

The Hows, Whys and Wherefores of Open Source



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

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Overview

- Some economic theory (not an economist)
 - Public goods
 - Tragedy of the commons
- The Chosen Solution
- About the software industry
- Example of open source product (Apache)
- Assumptions of old software development model
- Open source
- Some more economics
- Some things you can think about

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Short History

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).

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Collective Consumption Goods

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

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Excludability

- Is it easy to exclude others from using a good once produced?
- Nonexcludable = difficult to exclude others from use
- Matter of degree
- National defence
- Software?
- Commons is excludable (Enclosure Acts)

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Excludability and Free Riding

- If a good is nonexcludable each person has incentive to consume without paying for production (as it will be available to them anyway)
- “free riding”

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Public Goods

- Non rivalrous or collective consumption and
- Non excludable
- “Public goods provide a very important example of market failure. Because no private organisation can reap all the benefits of a public good which they have produced, economic theory concludes that there will be insufficient incentive to produce it. Consumers will take advantage of public goods, without contributing sufficiently to their creation. This is called the free rider problem, or occasionally, the “easy rider problem” (because consumer’s contributions will be small but non-zero).”
- http://en.wikipedia.org/wiki/Public_good

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Tragedy of the Commons

- Common land available for use by members of a community
- Each person has an incentive to overgraze at the expense of others
- Lack mechanism for apportioning costs
- One solution is to privatise the commons/give each individual a property right over a share.
- http://en.wikipedia.org/wiki/Tragedy_of_the_commons

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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>

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How to Apportion Property Rights - Coase's Theorem

- “[Coase's Theorem] may be summarised as stating that if private parties can bargain without cost over the allocation of resources, then they will be able to resolve an externality, resulting in the efficient allocation of resources.”
- “However, if the interested parties cannot reach or enforce a bargain, or if the bargaining process incurs a transaction cost, then the externality will not be resolved and will require the intervention of another party, the government.”
- http://en.wikipedia.org/wiki/Coase_Theorem
- The Problem of Social Cost -<http://www.sfu.ca/~allen/CoaseJLE1960.pdf>

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Joining the Dots

- Software is a public good
- Because of its nonexcludable character there is insufficient incentive for the creation of software = market failure
- Questions?
- Suggestions?

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Therefore “Intellectual Property”

- Collections of exclusive rights granted by State through legislation to achieve specific consequences
- Copyright = incentive for creation of works
- Patents = disclosure of inventions (NB: query whether actually stimulates invention because secret use is already an incentive)
- Necessary to have property because without it insufficient incentive to invest in software
- June 1984 Copyright Act extended to cover electronic reproduction

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Consequences of Intellectual Property?

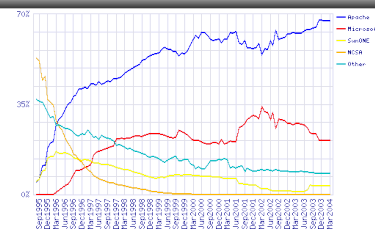
- Attempt to manufacture excludability
- Artificial scarcity
- Excludability proportional to enforcement – cost shifting
- Necessary evils, because without them insufficient incentive to produce software (addressing a market failure)

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Apache



- Web server software
- Available at no charge
- Runs 67% of all internet sites (Netcraft March 04) http://news.netcraft.com/archives/web_server_survey.html

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Apache

- Rose to dominance off:
 - Community need
 - Dissatisfaction with vendors' products
 - Community willingness to contribute
 - Existing seed (NCSA server)
 - Embraced radical approach to licensing
 - www.apache.org

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Some examples of things which don't exist

- Linux
- Apache
- MySQL
- PHP
- Email
- Internet protocols
- Vast majority of information available over the internet – compare its closed predecessors CompuServe/AOL/Prodigy/MSN
- Is there something wrong with the theory?

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Problems with Government Intervention

- If you do it wrong you can create a monopoly or a cartel
- It is problematic of itself because it has a negative influence on behaviour
- What if you don't actually create property?

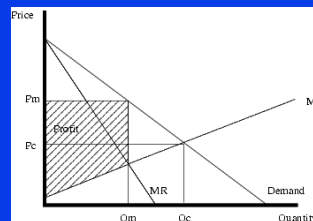
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About Monopolies (diversion)

Efficiency – that which maximises wealth across an economy
Monopolies are bad ok?



Reference: <http://en.wikipedia.org/wiki/Monopoly>

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Cartels (diversion)

- Agreements among competitors can increase profits for competitors by (eg): limiting supply, dividing territories, setting prices
- Hard to police (members break ranks), may be illegal
- Formation of "trusts" in US – legal ownership of assets in a central company, controlled by trustees – easier to police. Standard Oil Trust Agreement 1879 (others followed). Public outcry as prices increased. (Rockefeller)
- Trusts were founded on the property rights in the assets controlled by the trust
- Sherman "Anti-Trust" Act made this illegal in 1890
- "Anti trust" has come to apply to more general competition regulation.

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Cartels

- Post sale control over asset permits implementation of traditional cartel
- Exclusive licensing deals
- Market sharing arrangements
- Price fixing/tax games (as the price of the IP is fluid)
- Many have explicit exemption from competition policy (eg s 51(3) TPA)

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If Everyone Gets a Monopoly, surely that's fair?

- If everyone has the same entitlement to a monopoly, doesn't everyone receive the same benefit?
- If the rules of basketball are fair how come so many tall guys play?
- Large firm v small firm (NB: different in kind from effects where property involved)
- Patents

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The Software market today – Natural Monopolies

- Where average cost decreases with increasing demand
- Eg: software, telecommunications?
- http://en.wikipedia.org/wiki/Natural_monopoly
- Tends to:
 - prefer first movers,
 - entrench position of incumbents

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The Software market today – Network Externalities

- Other people's use of good increases good's utility
- Eg: telephone networks
- .doc format
- Tends to:
 - prefer first movers,
 - entrench position of incumbents
- Margolis and Leibowitz dispute the existence of network externalities see -<http://www.utdallas.edu/~liebowitz/jep.html>

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The Software market today - Contestability

- Describes difficulty competitors have in entering a market
- Software markets do not appear to be very contestable at a product area level
- Customer lock in, high switching costs
- Tends to:
 - entrench position of incumbents
- Lack of contestability possibly a result of natural monopoly nature, network externalities involved.

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Government Intervention - Bessen, Boldrin + Levine

- Patents used strategically (ie as bargaining chip in negotiations)
- Cross licensing between large players
- <http://www.researchoninnovation.org/thicket.pdf>
- Can lock out smaller entrants
- May create oligopoly/entrench incumbent's position.
- Defensive patents
- Growth in patenting not matched by growth in total factor of production statistics
- <http://levine.sscnet.ucla.edu/papers/ip.ch.4.m1004.pdf>

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Other Problems with Government intervention in markets

- 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.

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Government Intervention - Bessen + Hunt

- Empirical research on software patents
- Software industry underrepresented in patent filings - 15% of patents software related, but only 5% held by software publishers.
- Increase in software patents correlated with relative decrease in R&D intensity – patents are inversely related to R&D!!!
- <http://www.researchoninnovation.org/swpat.pdf>

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Assumptions about IP - The Lock In Paradigm

- Cornerstone of most copyright rhetoric
- Dead Content Model
- Copyright specifically structured to create product level monopolies – ie to enable vendors to lock in customers in respect of a product.
- Vendors derive clear benefits from the lock in paradigm – permits them to extract above market profits
- Mindlessly adopted by customers – customers typically have no interest in lock in. Lock in is typically against a customer's interest.
- Need to think differently when Customer is funding development and assuming speculative risk.

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Assumptions about IP - Software

- Software development assumption – indivisibility:
 - “big bang” model?
 - Speculative?
 - Non collaborative (ie in house at one s.ware developer)
- Software development a manufacturing model.

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Assumptions about IP - Apache

- What was so different, and why was it important?
- Apache licensed on early version of Apache Licence.
- Do what you like with it but:
 - give us credit where due
 - don't use our name for your own projects
 - No warranty.
- Copyright monopoly implies that competition is decreased and therefore costs to consumers are increased
- Apache group took a punt that cost of copyright outweighed benefit to them as consumers of copyright product

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Assumptions - Open Source Drivers

- Massively scaled incremental innovation
- Licensing structured to promote:
 - free market for software,
 - low transaction and administration costs
- Free market = competition = lower cost base
- Use value
- Product which is in constant flux
- In this environment does “the software” exist as an abstract good which can be bought and sold?

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Assumptions about IP - Speculation and Risk

- Speculative software development the minority of market (15%-25%?)
- Balance of development either set projects (no relevant risk) or in house development (again no risk, little prospect of sale)
- Moron Purchaser Theory
- Money + desire to achieve outcome + competitive market = outcome

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Assumptions - Non-collaborative

- Coase's Theory of the Firm
- Ronald Coase
- The Nature of the Firm/application to "big bang" development
- Firms arise as a response to transaction costs in market.
- <http://people.bu.edu/vaguirre/courses/bu>

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Coase's Penguin

- Coase's arguments about firms have been implicitly assumed when analysing software production
- Do they remain true in a networked world?
- Coase's penguin - <http://www.benkler.org/CoasesPenguin.PDF>

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Re-approaching Coase's Theorem

- "[Coase's Theorem] may be summarised as stating that if private parties can bargain without cost over the allocation of resources, then they will be able to resolve an externality, resulting in the efficient allocation of resources." [restatement from above]
- In other words, if transaction costs are sufficiently low:
 - there may not be any need for intervention; and
 - it should not be surprising if economic activity is dispersed.
- Moreover – if transaction costs are not low then how the property rights are apportioned becomes very significant

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About Intellectual Property

- Copyright Act has the effect of manufacturing excludability
- 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.

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Intellectual Property?

- If you sell property, you cease to control its exercise
- Not true of intellectual property
- Effects a product level monopoly over goods
- Substitutability?
- Exactly what is property?
- Is it sensible to base property on an abstraction?

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About Intellectual Property - Boldrin + Levine

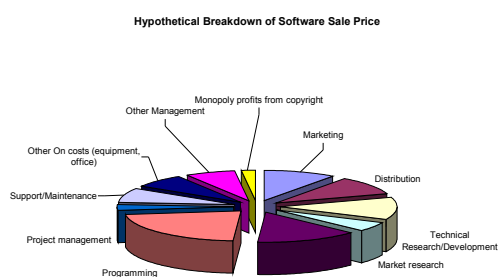
- "Intellectual Property" is in the first copy – note: excludable
- "Intellectual Monopoly" is Government intervention to restrict use of and acts in relation to an idea post the sale of that idea.
- <http://levine.sscnet.ucla.edu/general/intellectual/against.htm>

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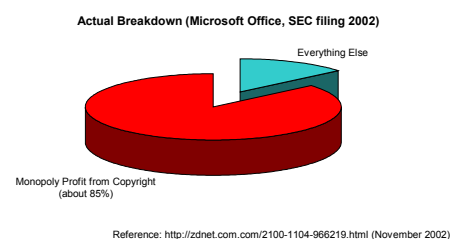
Hypothetical Breakdown of Software Sale Price



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Actual Breakdown of Software Sale Price



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Thank You

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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>