



Who benefits from stronger Digital Rights Management?

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Economics and Security



- Over the last five years, we've started to apply economic analysis to information security
- Economic analysis often explains security failure better! Bank customers suffer when bank systems allow fraud, patients suffer when hospital systems break privacy
- People who can protect a system are often not the people who suffer when it's hacked
- And information security mechanisms are used increasingly to support business models rather than manage risk

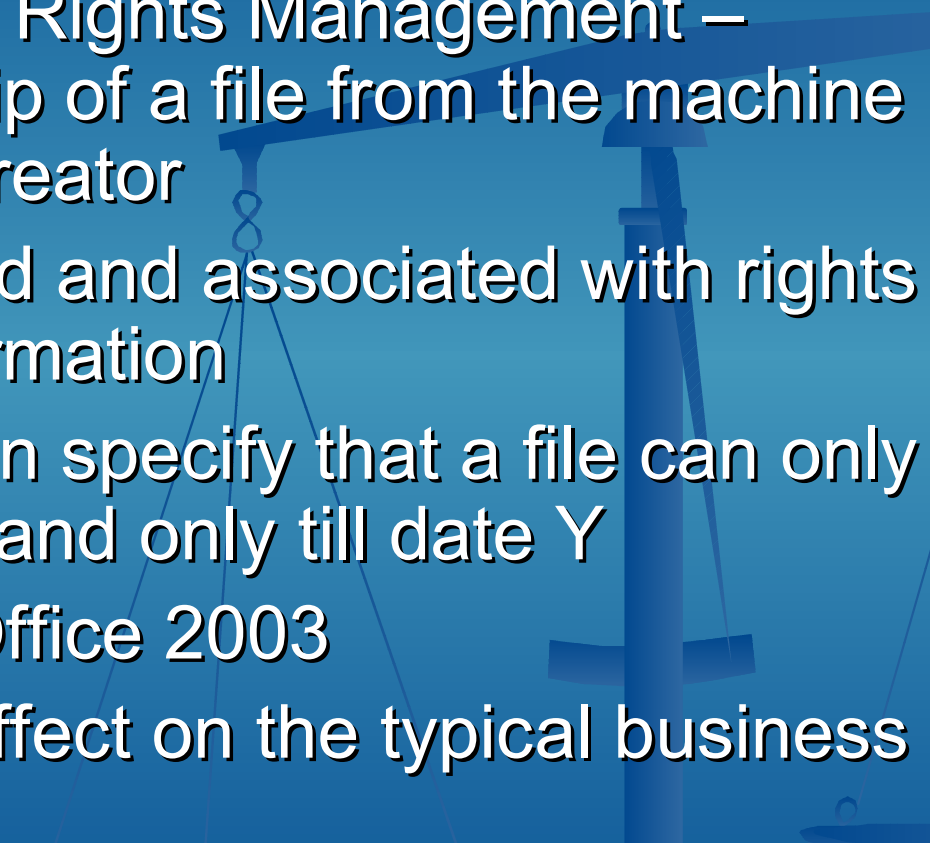
New Uses of Infosec

- Xerox started using authentication in ink cartridges to tie them to the printer. Followed by HP, Lexmark and others
- Motorola started authenticating batteries to mobile phones
- BMW now has a prototype car that authenticates its major components
- Increasingly crypto is used to lock customers in, tie products, bundle services, enforce cross-subsidies and rig markets generally
- Now 'Trusted Computing' will deepen this

What's Software Worth?

- The value of a software company is the total switching costs of all its customers
- E.g., law firm with 100 fee earners paying £500 a seat for Office -> it would cost £50K to retrain everyone to use OpenOffice, convert files etc
- In software, lock-in plays the role that patents do in the drug industry
- Same holds for many other online services

Rights Management and Competition

- IRM – Information Rights Management – changes ownership of a file from the machine owner to the file creator
 - Files are encrypted and associated with rights management information
 - The file creator can specify that a file can only be read by Mr. X, and only till date Y
 - Now shipping in Office 2003
 - What will be the effect on the typical business that uses PCs?
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TC (Trusted / Trustworthy / Treacherous Computing)

- 'Trusted Computing Group' (TCG) redesigning PCs to give better support to DRM, to the IRM mechanisms in Office 2003, to online software registration etc
- Idea – put a TPM (smartcard) chip in every PC motherboard, PDA, mobile phone
- This will do remote attestation of what the machine is and what software it's running
- On top of this will be layers of software providing new security functionality, of a kind that would otherwise be easily circumvented

Why is Microsoft so Keen?

- At present, a company with 100 PCs pays maybe £500 per seat for Office
- Remember – value of software company = total switching costs
- So – cost of retraining everyone to use Linux, converting files etc is maybe £50,000
- But once many of the documents can't be converted without the creators' permission, the switching cost is much higher
- Bill: 'we came to this thinking about music but then realised documents and email were much more interesting'

Strategic Issues



- Who will control users' data?
- Microsoft view – everything will be on an MS platform (your WP files, presentations, address book, pictures, movies, music)
- European Commission view – this is illegal! – orders MS to unbundle Media Player
- The struggle continues, with TC, the Vista file system, ...

Rights Management and the Music Industry

- What happens when you link a concentrated industry (platforms) with a less concentrated industry (music)?
- Varian (Jan 2005) – most of the resulting surplus goes to the platform owner
- Music industry was scornful – but by July were worried and are now panicking
- Musicians saw fee per single fall from 34p to 3p – and are now cutting out the majors

Competitive Issues



- Microsoft taught the industry the benefits of controlling all user data
- TC will help spread this model from the PC to PDAs, phones, music systems, ...
- At present, there are many petabytes of 'free' data for new apps to use (i.e., your data)
- In future, apps can use TC mechanisms to lock in users by locking down their data
- The software industry will become much less dynamic, more like a 'normal' industry - at a cost in growth and jobs (especially in LDCs)

Competitive Issues (2)

- Sony model – subsidize hardware from software
- 2007 – a PC costs \$399 in Walmart, a TC \$299
- 2009 – \$29.95 a month buys an Office Plan with unlimited Word and Excel, and 500 Powerpoint minutes per month. The hardware comes free
- What's the effect on free software?
- What's the effect on law enforcement?
- What's the effect on the Internal Market?
- And on the pervasive computing future???

The Information Society



- More and more goods contain software
- More and more industries are starting to become like the software industry
- The good: flexibility, rapid response
- The bad: frustration, poor service
- The ugly: monopolies
- How will the law evolve to cope?

Property



- The enlightenment idea – that the core mission of government wasn't defending faith, but defending property rights
- 18th-19th century: rapid evolution of property and contract law
- Realization that these are not absolute!
- Abolition of slavery, laws on compulsory purchase, railway regulation, labour contracts, tenancy contracts, ...

Intellectual Property



- Huge expansion as software etc have become more important – 7+ directives since 1991
- As with `ordinary' property and contract in about 1850, we're hitting serious conflicts
- Competition law – legal protection of DRM mechanisms leads to enforcement of illegal contracts and breaches of the Treaty of Rome; judgment against Microsoft
- Environmental law – recycling of ink cartridges mandated, after printer vendors use crypto to stop it

Intellectual Property (2)



- Privacy law – DRM mechanisms collect usage data to segment markets
- Trade law – exemption for online services may undermine the Single Market
- Employment law – French courts strike down a major's standard record contract
- IPR Enforcement Directive 2 – will criminalize patent infringement and incitement to infringe IP, unlike in the USA where the BSA is pushing for reduced civil damages in patent cases
- With IPRED 1 and Lexmark, it could make the EU more hostile to technology and innovation than America

Conclusions



- More government involvement in infosec, and related issues such as DRM, is inevitable
- However, policy is often confused and contradictory at all levels
- We need to figure out how to balance competing social goals, as we have in the physical world, and underpin that balance with legislation
- And we mustn't end up being more hostile to technology business than the USA
- Mature economic analysis is essential!

More ...

- WEIS 2006 (Workshop on Economics and Information Security), Cambridge, June 26-28 2006
- Economics and Security Resource Page – www.cl.cam.ac.uk/~rja14/econsec.html (or follow link from my home page)
- Foundation for Information Policy Research – www.fipr.org