
Marc Fetscherin
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Digital Rights Management

• Currently only 3 books worldwide including in the title „Digital Rights Management“, all published in 2002

• Next September 4\textsuperscript{th} book about DRM: „Digital Rights Management - Technological, Economic, Legal and Political Aspects” Berlin, Springer
Agenda

- Problem Statement
- Impact for content providers
- Digital Rights Management
- Practical Example
- Q&A
More people are on-line...

Million of internet users

...with faster internet access

Million of users with broadband access

- New channels to connect to the internet
  - Wireline: e.g., ADSL*, Cable, Modem, Power
  - Wireless: e.g., W-LAN, mobile
- Decreasing hardware costs
- Decreasing cost of internet access

EXAMPLE – US

* Asymmetric Digital Subscriber Line

Source: Forrester; Jupiter
Technology advances....

- **Hardware**
  - Scanners
  - CD(rw)
  - DVD(rw)
  - Portables players

- **Software**
  - Compression format like MP3 or MPEG
  - Burning software
  - Capturing software (e.g., SnagIt)

- **Always affected intellectual property issues**
  (e.g., VHS, CD, DVD)
… and networks...

- Such as the Internet
  - Several billions pages of information
  - Growing at 7 million pages per day

- Internet traffic doubling every six months including transmission of works of intellectual property

Source: http://mappa.mundi.net/maps/maps_020/
...enable easy transformation/sharing of content

Traditional content sharing

<table>
<thead>
<tr>
<th>From/ownership</th>
<th>Physical</th>
<th>To/share</th>
<th>Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical*</td>
<td>Vinyl → cas</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CD → cas.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Digital</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Current situation

<table>
<thead>
<tr>
<th>From/ownership</th>
<th>Physical</th>
<th>To/share</th>
<th>Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>Vinyl → cas</td>
<td>• CD → cas.</td>
<td>• CD → MP3</td>
</tr>
<tr>
<td></td>
<td>CD → cas.</td>
<td>• CD → CD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DVD → DVD</td>
<td>• DVD → DVD</td>
<td></td>
</tr>
<tr>
<td>Digital</td>
<td>N/A</td>
<td>• MP3 → CD</td>
<td>• File sharing like P2P, websites, e-mail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MP3 → other devices</td>
<td></td>
</tr>
</tbody>
</table>

Ownership attached record carrier => Quality decrease

Ownership decoupled of record carrier => No quality decrease

* record carrier
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Digital content can therefore be...

- Easily accessed
  - by everybody
  - from everywhere
    - wireline
    - wireless
  - at any time

- Easily being transformed (e.g., see matrix)
  - Digitize, store, copy, modified

- Easily being distributed or shared (e.g., P2P)
...where this results

- Des-intermediation of the value chain
- Low copying, production, and distribution costs for individuals and content providers
- Increasing amount of digital content available illegally (piracy)

Few content providers are making money with digital content
Example of file-sharing system

Example – Kazaa 2003-03-15

Intraday Analysis - Number of users connected

Intraday Analysis - Number of Files available

N = 35
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Technology solutions are needed...

- Digital content demand protection technologies
  - to fight piracy
  - make money with digital content
  - also to protect sensitive information and privacy (e-mail)
- Digital content demands same protection as physical product does
- New technologies enable innovative business models (e.g., superdistribution)

Managing, controlling, securing, and tracking of digital content are key requirements for the future where Digital Rights Management is playing a key role
...where Digital Rights Management emerges as the tool content providers are looking for

- No standard definition
- „DRM entails the operation of a control system that can monitor, regulate, and price each subsequent use of a digital content“ [Einhorn 2001]
- Managing rights means managing rights throughout the entire value chain and the life cycle of a digital content
- Seven components exist for a DRMS
- At the core is the „rights model“
There are seven key components...

- Access and usage control
- Protection of authenticity and integrity
- Hardware and software
- Copy detection system
- Integrated E-commerce systems
- Payment systems
- Metadata

EDI
XrML
microPAYMENT
DIGIMARC®
Rights Model: examples of „types of rights“

- **Render Rights**
  - Print
  - View
  - Play

- **Transport Rights**
  - Copy
  - Move
  - Loan

- **Derivative Work Rights**
  - Extract
  - Edit
  - Embed

*render = represent it on an output; derivated = deal with manipulation*

Source: Rosenblatt/Triple/Mooney [2002]
 DRM Reference Architecture

1. User gets content package through downloading (www, FTP, e-mail)
2. Exercise rights on the content, activate the DRM controller
3. DRM controller send identity and content information to the license server
4. Authenticate client identity against identity database
5. Look up rights information to the license server
6. According to rights information, kick off financial transactions
7. Creation of license (encrypted), license generator pull together rights information, client identity information encrypted key
8. Send license back to the client
9. Decrypt the content and release it to the rendering applications
10. Rendering applications play, shows, etc., the content to the user

Source: Rosenblatt/Trippe/Mooney [2002]
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## Application of Digital Rights Management

<table>
<thead>
<tr>
<th>Industry / Segment</th>
<th>Objectives</th>
<th>Market</th>
</tr>
</thead>
</table>
| • General Companies (documents, e-mails, presentations, budget figures, sensitive information like HR, training courses)  
• Financial Institutes (reports, trading information)  
• Healthcare (patient information)  
• Law Firms (contracts)  
• Universities (courses, e-learning)  
• Telecom (mobile business)  
• Government (documents, e-mails) | • Protection  
- Access and Usage control  
- Authenticity  
- Integrity | B2B/ B2G |
| • Media & Entertainment Industries (music, film, games, software)  
• Publishing (books) | • Protection against Piracy  
• Monetization of Content | B2C |

Institute of Information Systems  
Research Group Information Engineering  
University Bern, Switzerland
Example – DRM for Books

Publish eBook

### Usage rights & pricing

<table>
<thead>
<tr>
<th>Usage</th>
<th>Details</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preview</td>
<td>5 pages Low-resolution Image (GIF)</td>
<td>Free</td>
</tr>
<tr>
<td>Read</td>
<td>Secure Not Secure</td>
<td>$0.00</td>
</tr>
<tr>
<td>Read &amp; Print</td>
<td>Secure Not Secure</td>
<td>$10.00</td>
</tr>
</tbody>
</table>

### Revenue disbursement

<table>
<thead>
<tr>
<th>Member Name</th>
<th>Reason</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Libby Gleeson</td>
<td>By (author)</td>
<td>80</td>
</tr>
<tr>
<td>Renato Iannella</td>
<td>Illustrated by</td>
<td>10</td>
</tr>
<tr>
<td>Dale Spencer</td>
<td>Edited by</td>
<td>10</td>
</tr>
</tbody>
</table>

Quelle: ozauthors.com
Example – DRM for Music

Selecting the subscription

[Image of the HMV downloads page]

Accepting the licence agreement

My Essential Collections

Download

By pressing the subscribe button below, you agree to the following terms and conditions:

Subscription Service: Terms of Use

These are the terms (the "Terms") on which you will be allowed to access the subscription service operated on this web site.

Who we are:

The digital music subscription service on this web site is provided by On Demand Distribution Ltd ("CD2/we/us") and so the contract for the subscription service will be with us.

If you would like to find out more about CD2, our contact details are shown within the Help Section, which can be found in the navigation bar at the top of this screen.

What we offer:

SUBSCRIBE CANCEL

Purchase the subscription
Filling out user information

Please enter the following information to register for downloads in the shop. You will be asked for your username and password when you return to the download shop. Read our *Frequently Asked Questions* to find out why we need these details.

First name: Marc  
Surname: Fatscherin  
Email: fatscherin@iw.unibe.ch  
Username: fatscherin  
Password: ********

That's it - click "Register Now" to complete your sign up!

If you don't wish to receive information about product offers which may be of interest to you from carefully selected partner organisations, please tick the box ☑.

If you are already registered and have a login

Search for a music file

Saints and Sinners
by All Saints

Information
Released 23/09/2002
Label London
Tracks 14
Genre Pop

Title
1. Pure Shores
2. All Hooked Up
3. Dreams
4. Distance

Download the music file...
...and play the music file
License of music file (in Xrml)

```xml
<LICENSE version="2.0.0.0">
  <LICENSORINFO>
  </LICENSORINFO>
  <DATA>
    <LID>{DC9B8930-B4FC-49EA-B37E-120F57C22E79}</LID>
    <KID>Imj/t3sPvEWmEazwIjyw==</KID>
    <ISSUEDATE>#20021125 07:19:52Z</ISSUEDATE>
  </DATA>
</LICENSE>
```
## Pro and contra of DRMS

<table>
<thead>
<tr>
<th><strong>Pro DRMS</strong></th>
<th><strong>Contra DRMS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Gives content providers the necessary technology to protect their intellectual property</td>
<td>• Potential violation of data protection and privacy (e.g., track, monitor)</td>
</tr>
<tr>
<td>• Enables to control access and usage of digital content</td>
<td>• Restrict faire use (e.g., make copy)</td>
</tr>
<tr>
<td>• Enables to protect/guarantee the authenticity and integrity of digital content</td>
<td>• DRMS are conceptual simple but practical very complex</td>
</tr>
<tr>
<td>• If you want to consume legally digital content, DRMS is a solutions</td>
<td>• No standards</td>
</tr>
<tr>
<td>• Enables new business models (e.g., superdistribution – OASIS case)</td>
<td>• Poor inoperabilities other systems</td>
</tr>
<tr>
<td>• User pay only for the effective use of the content (e.g, pay-per-use)</td>
<td>• Poor ease of use (not user friendly)</td>
</tr>
<tr>
<td>• Hamper piracy</td>
<td>• Often restrict heavily the lawful consumers (thus, illegal offer more convenient than legal offer)</td>
</tr>
<tr>
<td></td>
<td>• So far any protection technology not been widely accepted by consumers</td>
</tr>
</tbody>
</table>
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The Author - CV

Marc Fetscherin
Institute of Information Systems
University of Bern
Research and Teaching Assistant
http://www.ie.iwi.unibe.ch/forschung/drm/;
fetscherin@iwi.unibe.ch

Studied finance and marketing at the University of Lausanne (HEC) and holds a Masters degree in IT and Strategy from the London School of Economics (LSE). He worked as a consultant at McKinsey & Company where he got specialized in telecommunication and e-commerce. Currently he is a research and teaching assistant at the Institute of Information Systems - University of Bern, Switzerland. His research focuses on E-commerce, Digital Content Distribution, and Digital Rights Management. He has published several articles.
The Author – Selected Publications


Fetscherin, M., Müller, J., Copyright and the Internet, One day Compact Seminar at the College of Europe, Warsaw, 2003-04-12.