

GEEKS BEARING GIFTS

OPEN SOURCE SOFTWARE AND ITS ENEMIES

Australia should be wary of extending its intellectual property law, argues **Nicholas Gruen**

No scientific inquirer can keep what he finds to himself or turn it to merely private account without losing his scientific standing. Everything discovered belongs to the community of workers. Every new idea and theory has to be submitted to this community for confirmation and test. There is an expanding community of cooperative effort and of truth. . . . [T]hese traits are now limited to small groups But the[ir] existence reveals a possibility of the present. . . . The general adoption of the scientific attitude in human affairs would mean nothing less than a revolutionary change in morals, religion, politics and industry.

John Dewey¹

If people had understood how patents would be granted when most of today's ideas were invented and had taken out patents, the industry would be at a complete standstill today A future start-up with no patents of its own will be forced to pay whatever price the giants choose to impose.

Bill Gates²

Prologue

Half way through Peter Weir's film 'Witness' there is a barn raising. As Maurice Jarre's synthesised monotonous transform themselves into a symphony, so the lives of those we see are transmogrified into a thing of simple and enduring utility, a monument to the miracle of human co-operation and endeavour.

Those viewers whose hearts have not turned to stone marvel at what they see. They have one of those moments when they wonder why life can't be more like this. Perhaps some contemplate how to make it so. Then their reveries fade and they return once more to life in its fallen state.

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The scene would be even more stirring if, once built, the barn would last forever, be freely available for anyone to use and to improve upon—with those improvements being likewise available for any and everyone to enjoy. More stirring still if this was just the beginning, so that once the barn was raised self-interested firms large and small were somehow drawn, quite freely into the same process of further building and maintaining it for their own, and the common good.

If all this came to pass who might try to stop the new methods? Those whose interests were threatened by them. And what better vehicle for them to use than the laws of the land—both those that existed before the new methods proved their worth and new ones that lawmakers might be persuaded to introduce?

All this is happening in the world of open source software (OSS).

Smithian virtues, Smithian threats

Along with micro-credit, OSS represents a new and exciting economic form which exemplify themes associated with Adam Smith. Firstly, as the great Austrian economist Carl Menger observed ‘Smith placed himself in all cases of conflict of interest between the poor and the rich, between the strong and the weak, *without exception* on the side of the latter’.³

As these new economic forms provide new possibilities for the underdog, they demonstrate the seemingly miraculous qualities of free competition within markets. Both are also founded on Smith’s other great theme—the bonds of human sympathy or what passes by the less euphonious neologism ‘social capital’. Their unique mix of these competitive and cooperative virtues provides these new economic forms with the additional excitement of ambiguity along the ideological spectrum.⁴

This essay explores OSS and explains why it is more than just ‘sharing’. Having outlined OSS’s merits, it explores the threats to OSS from the same forces that Smith saw as threats to his own vision of a community growing in opulence as it grew in liberty and civic virtue. That threat is the subversion of both public sentiment and government policy by the self-interest of the rich and powerful or what I call the producer-driven political culture of mercantilism.

Problems of source code secrecy

All computer software is ultimately ‘binary’ or ‘object’ code—a set of instructions to a computer written in a list of ‘1’s and ‘0’s. But binary coding is generated by ‘compiling’ it from ‘source code’ written by programmers in a programming language—like ‘Visual Basic’ or ‘C++’—that is an amalgamation of formal logic and natural written language.

To understand how software works, add functionality, fix bugs, or extend software, programmers need access to the source code. But with ‘proprietary software’ sold for profit by firms like Microsoft, source code is generally kept secret to minimise free riding on the owners’ programming investment.

This involves three inefficiencies.

- It prevents those who might want to ‘tinker’ with software from identifying and fixing bugs and/or sharing their improvements with others.
- Especially where there is spare capacity, as is the case with software, prices above marginal cost (i.e. the cost of producing the last unit of output) suggest inefficiency. The problem is acute as marginal cost pricing of software would be zero—an unpromising commercial prospect.
- Network externalities—the benefits of using software that is compatible with what others are using—can perpetuate monopolistic prices and poor product quality long beyond the period necessary to allow investment costs to be recouped.

Free as in speech: why OSS isn’t just ‘sharing’

OSS is the brainchild of MIT programmer Richard M Stallman who saw the academic culture of sharing and peer review from whence he came as a powerful solution to these dilemmas. Not only were his colleagues deserting to the commercial world in droves, but donating coding to the public domain was becoming increasingly Sisyphean. A programme, standard or protocols in the public domain could be embraced by proprietary software producers, and then ‘extended’. If users adopted the extensions—for the improvements they offered, or simply to facilitate interoperation with existing software—the initial software could be effectively privatised. The extending firm could then distribute

the public software along with its extensions—less the source code for the extension.

Stallman's development of the General Public Licence (GPL) was a direct response to this strategy to privatise public domain software which has become known as 'embrace, extend, extinguish'. The GPL asserted owners' traditional copyright in their software and tied the right to use it (whether conveyed by gift or by sale) to users' rights to freely access the source code. Thus the price of access to the asset of existing 'open source' or as it was then called 'free' software was that any extension to it would remain open source. This 'viral' quality distinguishes OSS as a new economic form. Though OSS has been an inspiration behind a growing enthusiasm for 'sharing as a modality of economic production' often assisted by the internet,⁵ OSS is not just 'sharing'. Sharing over the internet is integral to its rise, but the engine driving OSS is the fact it cannot be accessed without abiding by and so standing to propagate its terms.⁶

In the early 1990s Linus Torvalds wrote the Linux kernel which together with other modules already build by Stallman's 'Free Software Foundation' could operate as a complete operating system. Self-appointed official chronicler of OSS Eric S Raymond argues Linux's most important feature 'was not technical but sociological'. Until Linux, everyone, including Stallman had believed that complex software had to be 'carefully coordinated . . . by a relatively small, tightly-knit group'. But Linux 'was rather casually hacked on by huge numbers of volunteers coordinating only through the internet.

Quality was maintained not by rigid standards or autocracy but by the naively simple strategy of releasing every week and getting feedback from hundreds of users within days, creating a sort of rapid Darwinian selection on the mutations introduced by developers. To the amazement of almost everyone, this worked quite well.⁷

To use Friedrich Hayek's terminology, OSS development occurred within a new kind of 'catallaxy' or a self-organising system of voluntary exchange. The circumstances of its creation, and the possibilities for its development illustrate the cosmopolitan allusions that Hayek intended for the term. A catallaxy makes friends of enemies by admitting them into the community.

A new way of working: to love, honour and obey

As production becomes more knowledge intensive and the division of labour more complex both within and between firms, hierarchical production systems of command and control are increasingly disadvantaged. Feedback between users and producers at each stage of production becomes increasingly important. So too does engaging the knowledge and creativity of workers in continually improving productivity within the system and so their 'intrinsic motivation' in their work for its own satisfaction rather than for other extrinsic rewards. And these things are facilitated in their turn where ways are found of maximising workers' autonomy and work satisfaction subject to the needs of the production unit.

The development of institutions in which human autonomy, capability, morale and productivity have grown together has thus driven the development of human progress in the workplace. The move from the pure hierarchy and coercion of slavery towards institutions in which the worker gains greater autonomy—for instance sharecropping and wage labour—are steps in this story of progress. So too is the move from mass production towards the less hierarchical 'post-Fordist' production which engages workers as teams of semi-autonomous collaborators has been one move in this story of progress. Without suggesting that it will dominate modes of production outside its current areas of strength, OSS surely belongs in this story of ascent.

It is a world of constant, rich, multi-dimensional feedback. The drivers of OSS development are neatly encapsulated within the undertakings of the marriage vow—to love, honour and obey, though the first two terms probably apply more strongly to OSS within the hacker culture than within the corporate culture which increasingly dominates OSS production.

Firstly, hackers typically see themselves—as motivated by the love of programming well—a not implausible motivation for 'hobbyists'. Secondly, as in science, academia and the professions, reputation—one might call it 'honour' amongst peers—is also central not only in motivating, but in organising and in ordering OSS priorities.⁸ And with psychological literature reinforcing what

we intuitively know—that monetary reward and hierarchy often impair intrinsic motivation—OSS within the hacker community protects itself against this in the most radical way. Monetary reward is not on offer. And what hierarchy there is is ultimately freely consensual.

As Raymond puts it, evidently Linux's free market in ego-satisfaction 'works better to produce virtuous, other-directed behaviour than the massively-funded documentation shops of commercial software producers'.⁹ Microsoft's confidential internal documents broadly agree.. 'The ability of the OSS process to collect and harness the collective IQ of thousands of individuals across the Internet is simply amazing'.¹⁰ OSS is often better designed, more reliable and secure than proprietary software.

Yet the most important feature of OSS which accounts for its distinctiveness as an economic form and also the way in which it has moved from the hacker culture into the corporate mainstream is the obedience it requires to the terms of its licence. This radically undermines the commercial attractions of hoarding code because the functionality of any enhancements to OSS cannot be on-sold without conferring on the buyer(s) the right to distribute the enhancements and their source code themselves.

The way is then cleared for a chain of cumulative development in which—to use the hacker slogan—participants 'give a little and take a lot'. Once a core OSS programme exists, it is developed by those who use the software and—to meet their own needs as users—enhance it to extend functionality and/or fix bugs.¹¹ In the corporate world OSS development then emerges as a co-product of business development. Today IBM has over 600 programmers working on Linux¹² and while some individual volunteers and government agencies still chip in, more than 90% of the new Linux enhancements or 'patches' now come from employees at tech companies.¹³

By giving a little back to the OSS project, (code enhancements on which costs are already sunk) OSS users can take a lot (the asset of the existing and developing OSS). And with the OSS licence having undermined incentives to hoard, it turns out that the remaining incentives are to share. If the patch is accepted within the OSS project, the developer avoids the cost of rebuilding its enhancements

back into each new release of the core software, or worse still having others add incompatible enhancements.¹⁴

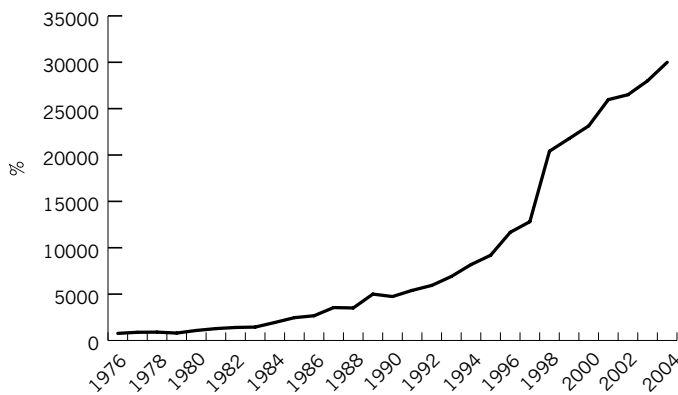
FUD reborn—Software patents

Just as its dominant predecessor IBM used to trade on the folk wisdom that 'no-one ever got sacked for buying IBM' Microsoft's first line of defence against competitors goes by the geek acronym 'FUD' and involves the kindling of fear, uncertainty and doubt about competitors in the minds of software buyers. Even if competitors products are better or cheaper, will their products interoperate with Microsoft's dominant software in the future and will they survive to back their products? Yet internal Microsoft documents concede that FUD is not winning the war to stop OSS. Until recently a central strategy of Microsoft has been to 'embrace, extend and extinguish' existing open standards.¹⁵

Yet the unfolding morass of software patents is putting a new spring in the step of Microsoft's FUD campaign. Playing down various precedents that might have been used to prevent it, US Court decisions of the early 1980s opened the way to the patenting of both software and business methods. Further, patent law imposes an 'innovation hurdle' requiring that ideas be non-obvious to qualify for patents. These requirements have been interpreted increasingly liberally. Patent offices have lacked the resources to keep up with the flow of patents and satisfactorily examine and reject patents. Policy makers have also sought to support innovation by giving potential patentees more of the benefit of any doubt about their patents. And patent offices have often identified with IP applicants as their 'customers'.¹⁶

A slew of absurd software patents have followed including patents for 'one click' internet shopping,¹⁷ peer review and recommendation of products on a website,¹⁸ 'tabbing' between links on a web page,¹⁹ and on and on. Obviously this carnival of lawyers increases both the cost of software development and its risk.²⁰ Microsoft's patent applications have risen steadily from 1,000 per year a few years ago to 3,000 this year.²¹

Microsoft CEO Steve Ballmer recently made clear the strategic attractions for large firms of the FUD generated by software patents. Microsoft's dominance enhanced 'the intellectual-property

Figure 1. US software patents, 1976-2004

Source: Bessen and Hunt, *An Empirical Look at Software Patents*, (2003), p. 36. Data from 2001 was provided in personal communication with James Bessen. 22.

indemnifications we give our customers. . . . We can stand behind our products in a way that open source can't because they have no one standing behind them'.²³ A recent examination of Linux code found 283 potential patent infringements. 27 of the relevant patents were held by Microsoft and 98 were owned by Linux allies.²⁴ None of them have been litigated for various reasons not least because that would ultimately dispel some uncertainty.

As ever, the most significant costs are likely to be the least visible. What little empirical analysis exists confirms what is intuitively obvious—that software patents are depressing software investment.²⁵ Andrew Tridgell creator and manager of OSS project Samba which provides print and file services to open source operating system Linux and assists it interface with Windows file systems says that he now spends a very large proportion of his time on legal issues. 'It's a big lottery, with the whole world paying the bill.'²⁶ Linus Torvalds believes software patents now represent the single biggest threat to OSS.²⁷

Meanwhile Open Source Risk Management is a start-up planning offer patent infringement insurance. Premiums start at US\$150,000 per annum. Corporate resellers of Linux are also stepping into the breach.²⁸ Their indemnity is often an undertaking to its customers to counter-sue any would be litigant with their own armoury of software patents.²⁹ Thus, as Gates' warning above implies, a 'patent pool' is developing.³⁰ Something similar developed in the wake of anti-trust activity in the twentieth century in both chemical and petrochemical industries. There

large firms held portfolios of patents giving them effective technological veto power over each others' activities. The large firms were able to use the pool to entrench their oligopoly by preventing the entry of newcomers to the industry.³¹ This approach has been dubbed 'mutual assured destruction' within the industry. But however viable this might be in an oligopoly, as it was viable between the US and the USSR, there are plenty of patent owners who are minimally exposed to retaliation.

Thus for instance *Eolas*, a University of California spin-off, has so far successfully sued Microsoft for patent rights to embedding small interactive programmes, such as plug-ins or applets, into online documents.³² The US Congress is at long last considering reining in software patents—by raising innovation hurdles, and limiting the size of damages. Illustrating the themes of this essay, the legislation suits Microsoft's interests particularly well, involving as it does 'specific language tailored to overturn *Eolas v. Microsoft* and eliminate any chance that Microsoft will have to pay that \$521 million'.³³

What can be done?

Is IP being extended because careful thought suggests it is in the public interest consistent with any of the political philosophies which influence our thinking today—liberalism, conservatism or social democracy? No. Though much of the current situation was instigated within government administration and the judiciary, its momentum and our apparent inability to undo its errors are now well entrenched by the a political culture driven by incumbent producers or what I call the politics of mercantilism. Just as the mercantilism of Adam Smith's day and beyond equated trade protection with the jobs it created (rather than those it destroyed) so today's IP debate is dominated by extreme and misleading claims. Such claims include the idea that IP is 'just like any other property'—suggesting for instance that IP rights should not ever expire and that accordingly we should still be paying royalties to the estates of inventors back to antiquity whose shoulders we still stand upon. Another is stronger IP promotes investment in innovation *ipso facto* when, at least in this case, the contrary evidence is overwhelming.

US firms and their government are also seeking to export their own problems to others. Amid a

slew of mostly indefensible extensions to IP law, AUSFTA introduces additional constraints on Australia's ability to tackle the problems in software patenting. But it does appear to leave the way open for Australia to insist upon much higher innovation hurdles than those imposed in the US, which would avoid many excesses of the American situation.³⁴

Australia is a leading exponent of unpicking the handiwork of mercantilism both within its own shores and internationally. There are any number of specific actions we could take. We could start by asserting the role of some basic economic principles which should dominate other considerations. Thus, for instance we should vigorously and loudly resist any further retrospective extensions of IP. We should do whatever possible domestically and internationally to defend and extend open standards in ICT. If services were not expressly excluded, defacto standards like Microsoft Word would attract access regimes under our national competition policy. At least in software we should remove this anomaly and treat the subject on its merits.

More generally we should import into our own IP policy making the safeguards of 'due process' we established for border protection. Though established as part of the apparatus of 'fortress Australia' the institutions thus established were subverted by economic reformers and now guarantee that changes in tariff levels require an independent public inquiry to assess the economy wide consequences. We should do the same for changes in intellectual property.

We could also seek the establishment of an international body to provide independent economic analysis of IP proposals in international agreements. Even in the absence of multilateral agreement to its establishment, such a body could be highly influential. Australia could fund its establishment (and perhaps invite like minded countries to join it). And as we did with the Cairns Group to support our agenda for liberalising agricultural trade, we should actively seek alliances amongst intellectual property importers (almost every country except the US) to balance the mercantilism that festers with such virulence in the US.

In our own government purchasing practices we should build mechanisms to consider any external benefits of commissioning open over closed source software as well as in releasing government funded

software as OSS. We should explore the merits of establishing cooperative production of OSS between state and local government agencies within Australia and between them and the Federal Government and similar governments in other countries.

Conclusion

At the dawn of the industrial revolution Adam Smith agitated against the economic fetters and cultural depredations of mercantilism. So too we must resist the new intellectual mercantilism if we are to enjoy the full fruits of the emerging information revolution. Just as Smith was at least as interested in the wider cultural ramifications of freer markets as he was in their economic efficiency, so too OSS offers us something more than efficiency. In his paean to OSS Eric Raymond observes that

The Linux world behaves in many respects like a free market or an ecology, a collection of selfish agents attempting to maximize utility which in the process produces a self-correcting spontaneous order more elaborate and efficient than any amount of central planning could have achieved. . . . The utility function Linux hackers are maximizing is not classically economic, but is the intangible of their own ego satisfaction and reputation among other hackers.³⁵

The preoccupations of Smith are present here—more powerfully perhaps than Raymond realises. Smith's two great works were built up according to the 'Newtonian Method'. Each took one of the two principles that Smith felt lay at the foundation of civilisation. The better known *Wealth of Nations* was built from the postulate of an innate human tendency to 'truck, barter and exchange'. But this was against the sociological backdrop expounded earlier in *The Theory of Moral Sentiments*. That book was predicated upon the natural bond of sympathy between people which, it argued, produced a near universal desire for each others' deserved approbation—the thing that Raymond argues motivates OSS hackers and helps them allocate the scarce resource of their collective talents. OSS provides us with a new and powerful illustration of the omnipresence of these Smithian themes. And it provides a new theatre and a new way in which they conjoin the pursuit of individual and collective goals.

Endnotes

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- [1] Ratner (ed), 1939. *Intelligence in the Modern World: The Writings of John Dewey*, The Modern Library, New York, pp. 459-60.
- [2] Cited by Richard Stallman at http://news.com.com/Bill+Gates+and+other+communists/2010-1071_3-5576230.html?tag=nefd.ac. Viewed on 18 Feb 05.
- [3] Menger’s emphasis is well considered. “[T]here is not a single instance . . . in which he represents the rich and powerful as opposed to the poor and weak.” Rothschild, Emma, 2001. *Economic Sentiments – Adam Smith, Condorcet, and the Enlightenment*, Harvard, Cambridge, Massachusetts, p. 65. (Emphasis in original).
- [4] Micro-credit – the first micro-credit loan was for US\$27 – provides people in the third world with the initial surplus to invest in simple equipment or feedstock. Loans are typically made to ‘solidarity groups’ of people (usually women) all of whom go co-guarantor.
- [5] See eg Benkler, Y. 2004. “Sharing Nicely: On Shareable Goods and the Emergence of Sharing as a Modality of Economic Production” *The Yale Law Journal*, Vol. 114, pp. 273-358.
- [6] Indeed, Eric S. Raymond argues that the nostalgic communitarianism of Stallman’s telling of the open source story underplays how new and revolutionary his innovation was. Overgeneralizing from his own experience, he began speaking and writing as though corporate greed had closed off a vast source-code commons that needed to be reclaimed. . . . But, in fact, nothing like RMS’s Edenic source-code commons had ever really existed outside [a] handful of privileged university laboratories The software myth of the Fall . . . obscures how astonishing the achievements of today’s open-source culture really are. Among other things, it understates RMS’s own genius, and how brave an act of imagination it was in 1985 to found the [OSS] GNU project. The software commons of myth did in fact come into being, but as the result of a conscious attempt to shape the future rather than as a reclamation of the past. (Personal communication, 11 March 05).
- [7] From Raymond, E. S. 2000. “A Brief History of Hackerdom” at <http://www.catb.org/~esr/writings/cathedral-bazaar/hacker-history/ar01s06.html> accessed on 11 Jan 05.
- [8] See Raymond, “The Many Faces of Reputation” in Raymond, 2000, *Homesteading the Noosphere*, at <http://www.catb.org/~esr/writings/cathedral-bazaar/homesteading/ar01s08.html> accessed on 5 Jan 05.
- [9] <http://www.catb.org/~esr/writings/cathedral-bazaar/cathedral-bazaar/ar01s11.html> accessed on 9 Jan 05.
- [10] A leaked Microsoft strategy document. Available at <http://www.opensource.org/halloween/halloween1.php> accessed on 5 Jan 05.
- [11] It seems geeks continue to donate their time though a substantial number of programmers working on OSS are doing so within corporate projects and are being paid for their time. In the sample of programmers surveyed by Lakhani and, Wolf 40% were paid for the OSS development they did. Lakhani, Karim R., and Wolf, Robert G. “Why Hackers Do What They Do: Understanding Motivation and Effort in Free/Open Source Software Projects, The Boston Consulting Group, published in forthcoming in Feller, J. Fitzgerald, B. Hissam, S. and Lakhani K. R. (eds), 2005 *Perspectives on Free and Open Source Software* MIT Press. At <http://freesoftware.mit.edu/papers/lakhaniwolf.pdf> accessed on 8 Jan 05. Further, the free rider incentive to wait till a development is done by someone else is usually trumped by the urgency of the need to fix a bug or enhance some feature.
- [12] http://www.businessweek.com/magazine/content/05_05/b3918001_mz001.htm accessed on 22 Dec 05.
- [13] http://www.businessweek.com/magazine/content/05_05/b3918001_mz001.htm?campaign_id=nws_insdr_jan21&link_position=link1 accessed on 22 Jan 05.
- [14] See Eric S Raymond, <http://www.catb.org/~esr/writings/cathedral-bazaar/magic-cauldron/ar01s12.html>
- [15] Microsoft has allegedly pursued its strategy in the following areas: HTML, JavaScript, Kerberos, Microsoft BASIC, SMB networking, Active Directory vs. LDAP, Indirect control of the IBM compatible PC architecture, Media Transfer Protocol, RNDIS, C++, Java. See “Embrace and Extend” in Wikipedia at http://en.wikipedia.org/wiki/Embrace,_extend_and_extinguish accessed on 16th Jan 05.
- [16] See eg Lessig, 2004. *Free culture: how big media uses technology and the law to lock down culture and control creativity*. Penguin Press, New York, p. 265. Available at <http://lessig.org/freeculture/>
- [17] Like others, CEO of Amazon Jeff Bezos thinks that patents on business methods and software “could end up harming all of us”. See http://news.zdnet.com/2100-9595_22-519097.html accessed 7 Jan 05
- [18] <http://www.internetnews.com/ec-news/article.php/3432211> accessed on 13 Jan 05.
- [19] US patent number 6,785,865. See <http://www.internetnews.com/ent-news/article.php/3406551>. accessed on 13 Jan 05.
- [20] IP Litigation in the US typically involves multi-million costs. American lawyer Michael J. Persson, Esq at http://www.perlarchive.com/___TLC/7114.shtml accessed on 17 Jan 05.

- [21] http://ecoustics-cnet.com.com/Gates+wants+patent+power/2100-1014_3-5288722.html?tag=nl accessed on 19 Jan 05.
- [22] Bessen, James, and Hunt, Robert M., 2003, "An Empirical Look at Software Patents", Federal Reserve Bank of Philadelphia accessed at www.researchoninnovation.org/swpat.pdf on 4th May 2005, p. 36.
- [23] http://ecoustics-cnet.com.com/Microsoft+to+back+customers+in+infringement+cases/2100-1014_3-5445868.html?tag=nl accessed on 17 Jan 05. CEO Scott McNealy made a virtue of Sun Microsystems payout to Kodak by urging software users to buy software from "a company that can protect you and take that \$92 million bullet". http://ecoustics-cnet.com.com/Group+Linux+potentially+infringes+283+patents/2100-7344_3-5291403.html?tag=nl accessed on 17 Jan 05.
- [24] Of the 98 patents held by Linux allies, IBM held 60, Hewlett-Packard 20 and Intel 11. http://ecoustics-cnet.com.com/Group+Linux+potentially+infringes+283+patents/2100-7344_3-5291403.html?tag=nl accessed on 17 Jan 05. Note the study was funded by Open Source Risk Management which sells legal insurance to open source software purchasers (see below) and it was conducted by the Public Patent Foundation which has public interest advocacy functions. Accordingly it should not be regarded as an unbiased source.
- [25] Bessen and Hunt, 2003. Note however this critique: Hahn, Robert W. and Wallsten, Scott, 2003, "A Review of Bessen and Hall's Analysis of Software Patents", AEI-Brookings Joint Center, November Accessed at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=467484 on 20 Jan 05. The authors of the original paper respond in Bessen, James, and Hunt, Robert M, 2004, "A Reply to Hahn and Wallsten" Federal Reserve Bank of Philadelphia, March 10. From my reading of the material, the original paper is a scholarly attempt to get at the truth. Whilst many – though not all – of the points raised in the critique are methodologically valid, their motive appears to be to quibble with what appear to be intuitively sensible results, rather than to propose better methodologies or to come up with alternative better estimates. Bessen and Hunt's basic message seems unimpeachable. "Hahn and Wallsten argue that a policy question should not be decided on the basis of one article, and we heartily agree. This leads to an important question for policy makers in Europe: Do they currently have sufficient data to make an informed judgment about extending patent protection to computer programs?" 2004, p. 2.
- [26] <http://www.builderau.com.au/manage/0,39024662,39171460,00.htm> viewed on 7 Jan 05.
- [27] "Patents 'biggest threat' to Linux – Torvalds", ZDNet UK, March 23, 2004 at <http://news.zdnet.co.uk/software/linuxunix/0,39020390,39149799,00.htm> accessed on 16th Jan 05.
- [28] http://news.com.com/How+to+fight+against+patent+terrorism/2010-1014_3-5513518.html accessed on 7 Jan 05. IBM has recently 'freed' 500 patents licencing their use to the OSS community. Yet that amounts to just two months worth of patenting for IBM which receives around 8 patents a day. <http://www.builderau.com.au/program/0,39024614,39173960,00.htm>.
- [29] http://news.com.com/How+to+fight+against+patent+terrorism/2010-1014_3-5513518.html accessed on 7 Jan 05.
- [30] David Kaefer, director of business development, intellectual property and licensing for Microsoft says that the firm "is looking to enter into cross-licensing deals with 30 to 40 of the largest companies in overlapping areas in the next four to five years." This may reflect its desire to capture network externalities by getting others to embrace its technology, or a patent pool, or both. <http://www.vnunet.com/news/1161325> accessed on 21 Feb 05.
- [31] See Boldrin and Levine's draft Chapter 4 of their forthcoming book, *Against Intellectual Property* at <http://www.dklevine.com/general/intellectual/against.htm> accessed on 17 Jan 05. The travesty of an anti-competitive patent pool in software is probably of greater microeconomic significance than it was in chemicals and petrochemicals both because those industries generally require substantial capital investment for participation and also because there was never any prospect in those industries of products being supplied at zero price.
- [32] "a method and system for distributing updates by presenting directory of software available for user installation that is not already installed on user station". <http://www.internetnews.com/bus-news/article.php/3383981> accessed on 13 Jan 05.
- [33] "Patently Fair", Opinion by Frank Hayes in *Computerworld*, April 25th 2005. At <http://www.computerworld.com/governmenttopics/government/legalissues/story/0,10801,101310,00.html> accessed on 25 April, 2005.
- [34] Weatherall, K., 2004. "Locked In: Australia Gets a Bad Intellectual Property Deal", *Policy Magazine*, Vol.20 No.4, CIS, Summer 2004-05, pp. 18-24, at p. 19.
- [35] From <http://www.catb.org/~esr/writings/cathedral-bazaar/cathedral-bazaar/ar01s11.html> accessed on 9 Jan 05.