Politics, ethics and networking

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I have mixed feelings about being here. On the one hand, I am deeply honoured to be invited to address you. On the other, I am conscious that I am the only thing standing between you and lunch. And more importantly I am aware that this is Friday, the end of a long week, and that you are probably itching to get away, back to normal life. So I am doubly honoured that so many of you are here in this hall. Thank you.

The title I have chosen may puzzle you. Certainly it baffled the organisers of the conference. After all, politics and ethics are topics which rarely trouble us engineers. They are for other people – for politicians and moral philosophers, for our employers, for those who run the institutions in which we work.

What I want to argue runs counter to those assumptions. I want to say that the work that you – and to some extent I – do is drenched in political and ethical issues. And that we can no longer ignore these issues -- that we can no longer pretend that they are someone else's concern. This may not be a palatable message, but there it is. I will try to explain why I believe it to be true. I don't expect you to agree with me. But I hope that I will give you some food for thought.

I want to start in an unexpected place, with an extreme example. There's an old saying in the legal profession that "hard cases make bad law". But sometimes they shed a brutal light on questions which are usually more nuanced and less direct. And in doing so they help us identify what we need to focus on.

In 1945, as the Allied armies swept through Germany and Poland, they came on the unimaginable horrors of the Holocaust – the industrialisation of mass murder that was the legacy of Germany's Nazi regime. Battalion after battalion of British, American and Russian troops stumbled into the extermination camps created by the Nazis to wipe out all traces of the Jewish population of what Donald Rumsfeld contemptuously calls 'old Europe'.

The Russians were the ones who liberated Auschwitz. And by a strange accident of history, they arrived before the camp regime could destroy the archives which had been painstakingly maintained by those who ran this extermination project. In most other camps, all the records had been burned by the time the Allies arrived.

In Auschwitz, as elsewhere, the Nazis were exceedingly thorough, and they had documented everything. The KGB seized the documents and carted them off to Moscow, where they remained under lock and key for decades. But when *Perestroika* convulsed the Soviet Union and it began to disintegrate, things began to change. And eventually an English academic historian named Fleming arrived in Moscow, found the Auschwitz archive and began to explore it. What he found raised deeply troubling questions for those of us who work as engineers and professionals generally.

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[2] For copyright information see the end of the document.

One of the files in the Auschwitz archive contained all the architectural drawings of the camp in the various stages of its evolution. What they show is the way the architects who worked on its design responded to the increasingly unreasonable demands of their imperious German clients. You see, Auschwitz was originally conceived as a relatively small-scale project. But as the mass extermination project gathered pace, they had to find ways of increasing the capacity of the camp. And what the drawings show is the evolution of a design which used architectural ingenuity to pack more and more people into limited accommodation. The architects who worked on Auschwitz were professionals. I have no doubt that they took pride in their work. They produced designs which doubled and trebled the capacity of the buildings in all kinds of ingenious ways. There was no indication in the archive that the inhumanity implied by these 'professional' solutions troubled them. And in that they were perhaps no different from any generation of architects before or since. After all, the client is always right. He's the one who pays the fees.

But there was another file in the Auschwitz archive which is even more troubling. It concerns a German engineering firm called Topf & Sons of Erfurt. They specialised in the design of incinerators and supplied the initial plant and equipment for Auschwitz. But as the extermination project gathered pace, it became clear to the clients – those running the program – that they would need to increase the throughput of the camp's incinerators. Again, the documents show how Topf's engineers rose to the challenge – finding ways of increasing the efficiency with which human beings could be reduced to ashes. I have no doubt that this task posed all kinds of interesting technical challenges. But there is no trace in the archive of any misgivings on the part of the company's engineers about the moral implications of what they were doing.[3]

Now as I said, hard cases make bad law. But this extreme case of professionalism without ethics highlights an important truth about engineers, namely that they are *primarily* concerned with *means*, not ends.[4] Engineering is about solving problems that are posed by others – finding elegant, ingenious, efficient or economical means of achieving a given end. Ends are for other people – clients, managers, superiors, politicians. *They* determine the ends, *we* merely provide the means. Usually of course the ends are not as morally repugnant as the objectives of the Nazi exterminators. But whether they are or not, an important feature of the engineering mindset is that ends are none of our business. Give us the tools, and we get on with the job.

And therein lies a problem.

The problem is our lack of interest in ends.

Ends are *expressions of values* – that is to say beliefs about what is good and bad, valuable and worthless. And the difficulty with this is that ends are essentially *incommensurable*. That is to say, there exists no purely rational way of determining whether one value is superior to another. There is no logical calculus for deciding – to everyone's satisfaction – that Bach is superior to Beethoven, or that the Beatles are better than the Who, or that Picasso is infinitely preferable to Cezanne. Or – to take a contemporary dilemma -- that national security is more important than civil liberties.

Yet our societies need to have ways of adjudicating between competing values. We call it *politics*.

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[3] Dwork, Deborah and van Pelt, Robert jan: *AUSCHWITZ: 1270 to the Present*, W. W. Norton and Co., New York, 1996; and Tuck, Joanne: "Preliminary Study on Ethics and German Engineers During the Nazi Period", http://www.wit.edu/Academics/HSSM/context/vol2/tuck.html

[4] The word 'primarily' is important. I am not implying that all engineering is an ethics-free zone. Most of the professional engineering bodies now have ethical codes, though how they are enforced is unclear. In some cases they seem to be merely exhortatory.

Politics creates laws which embody the values that happen to dominate at a particular time. In that sense, our entire legal system is just one vast compendium of values. Just to give one example, take the methods we have for determining whether an individual is guilty or innocent of a crime.[5] By any standards, this is a vastly inefficient system. We presume innocence and the state has to prove beyond reasonable doubt that the accused is guilty. He or she has to have a defence lawyer, paid for in most cases by the state. The defence has to be given sight of the prosecution case in advance. If the prosecution makes the slightest technical or procedural mistake, the trial may be ended and the accused released. Serious cases have to be tried before a jury of twelve lay people who may not fully understand the details of the case, and who may harbour irrational biases. An individual cannot be tried twice for the same offence, even if new evidence turns up later. If he or she has had previous convictions, they cannot be disclosed to the jury. Sometimes, this means that people who are guilty walk free. And the whole process takes ages and costs a fortune in lawyers' fees.

The entire system of prosecution and trial is thus an offence to all sound managerial principles. It would be much more efficient to have a simpler system in which people were tried by a judge or a tribunal of 'reasonable' people, in which previous convictions were disclosed and time limits were set for trials. This is broadly the way that military courts martial operate.

But we don't have such a system because our society believes that before people are deprived of their liberty they should be given every chance of being proved innocent. In other words, we *value* this more than we *value* the putative efficiency of summary justice.

So laws are drenched in values. Sometimes the values are widely acceptable. But sometimes they can be iniquitous. This building stands on land, remember, where it was once against the law for a Catholic to own a horse or run a school.[6] Laws may simply provide legal protection for certain special interests. And where laws are iniquitous the apparently virtuous act of 'obeying the law' may actually be a morally or ethically questionable act. It's easy to see how this might have been the case in Nazi Germany – and indeed after the war there was a lively debate about whether it was right to prosecute Germans who had obeyed the more iniquitous provisions of the Nazi legal code. But that was an extreme case, was it not? Surely such ethical dilemmas do not arise in our modern, civilised societies?

Well, let's see. I want to examine two case studies which illustrate the problem. Both involve what we call intellectual property.

The first is about the right of university computer scientists to conduct certain kinds of research.

In 1996, the countries participating in the World Intellectual Property Organisation (WIPO) signed a treaty which required that they enact laws to protect Intellectual Property embodied in digital media.

In fulfilment of this, the United States Congress passed the Digital Millennium Copyright Act (DMCA) which, among other things, made it a criminal offence to devise any method of circumventing an encryption system designed to protect intellectual property (the so-called anti-circumvention clause).

One such encryption method is the CSS system used to scramble movie files encoded on DVDs. Authorised decryption systems for CSS were released for manufacturers of DVD players, and for computers using the Windows and Macintosh operating systems. But no authorised decryption system was made available for Linux systems. So a young Norwegian programmer named Jon Johanssen wrote one called DeCSS and released it on the Net. He was then prosecuted by the Norwegian government at the

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[5] I am grateful to Professor G.H. de Vries of the University of Amsterdam, who suggested this example to me.

[6] See http://www.law.umn.edu/irishlaw/intro.html for an introduction to the so-called 'penal laws' which regulated the status of Irish Roman Catholics through most of the eighteenth century.

behest of the US authorities, who in turn were pressured by the Movie Producers Association of America (MPAA).

In the end, the prosecution failed, but the dead hand of the DMCA has since fallen more effectively on other victims. For example, in 1999 a US hacker magazine – *2600* -- published the code for DeCSS and was successfully sued by eight movie studios, despite expert testimony by distinguished computer scientists who argued that computer code was their method of expression and therefore protected under the First Amendment to the US Constitution – the statute that guarantees freedom of speech to American citizens.

A group of PERL hackers distilled the DeCSS code into (I believe) 20 lines of PERL (how's that for a terse language!) which a tee-shirt manufacturer, CopyLeft, then printed on shirts. This company was likewise sued by the movie studios.

Then an ingenious soul made an audio recording of himself reading the DeCSS code and released it as an MP3 file. I have that file on my laptop. If we were in the US now and I played the recording I would be committing an offence under the DMCA and rendered liable to prosecution.

Actually, if I were to play it here, I might likewise be vulnerable because the DMCA anti-circumvention clause is now embodied in the European Copyright Directive and will in due course find its way into the legal code of all 25 member states of the European Union. I'm not sure what the position is in Ireland: has the Dail legislated yet?[7]

But the DMCA story doesn't end there. In 2001, the Recording Industry Association of America (RIAA) issued a challenge to computer scientists. The Association's 'Secure Digital Music Initiative' researchers had devised a method for embedding digital watermarks in music tracks and challenged researchers to remove the SDMI watermarks without degrading the audio quality of the recordings.

A team of researchers from Princeton and Rice universities led by Ed Felten took on the challenge and found that it was laughably easy to remove the watermarks. But when Professor Felten submitted an abstract of the research paper which reported this work to an international conference of computer scientists, he and his university received letters from lawyers acting for the RIAA threatening to invoke the DMCA if he persisted with his intention of making his results public. Felten decided not to publish, but of course his paper made its way onto the Net[8], as these things tend to do.[9]

The point, however, is obvious and important. The DMCA has forced computer scientists to think very hard before embarking on some kinds of academic research. It forces them to choose between two sets of values -- between their commitment as scientists to the free and open publication of research results, and their commitment as citizens to obey the law.

In that case, some of them feel that the ethical thing to do is to defy the law because it embodies oppressive and restrictive values which in the end will be detrimental to the freedom of inquiry which is one of the cornerstones of an open society. And this illustrates the point I was trying to make at the beginning. Politics has created a law that some people feel -- *on ethical grounds* -- ought not to be obeyed.

My second case study involves many network administrators, particularly in universities. The explosion of peer-to-peer (P2P) file-sharing among the student community has caused major headaches for university network administrators. Most universities now have strict rules about this – they forbid students

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[7] Later, I discovered that it had – and in a particularly repressive way. For a compendium of DMCA absurdities, see Touretzky, David S.: "The DMCA vs. the First Amendment: or The Gallery of DMCA Abuses", http://www-2.cs.cmu.edu/~dst/DMCA/Gallery/

[8] http://cryptome.org/sdmi-attack.htm

[9] "Is the RIAA running scared?", *Salon*, April 26, 2001, http://dir.salon.com/tech/log/2001/04/26/felten/index.html

to use university bandwidth and networks for this purpose. Some institutions have very severe penalties for anyone caught sharing music files. And the people who have to detect and report such forbidden usages are… well, network administrators and managers like many of you sitting here today.

When I talk to administrators about this I find conflicting emotions and ethical confusion. Some staff delight in catching illicit file-sharers, but many feel uneasy about the role they are called upon to adopt, which is in essence acting as unpaid goons on behalf of the industry cartels which control the music business. In the end, though, most feel they have no option. After all, file-sharing is illegal and the law must be obeyed.

QED? Not quite.

First of all, not all file-sharing is illegal.

I have a good friend named Larry Lessig who is Professor of Law at Stanford and the founder of that university's Center for Internet Studies.[10] He recounts a strange episode in which he came into work one morning to find what he described as Stanford's 'network police' in his office. They had disconnected his computer from the network. Why? Because he had Morpheus P2P software installed on it, and that was, they said, illegal.

It took a while for Larry to explain to them that he used Morpheus as a way of distributing his academic papers and lectures. In other words, he was using the program to distribute his own material. *His own copyrighted material*. The thought that P2P software could have important non-infringing uses had obviously never penetrated what might loosely be called the minds of the Stanford network administrators. They had simply swallowed hook, line and sinker RIAA propaganda that all P2P software is the spawn of the devil.

This kind of thoughtlessness is, I'm afraid, rife among university managements everywhere. In part, it's a product of the usual cluelessness of men in suits. But it's also in part due to the lack of curiosity and reflectiveness on the part of the technical staff who manage their networks.

This sounds harsh, so let me explain.

P2P is, in my view, the most important communications technology to have appeared since the invention of the Web. It's important technically because it provides a way of harnessing the vast and hitherto untapped resources of the Net – all those PCs busy doing nothing most of the time, all those CPU cycles and hard disk sectors going unused. P2P provides a way of harnessing what the writer Clay Shirky calls 'the dark matter of the Internet', of making better use of the resources we have.[11]

Secondly, although P2P networking can be used to infringe copyright, it also has important non-infringing uses – as a recent US Court judgment decided when the content industries tried to have Grokster and Kazaa shut down.[12] And these non-infringing uses are likely to be far more important than the early

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[10] And author of one of the best books on this subject – *The Future of Ideas: the fate of the commons in a connected world*, Vintage, 2002.

[11] Shirky, Clay: "PCs are the Dark Matter of the Internet", http://www.shirky.com/writings/dark_matter.html

[12] The Judgment reads, in part: "While Grokster and StreamCast in particular may seek to be the 'next Napster,' ..., the peer-to-peer file-sharing technology at issue is not simply a tool engineered to get around the holdings of Napster I and Napster II. The technology has numerous other uses, significantly reducing the distribution costs of public domain and permissively shared art and speech, as well as reducing the centralized control of that distribution. Especially in light of the fact that liability for contributory copyright infringement does not require proof of any direct financial gain from the infringement, we decline to expand contributory copyright liability in the manner that the Copyright Owners request." See http://esp.realcities.com/a/hBBJi9BAPnpi4APtV1IAJckHd.APnpdQr$/gmsv728

applications which have so enraged the record companies and movie studios. Just to take one example, it seems to me that BitTorrent[13] is just about the best way yet devised for distributing large software packages like operating systems.

More importantly, P2P networking may have a vital social role to play. To illustrate this, let's go back to Larry Lessig and his use of Morpheus to distribute his content. Since 9/11 we have seen Western governments and their security apparatuses appropriate to themselves more and more powers to snoop on communications and control publication on the Web. Large corporations have also discovered that it is trivially easy to shut down critical or hostile websites which threaten their interests. The time when we could 'publish and be damned' on the Web are over.[14] In such circumstances, how can we ensure that the freedom of expression that was the glory of the early Internet is preserved and protected? One answer is via the imaginative use of P2P systems like Publius or Freenet which make it impossible for repressive regimes to stifle the circulation of awkward material. And this could one day be important for the freedom of speech that is the lifeblood of democracy.

Secondly, even when file-sharing involves the unauthorised transmission of copyrighted materials, that's not the end of the matter. The content industries have done a great job in convincing legislators, the media – and, yes, even university administrations – that intellectual property is the same as other kinds of property. Once you swallow that line, then you are easy prey for the equation of file-sharing with burglary.

But it isn't as simple as that. Intellectual property is not the same as other kinds of property, for two reasons. The first is that most intellectual property is not *rivalrous* in the way that other resources are. If I give you some of my ideas -- as I'm endeavouring to do now -- I do not have fewer as a result. Thomas Jefferson had a lovely metaphor for this when he said that anyone who lit a candle from his did not thereby diminish his light.[15] In fact, sharing an idea – like lighting one candle from another – is a way of making both parties richer. This is emphatically NOT the case with 'real' property like land or capital where if I give you some of mine, then I have less as a result. And it explains why sharing ideas is important for cultural vibrancy: lively cultures are the ones fizzing with ideas. And to the objection that while this might be true for ideas it does not apply to music I say this: can you imagine anyone composing a song who had not been influenced by all the songs she had listened to -- freely -- in the past?[16]

The second difference is that intellectual property is a *political* artefact, not an intrinsic property of something. A copyright or a patent is a temporary monopoly granted by government to an inventor or a creative artist. The people who understood this best were the men who framed the US Constitution. In thinking about it they were trying to strike a balance between two competing values. On the one hand, there was the need to provide some way of ensuring that creative people could reap the rewards of their

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[13] http://bittorrent.com/

[14] See Davies, Simon: "The new corporate threat to freedom of expression", http://webworld.unesco.org/infoethics2000/documents/paper_davies.rtf

[15] Jefferson wrote to Isaac McPherson on August 1813: "He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density in any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation."

[16] Many of the great classical composers were inveterate borrowers and 're-mixers' of one another's works. Handel is a paradigmatic example. It's been claimed that in his great oratorio *Israel in Egypt*, 15 of the 30 discrete pieces are, to a greater or lesser extent, borrowed. They range from memorable transformations of mediocre tunes to examples where Handel effectively merely transcribes other people's music. His principal sources were a wedding cantata by Stradella, two works by obscure Milanese composers (a *Magnificat* by Dionigi Erba and a *Te Deum* by Francesco Urio), an organ piece by Johann Caspar Kerll which Handel probably heard in his student days), and four of his own earlier pieces. See Zimmerman, Franklin B. "Musical Borrowings in the English Baroque." *The Musical Quarterly* 52 (October 1966): 483-95.

creativity. On the other was the need to ensure that society has a free flow of ideas because the framers understood intuitively that the dynamism of a culture depends critically on the vigorous circulation of ideas. Copyright was their way of striking a balance between these two conflicting requirements. So they struck a very intelligent balance. They decided that copyright – that temporary monopoly on the right to exploit an idea – should last for 14 years, with the option of extending it for 14 more. That's 28 years in all. Then it's over and the materials enter the public domain.

And that still seems to me to be about right. But it's not what we have. Over the years, the ceaseless political lobbying of content industries has led to the inexorable extension of the period of copyright – to the point where it now extends to the life of the author plus 70 years. And this is what is implemented in the law that university administrations now feel they have to uphold. But the truth is that this is bad law, not because I disapprove of it (though I do), but because it represents a colossal and damaging imbalance between the rights of authors and content-owners, on the one hand, and the needs of society on the other. And this has all come about through politics – the mechanism our society has for resolving value conflicts.

That's what I meant when I said that everything we do is drenched in politics.

What I'm arguing is that stamping on student use of P2P networking has ethical and political dimensions which are rarely discussed, even in universities – which after all are supposed to be critical institutions. The law in relation to digital copyright is largely a product of lobbying by corporations who wish to extend their control over consumers and to shrink the public domain.[17] P2P technology is, in my view, important for the future of networking and maybe even for democracy itself. But because it challenges the antiquated business models of record companies and movie studios, they want to squash it now. The law as it stands in relation to copyright is skewed in their favour and made by legislatures that are ignorant, lazy and sometimes corrupt.

In which case I say that the statement that 'universities must obey the law' should become the beginning of a discussion and not – as at present – the end of the matter.

If you have been, thank you for listening.

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[17] See Boyle, James: "The Second Enclosure Movement and the Construction of the Public Domain", http://www.law.duke.edu/pd/papers/boyle.pdf