A security analysis of business models for digital products

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Content

1. Security
2. Digital Rights Management
3. Role of payment
4. New business models
5. PotatoSystem

What Can Happen in the Internet

- Eavesdropping
- Theft
- Change, delete
- Identity fraud
- Repudiate
- Loss of access ← No music
- Loss of control ← No payment
- Viruses
- Privacy attacks ← No trust
- SPAM

IT Security

- The aim of an „attack“ is a personal advantage of the attacker on the cost of the attacked.
- Security problems stem from **conflicts of interest** between human actors.

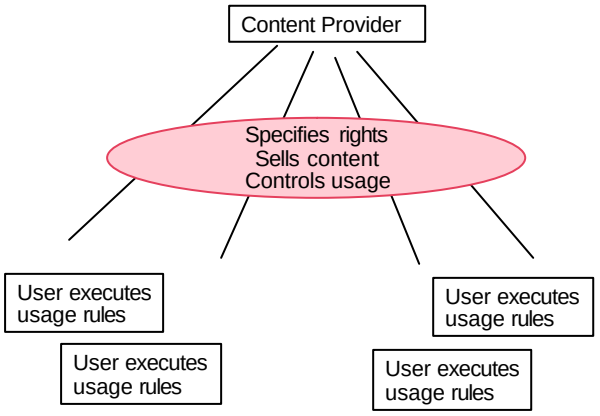
Digital Rights Management - Aims

- To imitate physical properties of goods
- Uniqueness
- No cheap copy
- Or to behave as specified by rights owner

Rights and Usage Rules

- Rights are encoded within media format
- Copy protection
- Usage restriction
  - Loss of quality (copies, pre-listening)
  - Number of copies
  - Number of replays
  - Time limits for replays
  - Usage environment for replays

Rights Enforcement



Security Analysis for DRM

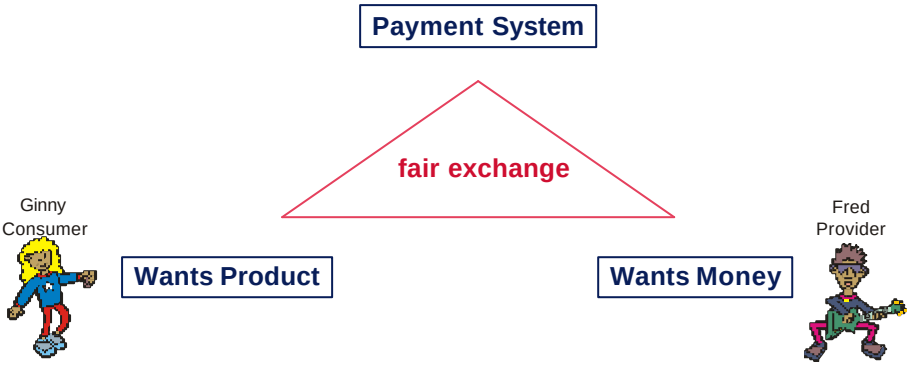
	Provider	Consumer
Value / Goods	Music data as product	Music data as quality product
Attacks/ Threats	Unpaid sharing	Unavailability
Security Requirements	Integrity, Quality, Product-Money-Binding, Uniqueness	Integrity, Quality, Fair Price, Availability
Security Mechanisms	Safe Distribution, Copy protection ® DRM	Distribution, Forwarding ® P2P

Interest vs. Enforcement

- Content providers have interest in rights
- Content providers specify rights and policies
- Rights restrict usage
- *Burdon on enforcement solely on users*
- Users have interest in private use
- Users circumvent rights

⇒ *Market is destroyed*

Role of Payment



Requirements

- Immediate money flow
- Low transaction costs
  - Bank clearance of micromoney expensive
- Other models
  - credit cards, subscription, packaging, intermediaries
- Additionally: fair exchange protocols

Payment Models

- Prepaid
  - HW (Chipcard, GeldKarte) *
  - SW (Paysafecard, Micromoney, Paybest Telefone TANs) *
- Intermediary
  - Credit Card (SSL, Visa 3D Secure)
  - Accounting (Paypal, Moneybookers, Firstgate, Paybest) *
  - Escrows for fair exchange (S-ITT)
- Traditional
  - Invoice
  - Bank withdrawal

* good for micropayment

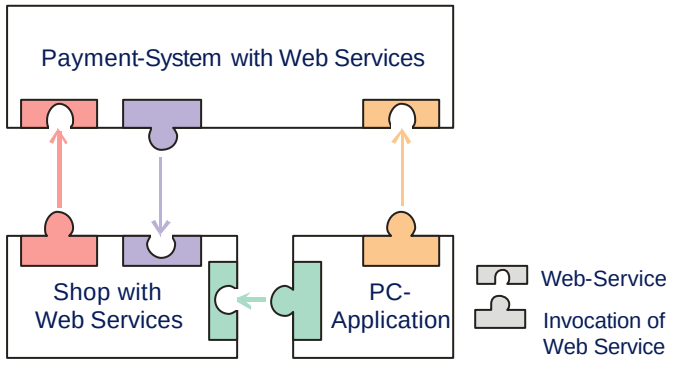
Payment + Purchase Integration

- Physical goods escrow
  - Product delivery and money transfer trough third party (eBay)
- Download proxy
  - Firstgate, Paybest
- Virtual accounts
  - Multiple purchase
  - Packaged clearance
  - „Paid“ signal
  - Prepaid, accounting and escrow systems

PayBest

- Account Service for multiple purchase and packaged clearance
- Download proxy
- Multiple Payment methods included
  - Paypal, Moneybookers, Firstgate Click&Buy, Paysafecard, Micromoney
  - Original telefone TAN
- Integration of payment and purchase by Web Services

PayBest Web Services

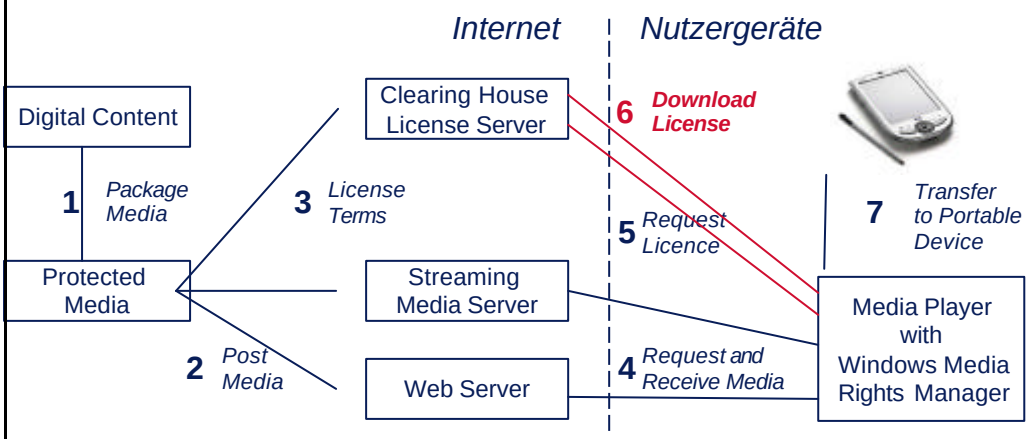


DRM and Alternative Models

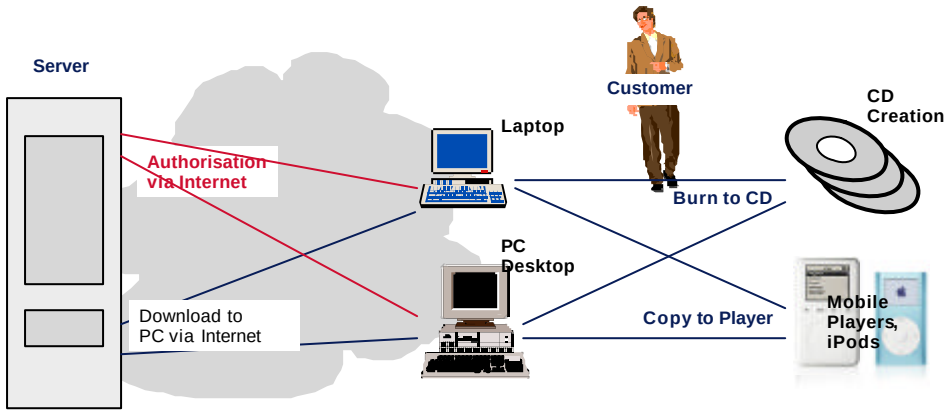
Users behave correctly because of

1. Technical enforcement
   - „Classical“ DRM
   - Windows Media, Sony Connect, Apples iTunes
2. Identification of misuse
   - LWDRM, M2S
3. Incentives
   - Users and providers cooperate
   - PotatoSystem, M2S

Windows Media Rights Manager



iTunes Music Store, Apple



iTunes Music Store, Apple

- Free copy of music in private home network
- Free private copies on CD
- Only 5 PCs authorized to play music

- Secial format with authorization id
- Warning if PC is not authorized to play music

- MP3 reproduction out of scope

LWDRM® - Basic Idea

- Aims
  - Respect of user interest (Fair-Use, Privacy)
  - No clear text on user site (encryption of content)
  - Identification of misuse

- Technically, a customer can copy and forward content, if he digitally signs it (SMF)
- Otherwise, content is bound locally to an individual end-user device (LMF)

Incentives

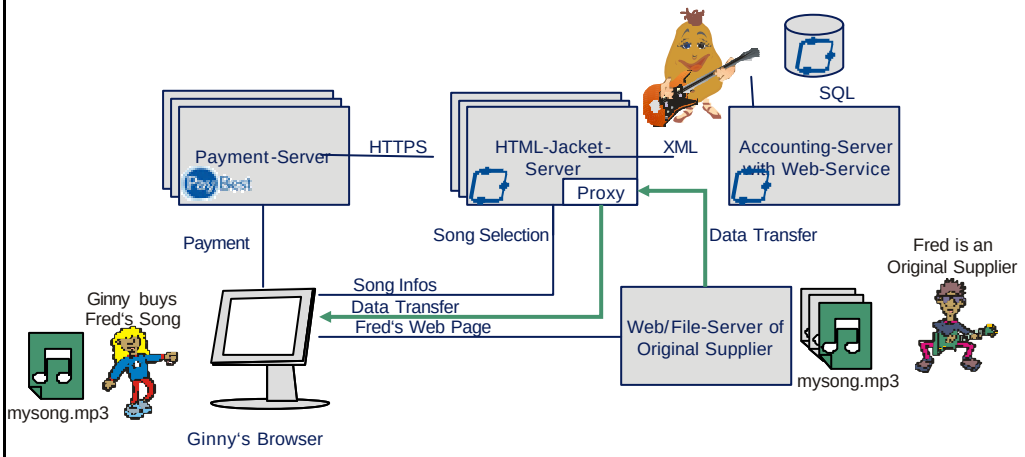
- Provision (*Potato*)
  - Users share income
- Services (*Potato*, *M2S*)
  - Users get more:
  - Cover, info, albums
  - „from radio/concet/pub to an album“
- Guarantee of quality, upgrade (*M2S*)
- Community (*Potato*)
  - Users get contact to other users (Matching Service)

The PotatoSystem *brings Users and Providers together*

- Users are motivated to pay for the good, because they can resell and earn money
- Users become active redistributors (good for both, users and providers)
- No copy protection mechanisms
- More user services: redistribution right, user matching, fan infos, combination with CDs and concert tickets

Jürgen Nützel, 4FriendsOnly.com

Sales Process



After Payment *Ginny is registered Reseller*

- She may publish her own sell link in the Web:
  https://www.potatosystem.com/process/sell?tan=88099176227
- Or embed a mini HTML page (per iframe-Code):

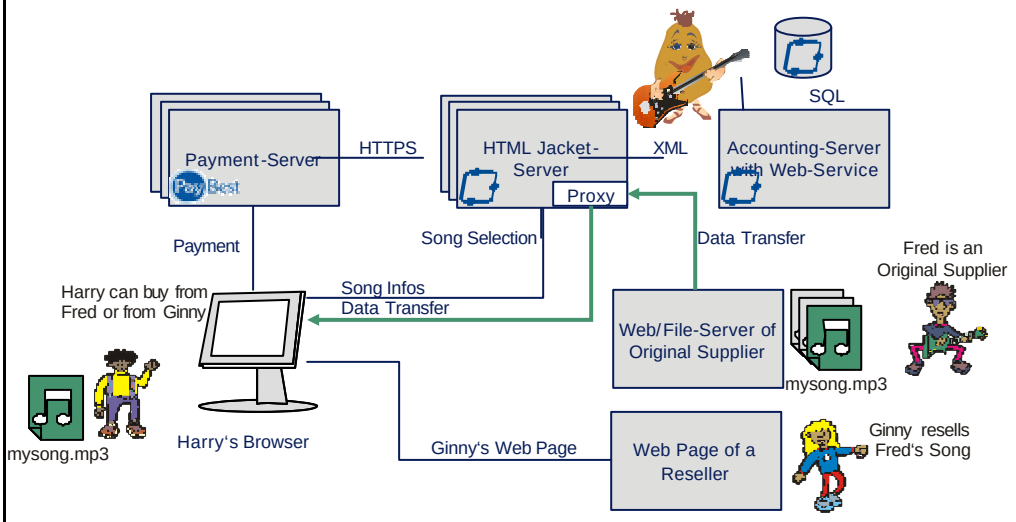
Prelistening

Sales

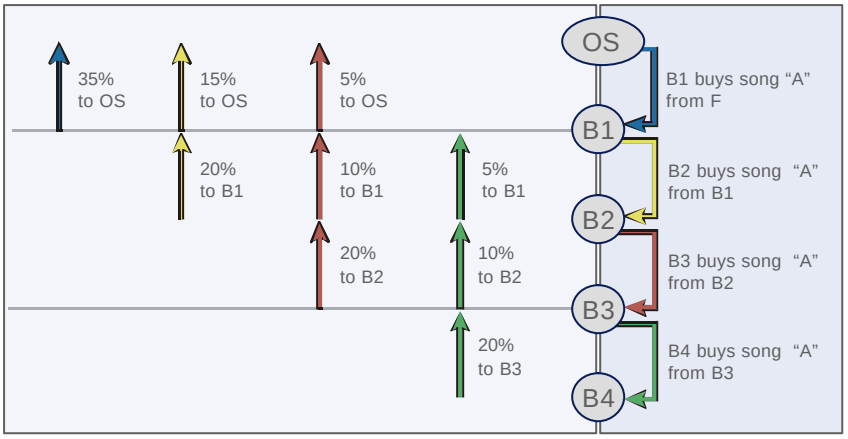
More Info

```
<iframe style='{width:225pt; height:30pt;}'
src='http://data.potatosystem.com/process/iFrame?tan=
88099176227' marginwidth='0' marginheight='0'
scrolling='no' frameborder='0'> </iframe>
```

Resale



Provisions



OS = Original Supplier (e.g., a Label), B1 … B4 = Buyer 1 bis 4

The PotatoSystem offers as Web service

- Account management for content owners and customers
- Payment clearance (Paybest)
- Delivery of purchased songs from provider server to the buyer via secure proxy
- Provision management
- Detailed receipts for providers
- Rights management (GEMA)
- Combinationen with real CDs and concert tickets
- More functions under construction …

Conclusion

- Users are ready to pay for fair use
- Providers are ready to deliver for payment
- The common bracket is „payment“
- Pure DRM is not sufficient
- Payment is integrated part of purchase
- Free usage after payment is required
- See, for example, Potato and Paybest: