On the Superdistribution of Digital Goods

A topical review and outlook

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Markets for digital goods: copyright waring or economy

warez & cracker sites

criminalise the clientele

DMCA

pirate sites

WIPO treaty

free riding

taxation

p2p nets

Bittorrent

GEMA

EU directive

culture

OMA

network marketing

remuneration

file sharing nets

national laws

flat-rate

super-distribution

Snocap

Potato

MashBoxx

PeerImpact

digital goods

durability
no wear & tear

transferable & non-rival

creation can be costly

video on demand

software as a service

ring-tones

some majors defect

online music

DRM

impede fair use

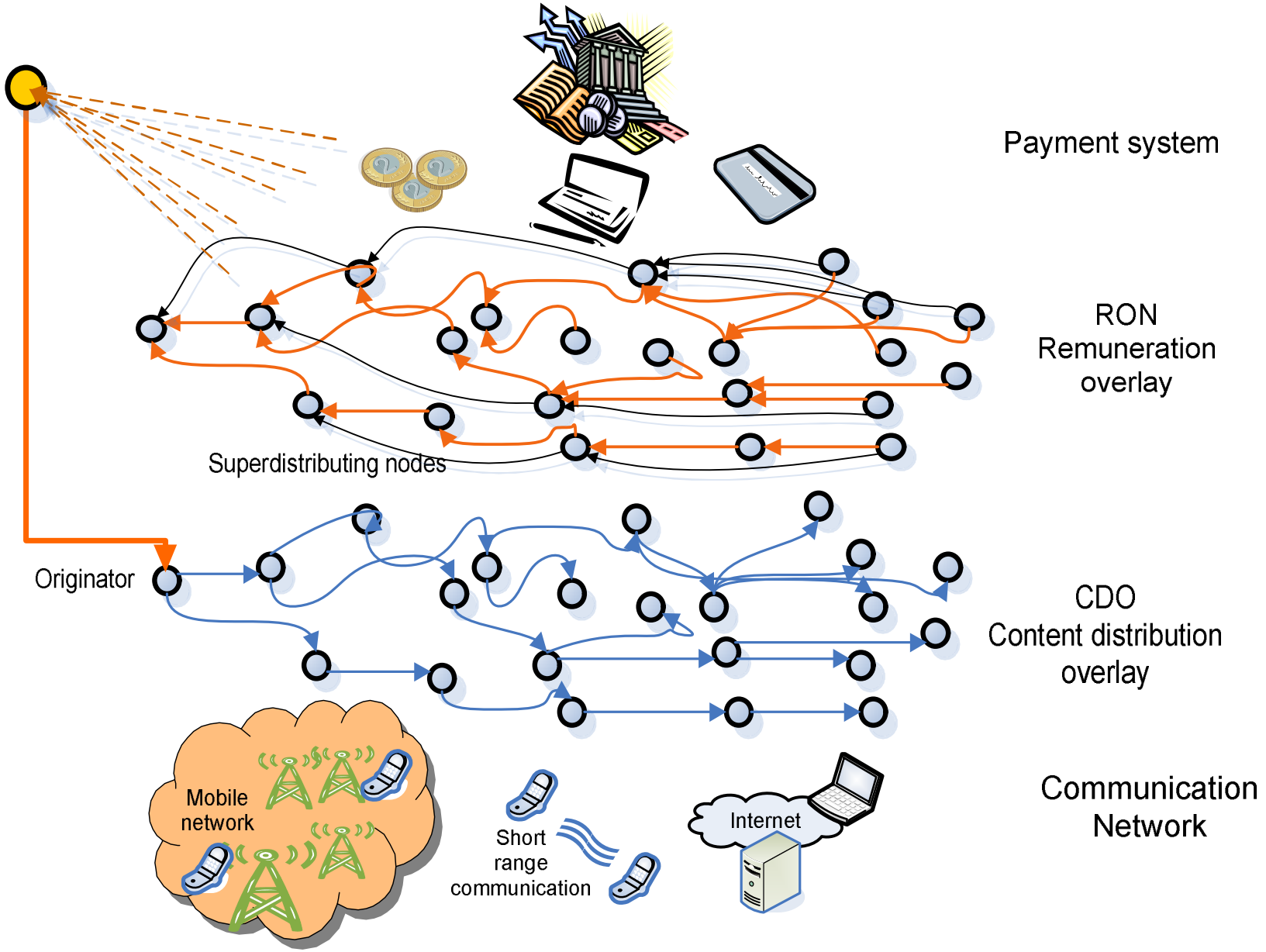
restore features of physical goods

copy protection

Superdistribution

- **Any marketing scheme for digital goods involving buyers as redistributors to other legitimate buyers**
  - **A combination of information distribution and market mechanism**
  - **The term has been around for a long time**
  - **Found serious consideration only with the advent of p2p networks**
  - **Standardised for mobile devices by OMA**
  - **IT views it mostly as a variant of DRM, but it's conceptionally different**
- **Definition of *superdistribution***
  - **A combination of two transactions with a digital good**
    - **Acquiring the good**
    - **Offering it for resales and transferring it to subsequent buyers**
    - **Wherein a *digital good* is an (economical) information good, represented in digital form (tangible or intagible)**

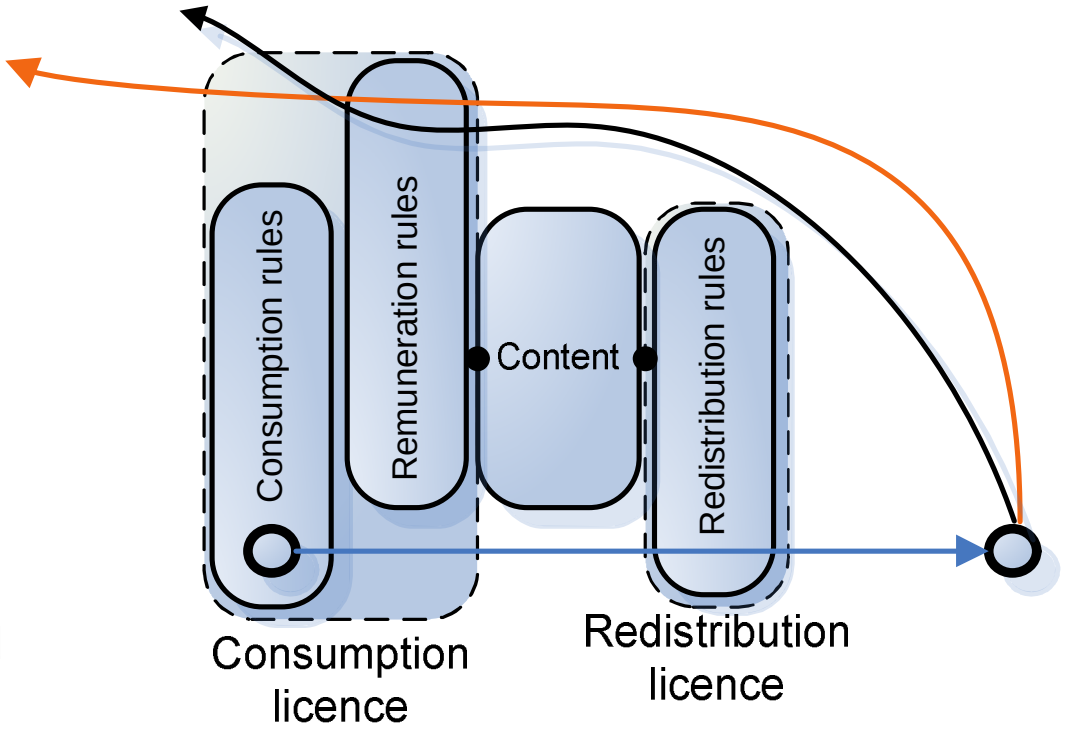
Superdistribution networks



Digital goods

- The ***digital good*** is an informational entity representing a value proposition to the buyer, composed of

- ***Consumption licence*** – how the buyer can use the good
  - ***Consumption rules*** describe how content may be used;
  - ***Remuneration rules*** describe how and who must be paid for it;
  - The ***content association*** describes to which content the rules apply
- ***Redistribution licence*** – how the buyer can redistribute it
  - ***Redistribution rules*** describe how, to whom and under which conditions content may be redistributed;
  - ***Content association***



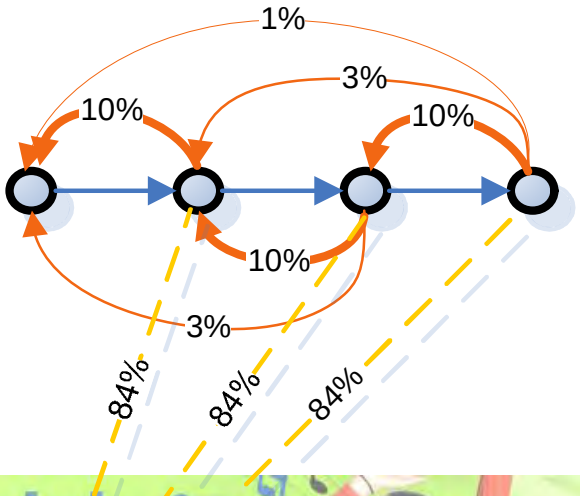
Examples

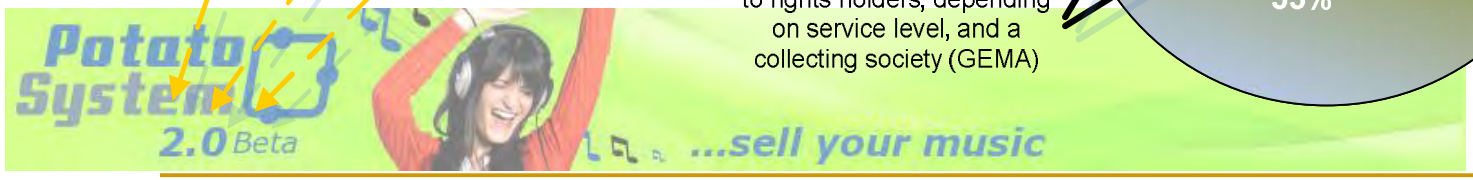
- **Snocap** – founded by Napster founders, idea: obtain licences from music industry that allow distribution over existing, popular p2p networks.
  - Audio fingerprinting to track the distribution of content,
  - file-sharing nets must be adapted to support Snocap's remuneration scheme.
  - made some deals with major, labels, it never took off economically
  - has been acquired in 02/08 by social networking platform **imeem**.
  - changing the strategy, it's now a general service provider for online music and for instance provides the technology for the music stores in MySpace
- **MashBoxx** – started with similar ambitions, also close to the circles of Napster and Grokster. Company is dormant for some time.
- **Peer Impact** – a pay-for-download file-sharing service by WurldMedia,
  - acquired together with WurldMedia by the online video service provider Roo.
  - file-sharing client has been re-released under the new name **ToPeer**
  - uses part of the original technology to allow p2p users to create private spaces in which to share content with peers they trust.
- ***Potato system*** – By 4 FriendsOnly AG and Fraunhofer IDMT founded 2000.
  - Targets small labels and individuals initially.
  - Has an agreement with the German collecting society GEMA.
- ***DRM Paradiso*** – A technical platform for mobile superdistribution.
  - Invented within the group of A. Tannenbaum
  - Proposes a trusted platform for superdistribution to guarantee enforcement of redistribution licence

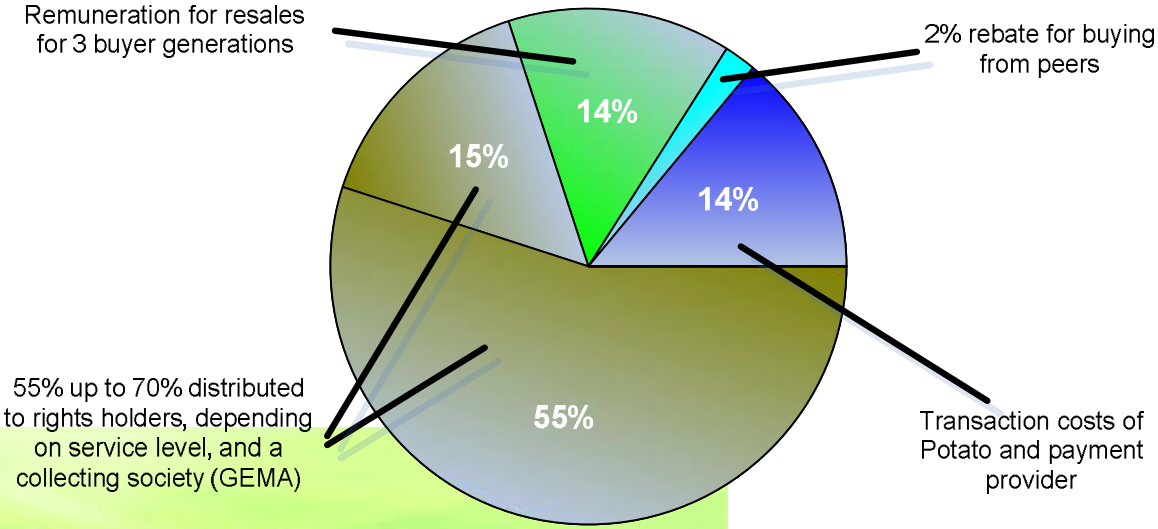
Potato System

- Uses a traditional, central accounting service
- Redistribution licence is embodied in a Transaction Number (TAN), redeemed upon resale
- Supports multiple payment providers
- Content is completely free of technical DRM measures

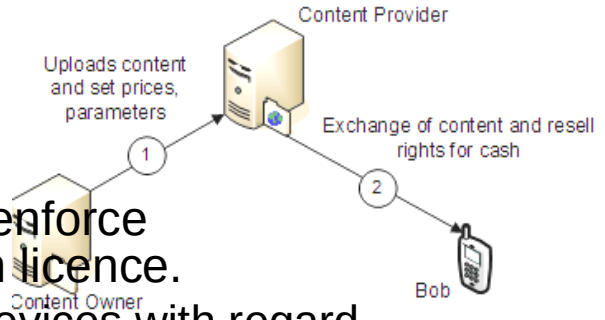
- Potato represents a true network (multi-level) market
- 3 levels of rewarding
- Uses a collector to remunerate originator
- Rebate for buying from peers instead of central service
- Integrates with social commerce platform SpreadBox to aid reselling

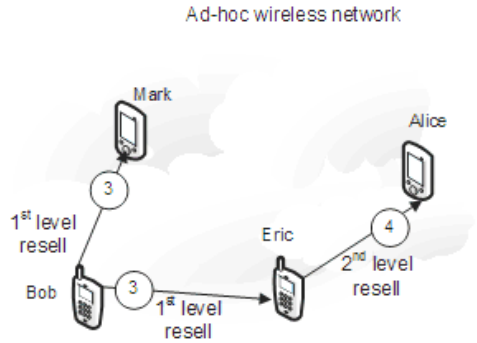




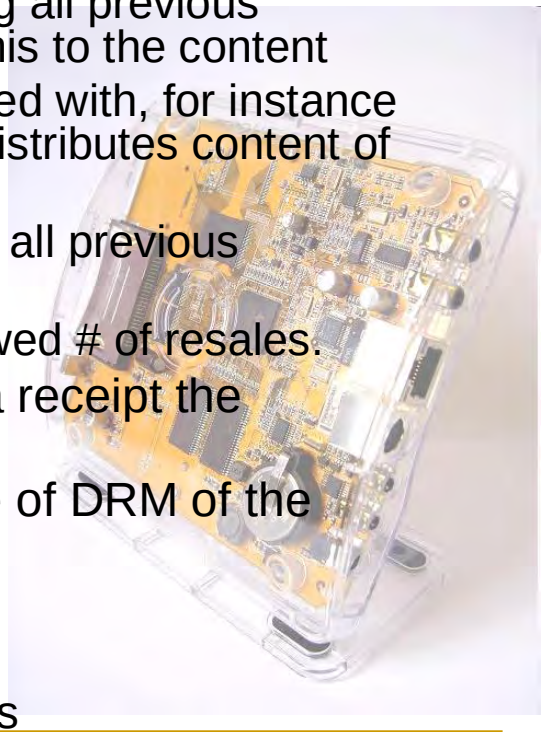


DRM Paradiso





- Technological solution for DRM-based superdistribution
- relies on a trusted platform to enforce consumption and redistribution licence.
  - requirements on compliant devices with regard to cryptographic capabilities (hash, AES engine, and PKI management), secure storage, secure content decoder.
- Consumption and remuneration rules are cryptographically bound to content and *chained*.
  - a buyer receives a signed container from reseller, containing all previous licences from upstream in the CDO. Signature associates this to the content
  - Enables receiver to verify that content has not been tampered with, for instance it prevents content masquerading attacks (a reseller superdistributes content of lower quality).
  - receiver can check that licence rules have been enforced in all previous distribution steps,
  - enforces rules for itself, e.g., respects and updates the allowed # of resales.
- Payment is and out of band process in Paradiso based on a receipt the acquiring node sends back to the superdistributing node.
- System has strong security with respect to the maintenance of DRM of the content down the CDO. Formal security proofs are given
- Paradiso has not been deployed commercially,
  - Prototype on a Neuros development board
  - similar capabilities of what is typical for mobile music players



Economic qualities of network markets

Ponzi schemes

favour recruitition over resales

Inventory loading

pyramid selling

externalise risk

digital goods

Peter-and-Paul scams

externalise distribution cost

snowball systems

late entrants are penalised

chain letters

- Buyers get not only a void right to resale, but a good of personal utility
- ***Inventory loading*** is absent
- Marginal costs for replication and redistribution are much smaller than resale prices – ***transaction costs are insignificant***;
- novel feature of digital superdistribution: it enables in principle a ***fair*** system design

what revenues from resale can an agent expect ?

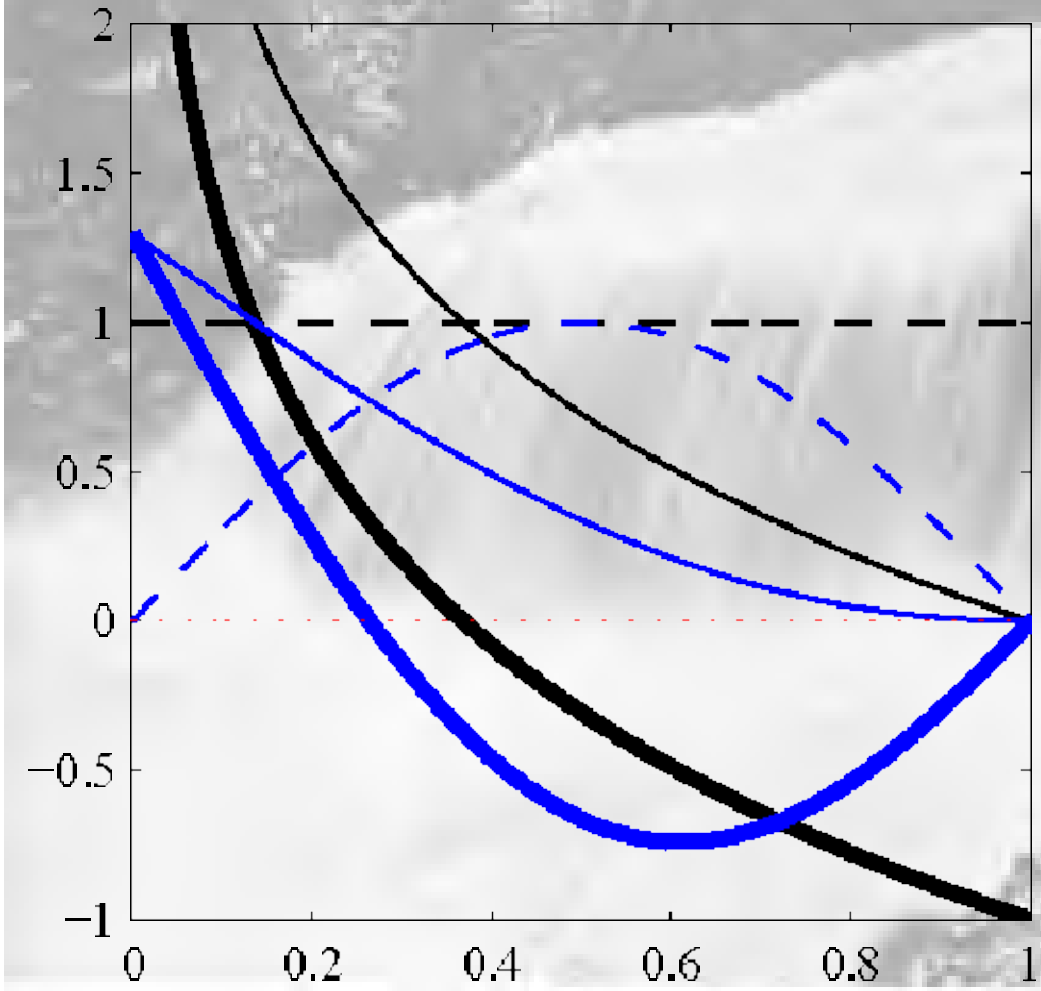
Fluid stochastic model for expected resale revenues

a flux model

buyers enter continuously

pay a certain price to the reseller

agents compete with each other for new buyers



$$v_r(s) = \int_s^1 \frac{\gamma(\sigma)\pi(\sigma) - \tau}{\sigma}\,\mathrm{d}\sigma$$

$$s = n/n_\infty,\ s \in [0,1]$$

mechanism design

dynamical forward pricing

fair reward / incentive schedules

competition against free-riders!

Technical and Security requirements on superdistribution

- **Superdistribution is almost technology-neutral**
  - Centralised or decentralised
  - In-band or out-of-band
  - Protection focused on RON instead of CDO (as opposed to DRM)
- **Requirements on successful superdistribution**
  - Protect privacy of buyers and resellers
  - ***Market mechanisms*** must be implementable and should enable the definition of CDO and RON structures, e.g., rewarding levels, match-making rules e.g. geo-localisation, allowed number of resales, etc.
  - A ***Marketing platform*** must be incorporated, in particular to ensure fairness in competition between resellers, and market homogeneity.
  - ***Dynamisation*** of the market should be supported.
    - local changes in space and/or time of licences
    - dynamical forward pricing.
    - research challenge: methods to monitor the SD market in real time
    - Responsive pricing, e.g. depending on popularity/demand

Conclusions

- The legal lever of the industry is becoming long
  - Helped “inadvertently” by telecommunications data retention regulation
  - ISPs pressurised to filter free-rider traffic
  - Suspected perpetrators receive internet bans
- Some thoughts from L. Lessig: “there is growing extremism that comes from both sides in this debate [. . .]”
  - Abolitionism against new technology – e.g. automatic removal of copyrighted content from sites like YouTube, regardless whether there might be a claim of fair use to it or not.
  - Growing disrespect (of youths) for the concept of intellectual property, and legality in general
  - User-generated content and other new forms of creativity may not grow in such a hostile environment
  - Can You let Your children take the risk of going online?
  - Culture could become ***read-only***
  - Can competition turn over this cartel?
- Superdistribution can have an economic impact in this battle
  - Use synergies with social networks
  - Encouraging users to create and resell derivative works
  - Let them set up their own marketing schemes
  - Make the economic value of digital goods (and thus intellectual property) tangible to the individual