

Before I begin, I should say that the following response represents my personal opinions, and not those of my current or former employers, or of any organisation with which I am affiliated.

I have been working with computer software for some 16 years now in a variety of roles; I have advised small companies on IT issues, I spent two years working as a Research Assistant at the University of Cambridge Computer Laboratory, I've sold software as a sole trader, and have spent the last five years working in various small companies in Cambridge, ranging from web service providers to a consulting company specialising in set-top box design for IPTV systems. I hold a degree (1992) and PhD (2001) in Computer Science from the University of Cambridge, and have directed studies in Computer Science at Selwyn College, Cambridge, for the past five years.

As such, my main purpose in responding to this call for evidence is to help ensure that I and my students can continue exploiting our expertise without being either run out of business through an overly lax intellectual property protection regime, or priced out of it by an overly tight regulatory environment. As a consumer, I'm obviously also concerned to ensure that I retain my power to purchase the goods and services that suit me from whomever I choose, that I am able to fairly assess the goods I propose to buy, and that I am not unfairly restricted in my use of those goods.

I apologise in advance for the lack of references – I'm afraid I've had insufficient time to ferret them out; please do contact me if you would like more information, and I shall do my best to supply it.

I think the first point that should be made in any debate over IP policy is that the current IP regime in the UK has relatively little effect on most computing firms. In fact, what concerns consumers and practitioners alike is the fact that the law seems to be about to start having a significant effect on the field, and that the early indications are that without some action, this effect is likely to be to vastly increase the legal burden on the industry, to the extent that innovation and investment in research and development will be suppressed, small firms will find it very difficult to continue operating, and the market will tend towards a patchwork of monopolies constantly locked in complex legal battles, forcing a limited range of highly priced unimaginative products on unwilling consumers.

I don't believe that this will be good for the consumer, the industry, or the UK economy at large.

IP Protection for small computing companies

The several small (5-20 person) software companies I've worked for over the last five years or so have had a fairly neutral experience of IP protection. For such companies, the existing IP protection regime works well only in that it doesn't interfere with their business; the pace of innovation and the cost both of protection and of litigation is such that none of the companies I've worked for has seriously considered legal action as a way of protecting their IP.

The assets of these companies lie mostly in the heads of their staff, and they acquire and retain customers through good service and brand loyalty. As such, the manifest IP they produce is not particularly important to the business. In any case, actions for infringement will either be against another small company, who will be unable to pay any settlement, or against a large competitor who will likely simply sue you into the ground – either way, it's not a fight you can sensibly win.

Venture capitalists in the field seem to understand this, and whilst patents on key elements of your technology are nice-to-haves in that they may raise your price on acquisition (see later), I don't believe any company I've seen has had difficulty raising money on the basis of know-how.

As an academic researcher (albeit some time ago), my experience was similar; value was extracted from our project by means of industrial collaborations and consultancy deals. Our academic computer programs weren't commercialisable in themselves, and patents were seen as hard to obtain, hard to license, and involved the University bureaucracy; by the time you'd jumped through the necessary hoops to get protection for your invention, the market would have moved on, and in any case, infringement actions are hard to bring – by the time you've brought a successful action,

the company you're suing will have lost out to its competitors and gone out of business anyway. It is, in general, cheaper and more efficient to be hired by the company using your invention and to extract value by using your know-how to shorten their time to market.

In general, in my experience, what individuals, academics, and small IT companies want from IP law is for it to keep out of their way and let them innovate – the law moves much more slowly than the market in computing products, and whilst it would be nice to think that you could build a business licencing your work, the fact is that in practice, the revenue you can generate from building a better product far exceeds what you can extract, after long and bitter legal battles, from unwilling competitors.

Protection of programs by copyright is generally found to be useful in that it prevents gratuitous copying for the lifetime of the product – in practice, the current copyright term of 75 years is far far longer than anyone might ever want, and in fact it's often a slight problem in that it forces rewrites of perfectly good, but orphaned works – however, this is not usually a serious problem (not least, because people use orphaned code anyway).

Cross-licensing of IP has, in my experience, generally been viewed as impractical; product development lifecycles are now below a year and the process simply takes too long – your usual recourse here is to employ the inventor as a consultant and either bypass legal protection entirely or get the patent assigned or licenced by the inventor in the course of his duties as a consultant, or to design around the IP in question. Companies will occasionally licence a major bit of IP at the core of a product – the new algorithm at the heart of a product – but that is viewed with extreme caution, and considering anything more is, in my experience, very rare.

Patent pools are generally enterable, but it's often somewhat hard to do so because of high up-front fees, legal or political issues, so some legal relief would be appreciated here – not least from submarine patents (again, see later); a requirement to allow reasonable, non-discriminatory licencing of de-facto or de-jure standards to all comers (including individuals and small companies), or to relinquish right of action would provide a satisfying impetus to motion here.

Consultancy companies and companies developing software on contract often have the problem that patent pools are geared to production companies, with the result that to license the patents you need to buy, say, 10,000 licences – this can pose something of a burden when all you want to do is build 20 prototype units, or have four people work on code for a client; if regulation of patent pools is considered, this is an issue which might usefully be addressed.

Identification of ownership is, again, practically impossible – software itself usually comes with a copyright notice that will typically name some individual or company vaguely connected with the software; most software is the subject a tangled web of contracts, licences and sublicences that it is impractical to unravel, and may or may not be covered in various jurisdictions by an equally tangled web of patents that it is utterly impossible to discover, let alone unravel and licence. The industry usually ignores these issues, licences code from those who claim to own it via written licence agreements that few people read and oral assurances about, for example, binary redistribution, then do what seems reasonable and basically ignore the license agreement. To do otherwise would involve crippling overheads and make carrying on the business extremely hard, if not impossible, and here a general defence of fair dealing in software would be a welcome clarification of the situation, as well as an incentive for software vendors to describe their terms clearly in advance, rather than imposing complex restrictions on use in small print that few people read.

One thing that most of the people I know in this field are very concerned about is patents – and software patents in particular.

Quite apart from being basically defenceless against baseless royalty claims from anyone who cares to make them, it is obviously somewhat frustrating to see the price of your business depressed by the gratuitous use of software patents by a potential acquirer, or a nice piece of research torpedoed by a company half-way across the world who happens to own a patent on a tiny element of your proposed work (a recent piece of work conducted in the USA concluded that a substantial fraction of academic research proposals in biotechnology were dropped due to IPR concerns). Whilst both of these are highly questionable (and in some cases, actionable) tactics, they're also

widely practiced, and both would be significant worries were I to consider starting my own business in the future.

The traditional approach to the prospect of essentially random infringement actions has been to acquire forests of patents of your own, in the hope of being able to reply in kind. This is obviously an impossibility for the kind of small companies that account for most innovation in computing and related fields, but it's quite easy for multinationals. Unfortunately, as we shall see, it doesn't work – even for them.

One other way to protect yourself would be insurance; Microsoft (and others) provide insurance to the effect that you will be reimbursed for patent infringements committed whilst using their tools, but this only covers your use of their tools – anything you build is not covered. Commercial patent infringement insurance doesn't seem to be sufficiently widely available that any of my employers have considered using it.

As such, until recently, the position of the large multinationals seems to have been cautious support for software patents as a way of driving down the price of acquisitions; unable to innovate themselves, large companies usually buy in innovation in the form of the staff and products of successful startups. Obviously, it is to their advantage to use the threat of patent lawsuits to reduce the cost of these acquisitions, and until recently, they seem to have believed that they could protect themselves with patent forests of their own. Even large companies, it should be noted, rarely seem to believe in protecting products with court action – again, the pace of legal proceedings is such that anyone who gets involved in litigation will lose out to rivals in the marketplace almost immediately, irrespective of the merits of the case.

Unfortunately, it is hard to launch an infringement suit against someone with no product. Hence, the rise of 'patent trolls' – companies who hide behind their lack of infringement to attack even people with suitably large patent forests, and of submarine patents – the practice of filing a patent on technology very quietly, in the hope that it will be subsequently independently reinvented, whereupon you wait for others to develop a market in the technology, and then sue (or monopolise) the resulting market using your patent. In some cases, this process is artificially triggered by donating the technology to a standards body, but failing to disclose the fact that you hold (or have applied for) a patent on it.

Recent cases include *NTP vs Research In Motion*, *Eolas vs Microsoft*, and *Unisys and AT&Ts* claims to hold submarine patents on the Graphics Interchange Format and MPEG 4 motion compensation, respectively. New examples are appearing almost daily.

A related concern that often arises, though not very significantly, is that many international standards are now patent encumbered. Though the licencing terms for these have not historically been very onerous, they do amount to granting an effective monopoly on such things as displaying Freeview TV channels (which are transmitted in MPEG-2, implementations of which must acquire a licence from the MPEG-LA). It may be worth considering legislative exemptions or restrictions for the most important of these – it seems a little inequitable, for example, that I am technically enjoined from building a TV set without paying some large (and unavailable to the uninitiated) up-front licence fee, given that the government mandates the transmission standard.

The problems outlined above are far more acute in the US than in the UK, which excludes most of the problematic subject material via the doctrine of technical effect, but the electronics industry has recently latched on to these new patent tactics and there is some evidence that large microchip companies are starting to use similar techniques to suppress competition rather than drive innovation (a recent filing by Microchip Inc concerning microcontroller patents is alleged to have this as its aim), and some concern that biotechnology companies are beginning to do the same.

Assuming that we want a patent system which protects inventors and promotes innovation, rather than one which encourages profligate filing of questionable patents on the quiet, in the hope of being able to unfairly extract royalties from independent reinventors, we seem to have arrived at an unseemly mess – a series of problematic areas in which patent law is useless for protecting innovation, but in which it escalates operating risk severely. I believe that patent law could benefit from moving in the following directions

- Patent categories, analogous to trademark categories, seem inevitable – apart from other considerations, it seems that the pharmaceutical lobby will not accept any variation in the law as it applies to their products, and there do seem to be good grounds for treating patents for bolts differently from those for elaborate software processes.
- Many problems can be reduced by taking some principles from the doctrine of unjust enrichment (which does pop up in contract law from time to time) – if we treat damages for patent infringement as a form of unjust enrichment of B (the defendant) by A (the plaintiff)'s investment, it follows that if it could not reasonably have been expected that B would rely on A's invention, A cannot claim that B has been unjustly enriched by it. This will kill off large numbers of patent trolls, since if the defendant can reasonably claim never to have seen the patent, no damages will be claimable. It also doesn't strictly seem to require primary legislation, though it does have the side-effect of extending the doctrine of independent invention to inventions occurring after the priority date, so it should probably be limited to technical categories of patent. You could extend this to address some of the competition aspects of patent law – B can't really be said to be unjustly enriching himself if he has no choice, as he will have if A's patent covers a standard that he must implement, for regulatory reasons or possibly just because it is the de-facto standard.
- Some sort of clean hands requirement for bringing an action is probably necessary to deal with submarine patents – B will not be liable for his infringement if A knew, or should have known, that he was practicing A's invention but did not take reasonable steps to bring this to his attention (if you are feeling particularly vicious, you can then allow a reverse action for the costs of licencing by B against A). International standards bodies frequently form groups, such as the MPEG-LA, to administer patents involved in the standards they produce. It might be advisable to force patent holders to join such groups or relinquish their right to damages for implementations of the standard.
- In view of advances in technology, the novelty test for complex technical patents should be tightened to 'an invention that no reasonable practitioner would have made in the normal course of his duties' – i.e. in order to be patentable, something ought to be so new that it would not have naturally occurred to anyone studying the problem, even someone of moderately high inventiveness. This should kill most of our problems of reinvention – by definition, if something is widely reinvented, it wasn't novel enough to have been patentable.
- Patent trolls more or less rely on being able to injure their victims out of business in order to force them into early settlements on the basis of weak infringement actions. A clear signal should be sent that this will not be tolerated – either by making it clear that injunctions will not in general be granted unless there is an overwhelming likelihood of success, or by imposing punitive damages (and corresponding payments into court) on unsuccessful litigants.
- It would be entertaining, though probably impractical, to insist that patents were usable in the course of the art – i.e. that they are competent technical documents that could actually be used to practice the invention, rather than works of legalese intended to grab as much territory as possible whilst trying to give away as little as possible of what is actually patented lest someone notice and work around them.

Design rights

Just as a possibly interesting aside: Design right is currently almost entirely unused by software companies – they use copyright instead. However, design right exists to protect the non-essential design features of an item, and it occurs that this is precisely what we want for software – it would clearly be anti-competitive to protect the essential features of a piece of software, but equally it would be nice to give protection to those non-essential features that distinguish your software from

your competitors' – in any case, in the modern world, where software is distributed over the internet via several intermediate machines and where each computer has four or five caches all copying the program during normal operation, a `copy'right makes fairly little sense. Design right, on the other hand, makes perfect sense. Plus, it has a shorter term than copyright, which, for short-lived works like computer programs, is also an advantage – it would, for example, greatly reduce the problem of orphaned works.

Open-Source Software

One recent phenomenon in computing has been the wide adoption of open-source software; software whose source code is publically available and which is, typically, freely usable and redistributable by anyone. The advent of open-source software has been of immense benefit to all the companies I have worked for, and to the University – both in reducing the costs of research and the overheads involved in obtaining, modifying, and using software, and for teaching. The availability of source code eliminates the need to rely on a single vendor for support, and vastly improves productivity whilst slashing operating costs. Open-source software has, in my opinion, been overwhelmingly good for business.

Unfortunately, open-source software has a number of legal problems; patents and standards conformance being two of the main issues. Obviously, open-source software infringes software patents – every non-trivial computer program does – however, it is unclear that open-source authors have a choice; most patents are licensed on a per-unit-distributed basis, and it is obviously impractical (or at least costly) to give something away if you must pay a fee every time you do so.

Standards are another problem; standards for home entertainment increasingly include Digital Rights Management and encryption schemes which are protected in confidence and/or copyright and licenced on a per-unit basis. Often, the administering bodies simply will not license open-source implementations. More frequently, these bodies require large (on the order of \$10,000) up-front fees and per-unit fees besides. Again, open-source cannot hope to comply with these requirements (in fact, I suspect that some of these requirements are deliberately aimed at open-source, partly out of mistrust, partly in an attempt to drive up the price of the other members' products).

In view of the vast benefits of open-source software – most of the internet is based on it, for example - I believe that it would be appropriate to consider excluding patent claims against open-source software where the protected invention is not the main purpose of the software, and I believe that when setting standards for UK-wide adoption (such as the Freeview standard), we should aim, as far as possible, to allow open-source implementations – a practice analogous to not preventing people from building their own radios or cars, for example. There exist, for example, some good open-source-ready standards for Digital Rights Management (Sun's DReaM system), and office suite applications (the Open Document Format).

A group called the OSI (<http://www.opensource.org/>) maintains a good set of working definitions of what constitutes open source software.

Consumer rights

Both as a consumer and as a software engineer who wants consumers to have confidence in the market, it would be nice to see consumers given some rights over their digital property.

Computer software and digital content are both increasingly licensed under copyright. Leaving aside for the moment the fact that an awful lot of software licenses probably fall foul of the sale of goods acts, I feel that consumers are being pretty poorly treated.

My licence for Microsoft Windows XP prohibits me from reselling it. Technical measures in the software put me to considerable trouble if I upgrade my computer or want to reinstall the software. Periodic upgrades introduce Digital Rights Management features I don't need or necessarily want (which, incidentally, can distribute personal information – my name, address, and what films I watch – to their home servers in the US without my permission). The software turns out to contain numerous security holes for which the manufacturer is not, apparently, liable, even in negligence. For some Microsoft products, I'm prohibited by license agreement from even finding out whether they're better suited to my needs than others by testing their speed. I'm not allowed to take them apart to find out how they work. I'm not allowed to write reviews of them without Microsoft's permission. And the way I find out about these restrictions is by being told, in small print, in a window that pops up half-way through a half-hour installation process.

This is pretty shoddy treatment by anyone's standards, and if my copy of Windows XP was a chair, for example, not only would Microsoft have already breached Trading Standards regulations, but I would (rightly) be able to tell them where they could stick their licence agreement. I'd welcome a change in legislation giving me the same rights over a digital purchase that I have over a physical one. Specifically, a right of fair dealing in copyright works would help greatly in, for example, legitimising the trade in second-hand software – it seems odd that trademark and patent rights are subject to exhaustion on first sale, but that in practice, copyrights aren't.

Where this comes to digital media, I think we have a decision to make as a society – the entertainment industry contends that its continued existence relies on being able to exploit any technical niche it can create to force consumers to repurchase content. Consumer groups and digital rights activists contend that consumers should be able to do what they like with their content. Clearly, a balance has to be struck, and I can only offer a personal opinion and a couple of observations on digital rights management (with which the company I currently work for is involved).

My personal opinion is that we have a perfectly good set of rules for the physical world, and that they probably form a good start in the digital world; we have a whole network of trading standards and consumer protection laws that make it very hard for a furniture maker, for example, to dictate to what use his furniture is put after one has bought it, and the same should be true for digital media – I see no reason to stop me moving my MP3 files from my computer to my car to my machine at work. I'd welcome legislation requiring, at the very least, prominent labelling of restricted content: consumers should be told exactly what they're buying. In fact, legislation requiring digital content to be unprotected might be very useful, since the chances are that the entertainment industry will eventually give up on digital rights management in the same way that computer games makers have largely given up on elaborate physical copy-protection schemes – the entertainment industry will kick and scream, but they've complained about every technological innovation since the invention of the record player and there's no evidence that their protests have done anything but damage their own profits, so I see no compelling reason to listen to them.

Irrespective of how far one wishes to give DRM legal force, one can imagine a number of unpleasant scenarios in which DRM-protected content is supplied to libraries and then becomes inaccessible when the standard becomes outdated and computers to play it are no longer available, and a number of more unpleasant scenarios in which a file is coded to read one thing to one person and something else to everyone else – providing, for example, a way to perpetrate libel without leaving evidence. A clear signal needs to be sent that there must always be a machine, available to the proper authorities, providing a way to recover the unencrypted version of DRM'd content, and it needs to be sent soon so that the industry bodies which administer DRM standards can comply. In the UK, we may be able to use the Regulation of Investigatory Powers Act without additional legislation. Arrangements should be made for libraries to have access to unprotected content for archiving (it's easy enough to reapply restrictions to those borrowing the content).

Another issue that comes up with DRM is interoperability; there are a number of DRM schemes on the market, and the markings on content are such that it may be difficult for manufacturers to legally build a machine which transcodes content from one DRM system to another. In the interests

of fair competition, we may want to provide exemptions for people building such machines, so long as the content is at least as well-protected in the target system as the source. -

IP and Competition

I presume you are aware of Sigmatel's recent attempts to use its patents on hardware MP3 players to extract royalties on, if not all, then the vast majority of MP3 players not containing Sigmatel chips. The MPEG-LA similarly extracts royalties for each Freeview receiver shipped, and there has recently been something of a tussle in the mobile phone industry over Qualcomm's patents on CDMA and GSM standards – I believe that the issue has been referred to the EU Competition Commission, that ETSI has been asked by the European Commission to stop submarine patents threatening telecomms standards in future, and handset manufacturers seem to be extremely unhappy with Qualcomm's licencing terms and with their strategies for enforcing their patents. I believe that serious thought should be given to how far competition law should restrict such behaviour; I'd encourage a light touch here, since a fair amount of innovation does actually happen in the course of producing these standards; it would be fair to allow fairly wide leeway so long as licence terms are fair, non-discriminatory, universally available (and that includes to individuals with a credit-card who are interested in building a one-off unit), and advertised widely in advance. Again, the problem here seems not to be so much one of having patents, as of the underhand tactics that patent holders choose to use to enforce their rights – in particular, of using submarine patents to suddenly extract royalties and/or competitive power from an already-developed market. In this respect, it's notable that although the MPEG-LA have just as much monopoly power in their field as Qualcomm or Sigmatel do in theirs, they tend to attract fewer complaints by disclosing fees and applicable patents at the start of the product development cycle.

An aside on musical performances and performers' rights

One of my hobbies is playing guitar in a local rock band; for what it may be worth, we've often found it hard to work out quite what songs' performances are covered by the licences the venues we play at have acquired. As for performers' rights, frankly, my feeling is that the existing copyright term is far too long as it is – the only justification for extending it appears to be that performers who knew their rights would expire when they made the recordings would rather like them not to do so now the deadline has arrived. Whilst this is entirely natural, it doesn't, in my mind, form any sort of compelling reason to accede.

I do feel that the music industry needs some help – it's becoming very hard to make money from music in any way, and the whole industry has a number of complex commercial and regulatory problems – but simply extending copyright terms is not the help it needs.

I hope you've found this document useful, and I wish you every success in your review; please do feel free to contact me if you require any further information,

Richard Watts