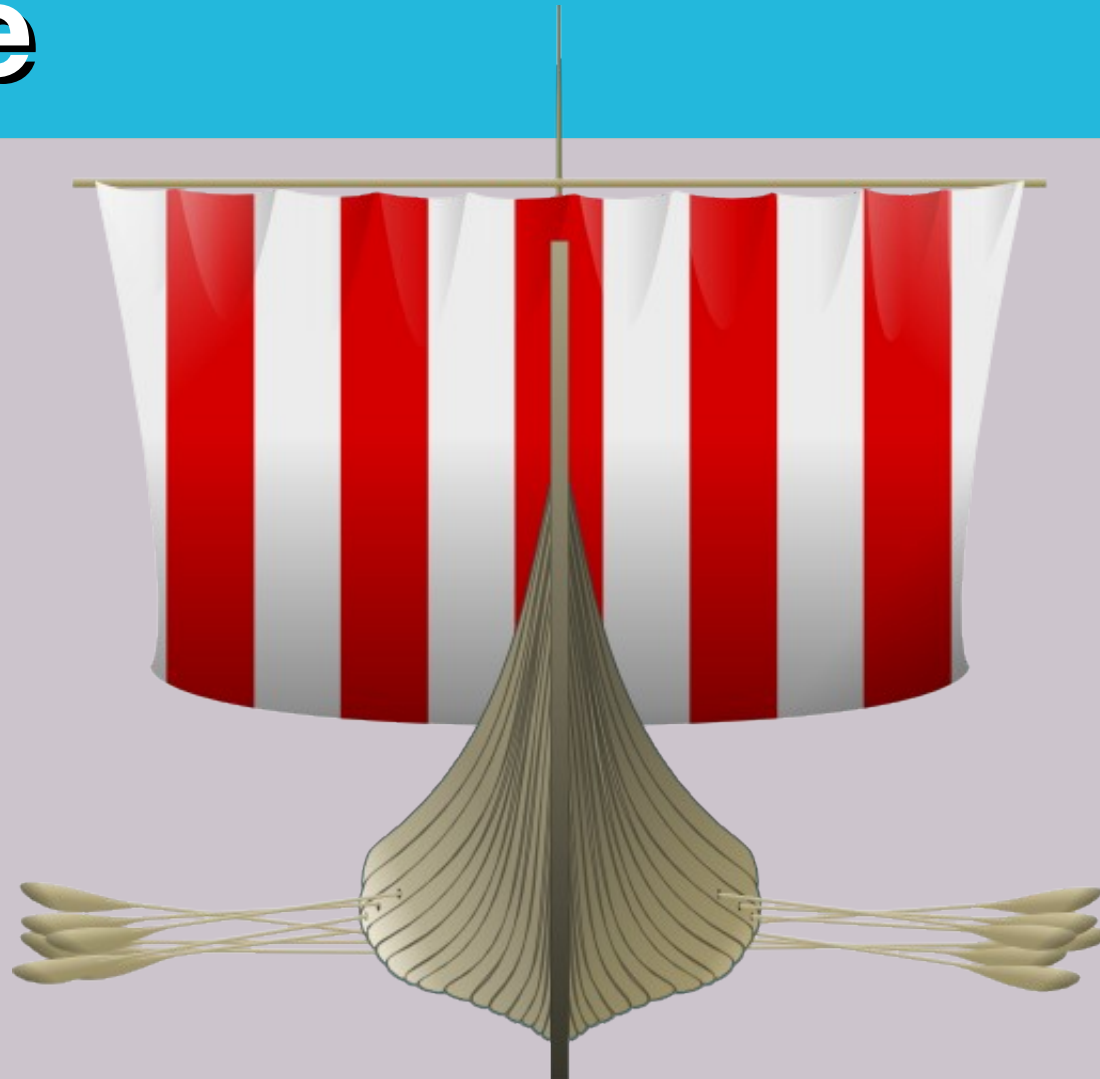
- Schumpeter (1883-1950)
 - This is a good thing
 - Increases profits for incumbents, causes aspiring monopolists to fight hard for the ground
 - Drives innovation
 - “Creative destruction”
- Stiglitz (2005)
 - *The economic rationale for intellectual property is that faster innovation offsets the enormous costs of such inefficiencies. But it has become increasingly clear that excessively strong or badly formulated intellectual property rights may actually impede innovation – and not just by increasing the price of research.*
 - *Monopolists may have much less incentive to innovate than they would if they had to compete. Modern research has shown that the great economist Joseph Schumpeter was wrong in thinking that competition in innovation leads to a succession of firms.*

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Part 6 – Back to the Future



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- <http://openclipart.org/media/files/GMcGlinn/2508>

Part 6 – Back to the Future (Feudalism)



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- Public services provisioned by direct levies of service
- In return for grant of land you must provide services to me
- “knight service” but also obligations to repair bridges, protect cattle, help churches etc.

Consequences



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- All land held by king/overlord
- No automatic right to alienate (eg sell) land without King's consent –
- Heirs needed to pay to inherit (called “incidents of tenure”)

Subinfeudation



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- For various reasons might want someone else to do the service → subinfeudation by “mense” (middle) lords
- Could subinfeudate –
 - inheritance problems (right of wardship);
 - uncertainty of title (eg default by higher up lord)
- “Mense” lords engaged in schemes to avoid inheritance taxes, wardship
- Subscription economy

End of Subinfeudation



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- Over time complex pyramid of subinfeudation – rights in land diffused
- Difficult for overlords to enforce services
- In the end King abolished subinfeudation (Quia Emptores 1290).
- Over time feudal pyramid collapsed and land began to be aggregated
- Developed organically in a simple economy
- Collapsed under its own weight as the economy became more complex

Part 7 – About Property



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- Demsetz on Property
- Discussion of IP as property
- Comparison vs free software

Property Rights



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Property rights

“Primary function of property rights is that of guiding incentives to achieve a greater internalisation of externalities”

Harold Demsetz “Toward a Theory of Property”

The American Economic Review Volume 57, Issue 2 May, 1967, 347-359

<http://www.compilerpress.atfreeweb.com/Anno%20Demsetz%20Property%20Rights.htm>

- Feudal example, subinfeudation imposed a cost on Overlords (and the King) in enforcing the feudal obligations owed to them.
- Photo: Ryan McD cc-by <http://www.flickr.com/photos/mcdnry/876678231/sizes/o/>

About Intellectual Property



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- Copyright Act has the aim of manufacturing excludability
- If property, then for the purpose of internalising an externality.
- Exactly what externality is being internalised?
- Is it negative?
- Do we try to create regimes to internalise these “externalities” in other situations?
- Looking at flowers from across the road.

Intellectual Property?

- If you sell property, you cease to control its exercise – relationship ends upon paying sale price
- Not true of “intellectual property”
- Copyright/IP not exercised as a right to possession or use, but a negative right to prevent others from using.

About Intellectual Property

- Boldrin + Levine



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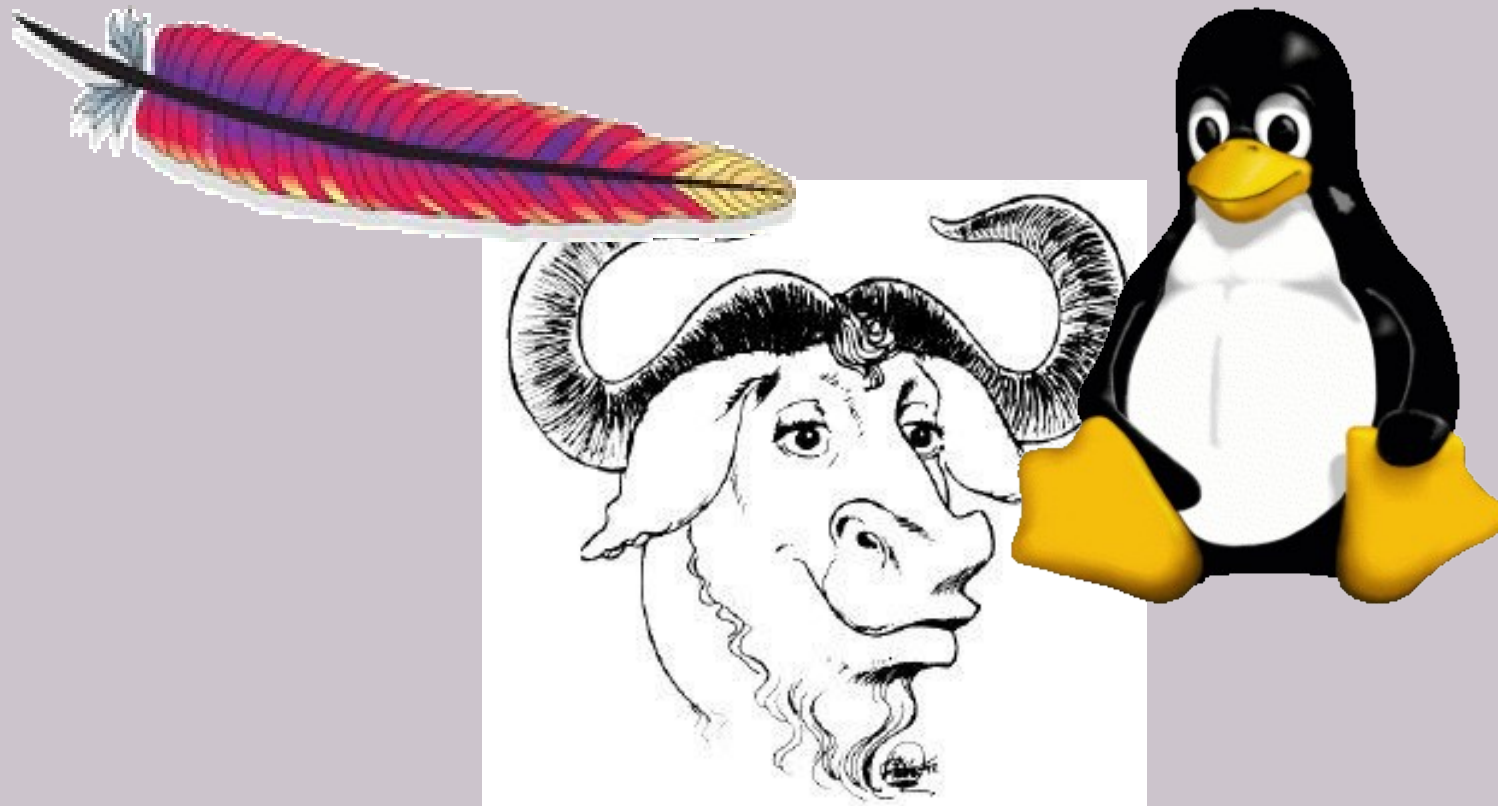
- “Intellectual Property” is in the first copy –
note: excludable, possibly rival
- “Intellectual Monopoly” is Government
intervention to restrict use of and acts in
relation to an idea/copy post the sale of that
idea/copy.

<http://levine.sscnet.ucla.edu/general/intellectual/against.htm>

Part 8 – The Unreasonable Effectiveness of Free Software



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- <http://www.apache.org/images/feather-small.gif>
- <http://en.wikipedia.org/wiki/File:Tux.png>
- <http://gnuwww.nedmirror.nl/graphics/agnuhead.html>

Part 8 – The Unreasonable Effectiveness of Free Software



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- Ethical basis of Free Software
- Success of Linux/Apache licensing
- Hayek on:
 - division of information in society
 - linkage between freedom and productivity

RMS' View of Ethics



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Free software is a matter of liberty, not price. ...

Free software is a matter of the users' freedom to run, copy, distribute, study, change and improve the software. More precisely, it refers to four kinds of freedom, for the users of the software:

** The freedom to run the program, for any purpose (freedom 0).*

** The freedom to study how the program works, and adapt it to your needs (freedom 1). Access to the source code is a precondition for this.*

** The freedom to redistribute copies so you can help your neighbor (freedom 2).*

** The freedom to improve the program, and release your improvements to the public, so that the whole community benefits (freedom 3). Access to the source code is a precondition for this.*

A program is free software if users have all of these freedoms...

<http://www.gnu.org/philosophy/free-sw.html>

FSF Chronology



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GNU Project launched – 1983 <-note date

GNU Manifesto – 1985

<http://www.gnu.org/gnu/manifesto.html>

First Free Software Definition – Feb 1986

GPL, LGPL together account for about
85%-90% of all projects on Sourceforge

Linux, Apache



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- Linux (1991)
 - Originally distributed under purpose based restriction (no commercial use)
 - Adopted GPL -> ? -> profit!
 - Choice not made on ethical grounds
- Apache (Feb 1995? - unclear)
 - Early version of Apache Licence – broad use rights, no warranty
 - organisational certainty and liberal licensing (inter alia) led to success of project

Proof is in the Pudding?



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Article: Proprietary vendors lose £30bn to open source

Open-source software is successfully displacing proprietary applications in many large companies and eating into the annual revenues of proprietary software vendors by \$60bn (£30bn) a year, according to research.

...

"Open-source software is raising havoc throughout the software market," said Standish Group chairman Jim Johnson...

The study ... states that if open-source products and services were calculated at commercial prices, open source as a whole would be equivalent to the largest software company in the world, with revenues exceeding the combined income of Microsoft, Oracle and Computer Associates.

<http://news.zdnet.co.uk/software/0,1000000121,39397439,00.htm>

Economic Value of Freedom - Hayek



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- Information is divided among all participants in society
- Each knows best how to achieve their goals
- System is too complex for central planners to anticipate
- => a centrally planned economy will always be less productive

Hayek Quote



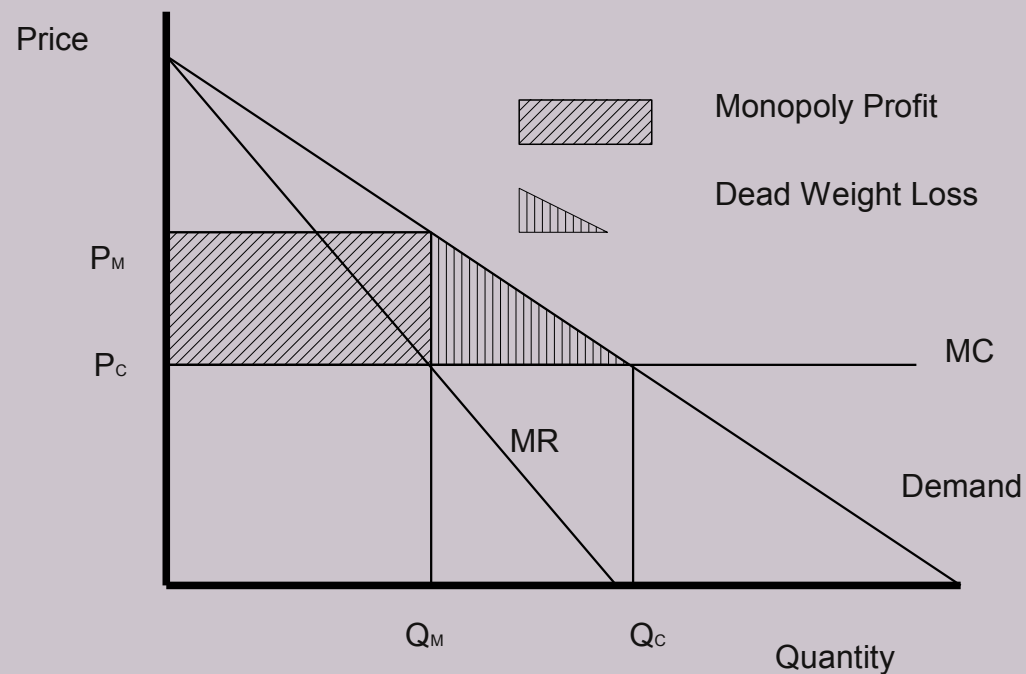
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“The enemies of liberty have always based their arguments on the contention that order in human affairs requires that some should give orders and others obey. Much of the opposition to a system of freedom under general law arises from the inability to conceive of an effective co-ordination of human activities without deliberate organization by a commanding intelligence. ... [The orderliness of social activity] cannot be the result of a unified direction if we want individuals to adjust their actions to the particular circumstances largely known only to them and never known in their totality to any one mind. Order with reference to society thus means essentially that individual action is guided by successful forethought, that people not only make effective use of their knowledge but can also foresee with a high degree of confidence what collaboration they can expect from others.”

F. A Hayek, *The Constitution of Liberty*, Routledge Classics, 2006 @ 140.

Part 9 – Wider Consequences

Pricing in a Monopoly



Note: assumes marginal cost to produce is independent of quantity

- Efficiency – that which maximises wealth across an economy

Collateral Damage



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- A negative right brings with it a need to have a different enforcement structure
- Within knowledge:
 - Inventory is
 - Infringement isn't
- Of its nature, IP requires:
 - ongoing monitoring... of everyone
 - breaking of concept of ownership
 - replacement with the subscription

Collateral Damage



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- Difficult to pursue individuals (comparatively hard to identify, expensive to pursue within the law)
- Attempts to shift liability to innocent third parties – Moorhouse v UNSW, Grokster, Cooper, Napster, iiNet, unsecured wireless cases in Germany and Coshocton
- This, in turn, requires rewriting a number of pre-existing legal principles

Undermining Principles

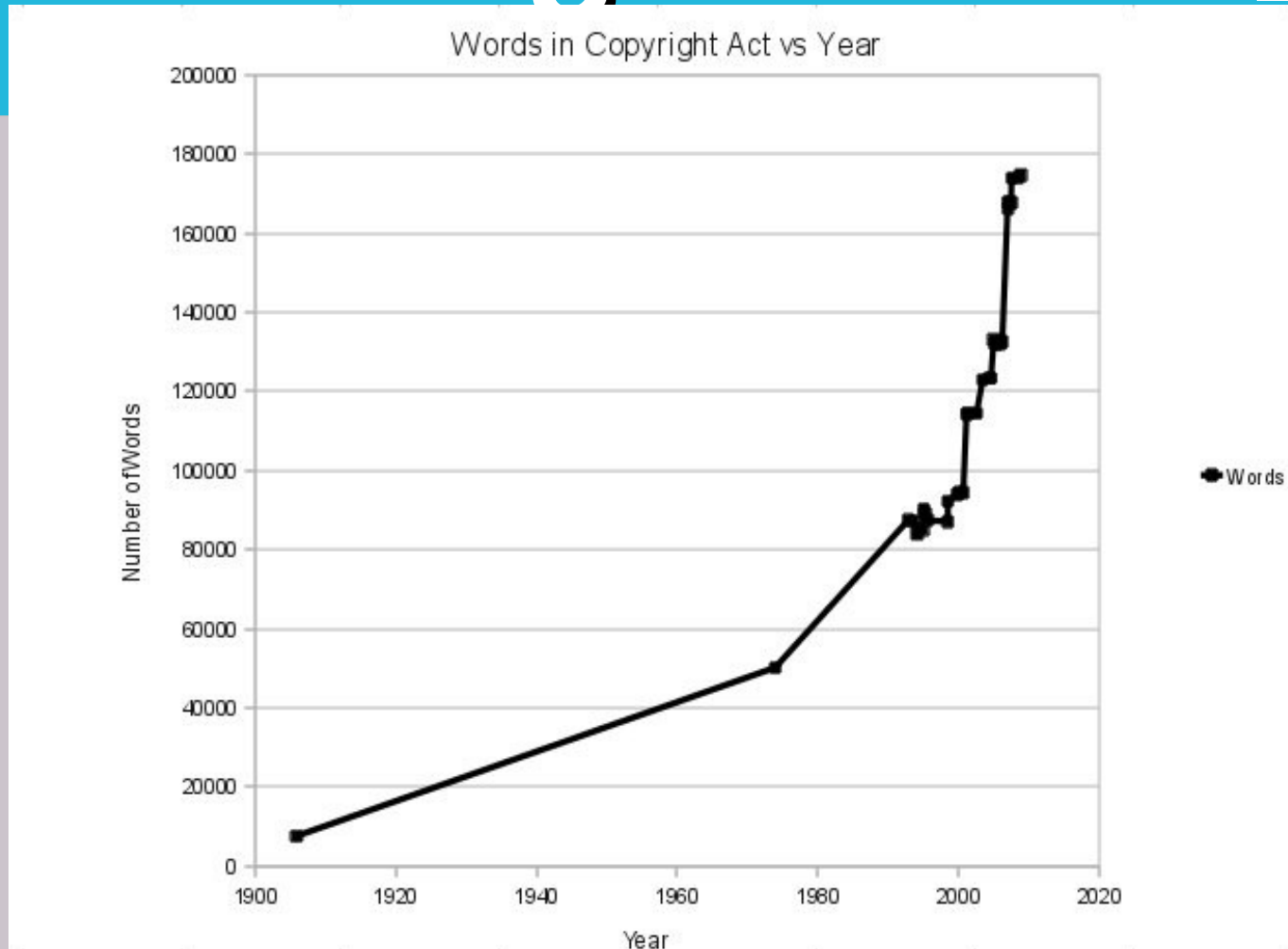


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- No requirement to prove ownership
- No requirement to suffer damage
- No requirement to prove damage
- No requirement for intention in some criminal cases
- Crime of “Commercial infringement” now includes non-commercial infringement
- If we are all copyright criminals, we can be prosecuted arbitrarily

Rate of regulation

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“Somebody must have been telling lies about Joseph K., for without having done anything wrong he was arrested one fine morning.” Kafka, *The Trial*

No Ownership



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- Life imitates Farce
 - Amazon book deletion
 - <http://www.nytimes.com/2009/07/18/technology/companies/18amazon.html>
- No certainty of title
- No quiet possession
- Move to subscription economy
- Ultimately, breaks the link between buying and ownership
- Reduces the ability of people to plan effectively

Poor Provenance



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- IP laws rarely originate from within democratic process
- Rather, formulated by lobby groups with connections to the executive. In the past decades the path has been to change international agreements, and by them, import legislation into local law
- Where 'progress' is not 'fast enough' forum is shifted (WIPO → GATT/TRIPS → Bilateral FTAs)

Impact on Civil Society



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- *"Unless the defense can see how the breathalyzer works," the judges wrote, the device amounts to "nothing more than a 'mystical machine' used to establish an accused's guilt."* http://news.cnet.com/Breathalyzer-source-code-must-be-disclosed/2100-1028_3-5931553.html
- How can a citizen test evidence?
- Speeding Cameras, breathalizers, etc, etc
- Voting machines – if there is a black box in the process how can you be assured a result is fair?

Impact on Civil Society



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- Speed Camera manufacturer required that all certifications be carried out by it (conflict of interest)
<http://www.thenewspaper.com/news/27/2736.asp>
- This is a consequence of a subscription economy

Conclusion



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- Funding Problem might be overstated
- “Intellectual property” seems more like a return to feudalism than an evolution of property
- Free Software definition is a statement about ethics.
 - Applies how/whether software “protected”.
 - Driven by underlying concern for freedom
 - Imposes ethical obligation to not interfere with others' freedom
- Promoting freedom is consistent with promoting the economy and is likely positively linked.

Thank You



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Brendan Scott

Open Source Law

inquiries@opensourcelaw.biz

brendanscott.wordpress.com

www.opensourcelaw.biz

0414 339 227

References

The following papers:

TCO: Why Free Software's Long Run TCO Must be Lower

Policy: Four Free Software Fallacies

The term “Lock in”: Lock in Software

Access Regimes and Govt: Draft Software Access Regime White
Paper

Available from:

<http://www.opensourcelaw.biz/publications>

Other Problems with Government intervention in markets



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- Rent seeking behaviour (Gordon Tulloch)
http://www.thelockeinstitute.org/journals/luminary_v1_n2_p2.html
- Distortion of market – overcommit resources to one sector at expense of others
- These aspects explain much of the disparity between price predicted by classical economics (marginal cost of production) and actual price in the market.