2 Digital Rights Management

2.1 Media Rights
2.2 Rights Models
2.3 Principles of DRM Systems
2.4 DRM Standards
2.5 Selected Commercial Solutions

Literature:
Gerald Fränkl, Philipp Karpf: Digital Rights Management Systeme – Einführung, Technologien, Recht, Ökonomie und Marktanalyse, pg-Verlag 2004

Urheberrecht (Intellectual Property Right IPR)

• Geschichte:
  – Autorenprivilegien (seit 1486)
  – Theorie vom geistigen Eigentum seit ca. 1700
• Aufgaben des Urheberrechts:
  – Sicherung von Nutzungs-, Veröffentlichungs- und Verwertungsrechten für den Urheber eines Werkes
  – Rechte bestehen direkt und registrierungsunabhängig
    » Anders als z.B. bei Patenten und Markennamen
• Territorialprinzip
  – Regionale Gesetze
  – Wenige internationale Abkommen
    » WIPO = World Intellectual Property Organisation (www.wipo.int)
    » 150 Teilnehmerstaaten
Types of Copyrighted Works

- Literary works, e.g. newspapers, manuals, fiction, non-fiction, poetry, advertisements, ...
- Musical works, such as songs and instrumentals
- Dramatic works, such as plays
- Pantomime and choreographic works, such as dance and mime
- Pictorial, graphic and sculptural works, such as photographs, paintings, maps, drawings, ...
- Motion pictures and other audiovisual works
- Sound recordings
- Architectural works
- Audio-visual displays
- Software programs

IPR in the U.S. (1)

- Article 1, section 8 of U.S. Constitution:
  - “The Congress shall have Power […] to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”
- Copyright Act of U.S. Congress 1976
  - Protects “…original works of authorship fixed in a tangible medium of expression, now known or later developed, from which they can be perceived, reproduced and otherwise communicated, either directly or with the aid of a machine or device”
  - Fair-Use Doctrine
    - Use of the copyrighted work to a small extent which does not affect the market value of the work is admitted
  - First-Sale Doctrine
    - Buyers get extensive rights to do everything they want with the physical copy bought, but they do not get the copyright for the content
  - Public-Domain Doctrine
    - Works older than 70 years are free of copyright
IPR in the U.S. (2)

- Digital Millennium Copyright Act (DMCA) 1998
  - US response to world-wide copyright treaties (WIPO Copyright Treaty and WIPO Performances and Phonograms Treaty
  - Section 1201: Anti-circumvention provision:
    It is prohibited to make or sell devices that
    » Are primarily designed or produced to circumvent technological measures to protect copyrights
    » Have only limited commercial significant purpose or use other than this kind of circumvention
    » Are marketed for such circumvention
    - This is a tacit admission that copy-protection technologies will never be perfect!
    - Problematic:
      » Where does fair use end? (e.g. circumvention for backup copies)
      » Can DMCA restrict the right of free speech? (e.g. for magazines publicizing protection-cracking software code)

IPR in the EU

- Original Idea: Harmonization of the individual regulations of the EU member states
  - “Green Book” 1997
- Basis: Article 94 of EU Treaty
  - “Harmonization of national provisions affecting Common Market”
- EU entered WIPO in 2001
- EU Copyright Directive (Info-Richtlinie) 2001
  - Gives a similar basis for Digital Rights Management as the DCMA in the U.S.A.
  - Strong emphasis on the rights of the creator (droit moral), less market-oriented
Urheberrecht in Deutschland

• Urheberrechtsgesetz (UrhG) 1965
• Novelliert 2003 in Anpassung an die EU-Info-Richtlinie und die WIPO-Abkommen ("Erster Korb")
  – Künstlerische und ästhetische Interessen des Urhebers an seinem Werk (nur natürliche Personen, nicht wie in den USA auch juristische)
  – Anreiz für Urheber, weiter Werke herzustellen
  – Sicherung einer angemessenen Vergütung
  – Eigentümerstellung des Urhebers fast so stark wie bei einer materiellen Sache
• Zweierlei Rechte:
  – Urheber-Persönlichkeitsschutz
  – Verwertungsrechte
    » Urheber bestimmt, ob Werk vervielfältigt werden darf
    » Privatkopie (Vervielfältigung zum eigenen Gebrauch) immer erlaubt (§53)

Rights Management Terminology

• Rightsholder: A party owning rights in intellectual property
• User: A party that intends to make use of intellectual property rights. May be a licensee or a buyer (or grantee).
• Content owner: Like rightsholder, but less strict. May own the rights only partially, e.g. only for specific countries.
• Rights transaction: Transaction establishing a new rights situation
  – Example: Buying a newspaper, buying the right to re-publish content from the newspaper, buying the publishing house
• Agent: A legal entity authorized by a rightsholder to enter into a rights transaction on behalf of the rightsholder
• Royalties: Monetary compensation to a rightsholder or his agent for the use of intellectual property rights
• Rights management: Business processes that for legal and commercial purposes track rights, rightsholders, licenses, sales, royalties, and associated terms and conditions
• Digital rights management (DRM): Rights management using digital technology
Traditional Rights Management Solutions (1)

- The solution found for photocopying: Copyright Clearance Center
  - Obtains the rights from publishers to make photocopies (relating to over 1.75 million works)
    - US: Copyright Clearance Center (CCC), www.copyright.com
    - Germany: VG WORT (Verwertungsgemeinschaft Wort, www.vgwort.de)
      - 2003: 83 Mio. EUR distributed to 260000 authors
    - International Federation of Reproduction Rights Organizations (IFRRO)
      - Bundles these rights into an offer to users like copy centers
      - Publicly available photocopy machines can obtain a licence from CCC
      - Corporate organizations are charged according to survey data for a given industry branch
      - Recent development: “Pay-by-the-copy” via Internet
  - Rather successful, low overhead
  - Not the only possibility for rights transactions of this kind
    - Separate agreements with publishers always possible

Traditional Rights Management Solutions (2)

- Collective music licensing
- Organizations for collecting fees from commercial music use
  - Germany: “Gesellschaft für musikalische Aufführungs- und mechanische Vervielfältigungsrechte” (GEMA, www.gema.de)
- Music is played commercially at a high number of occasions:
  - Radio broadcasting, concerts, restaurants, shops, airlines, soundtracks for movie broadcasts, sound on websites, hold music for telephones, ...
  - This use in not covered by the license obtained with e.g. a CD
  - Additional fees are collected
Tradional Rights Management Solutions (3)

- In the schemes discussed above, the rightsholder is free to admit a certain use or not, depending on a rights transaction.
- Compulsory licensing:
  - Government-regulated pricing
  - As soon as user pays an established fee (possibly to a governmental organization), he has certain rights of use
  - Pricing scheme is likely to be "flat", e.g. monthly fee independent of actual degree of usage and used works

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Literature:
Examples for Content Rights Transactions

• Buying a book, the buyer gets:
  – The right to read one copy of the physical book arbitrarily often
  – The right to sell or give the book to someone else
  – He does not get the rights to, e.g.:
    » To perceive the book in a different technology (eBook, audio book)
    » To quote from the book in own publications beyond fair use

• Buying a cinema ticket, the buyer gets:
  – The right to see the movie once (or sometimes until the theatre closes)
  – He does not get the rights to, e.g.:
    » Let a friend see the movie
    » Make a video record of the movie

• Listening to a song on the radio, the listener gets (without paying)
  – The right to listen to the song
  – The right to record it for personal use

Fundamental Types of Rights

• According to Mark Stefik, Xerox PARC ("Letting Loose the Light")

<table>
<thead>
<tr>
<th>Render Rights</th>
<th>Transport Rights</th>
<th>Derivative Work Rights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print</td>
<td>Copy</td>
<td>Extract</td>
</tr>
<tr>
<td>Play/View</td>
<td>Transfer</td>
<td>Edit</td>
</tr>
<tr>
<td>Export</td>
<td>Loan</td>
<td>Embed</td>
</tr>
</tbody>
</table>
Utility Rights

- Additional types of rights which exist for technological reasons rather than to support publishers’ business models

- Backup rights:
  - Right to make a copy as a safety means against technical failure

- Caching rights:
  - Right to make temporary local copies to improve performance

- Data integrity rights:
  - Right to create redundant code information etc. to ensure that the data does not get corrupted

Rights Attributes

- Rights attributes are additional specifications added to each of the fundamental rights
- Rights model = fundamental rights + rights attributes
Examples (Basic Rights Language) (1)

- Buying a book:
  - Render rights: Print
    » Consideration: Price of the book
    » Extent: Forever, one copy only
    » Type of user: No distinctions
  - Transport rights: Sell, give away, loan
    » No restrictions
  - Derivative rights: None

- Buying a cinema ticket:
  - Render rights: Play
    » Consideration: Price of movie ticket
    » Extent: Once or rest of the day
    » Type of user: Adult or child
  - Transport rights: None
  - Derivative rights: None

Examples (Basic Rights Language) (2)

- Listening to a song on the radio
  - Render rights: Play
    » Consideration: None
    » Extent: Once for each receiver
    » Type of user: No distinction
  - Transport rights: Copy for personal use
    » Consideration: Percentage of the cost of the recording media
    » Extent: Personal use only
    » Type of user: No distinction
  - Derivative rights: None
Rights Transactions May Change Rights

- Recording a tape from radio is a step in a chain of rights transactions
- After recording, the rights on the record change:
  - Extent of the render right is now “forever”
  - New derivative rights are added, e.g.:
    - **Derivative right:** Extract and embed rights for commercial use
      » Consideration: None
      » Extent: Only 30 seconds samples
      » Type of user: Commercial

Rights Models and Digital Media

- Example: Music or video download service
  - **Render rights:** View
    » Consideration: Price of the download
    » Extent: Forever
    » Type of user: No distinction
  - **Transport rights:** None
  - **Derivative rights:** None

- Practical questions:
  - How to ensure that the transport rights are obeyed (i.e. the file is not copied to other people)?
    » Legal measures: How to prove from where the file came?
    » Technical measures: How to make content viewable only for uniquely identified users?
  - These are technical challenges of DRM technology
Superdistribution

- Basic idea (Ryoichi Mori): A software object cannot easily determine whether it has been copied or not, but it can easily be built to do some extra things when run.
- Superdistribution-enabled computer: Contains special (tamper-proof) hardware/software components for usage metering and transfer to some billing agency.
- Superdistribution-enabled software: Can be used only on superdistribution-enabled computers, and meters its use
  - Can be obtained and copied freely, since financial commitment is restricted to use, not to possession.
- Superdistribution-enabled content: Operating system automatically loads required playback software components
  - When content is played back, billing for content (and possibly playback software) takes place

Chains of Rights Transactions

- Rights transactions always take place in chains
- Each transaction creates a new set of rights
- Example:
Superdistribution Chains

• Superdistribution can be used for managing distribution chains
  – Usage rights change during distribution (from business to business)
  – Idea: Copy freely, but keep always an adequate set of rights
• In a superdistribution scheme, one specifies
  – The rights for the object at hands
  – The rights that are handed on to others
• Transport rights extended with the specification of superdistribution rights
• Example: Buying and re-selling a book
  – Render rights: Print ...
  – Superdistribution rights:
    » Render: Print
    » Consideration: Half the selling price
    » Extent: Up to 10 copies
    » Type of user: No distinction

Implementing Rights Models

• Mark Stefik, Xerox Labs
  – "Letting Loose the Light: Igniting Commerce in Electronic Publication", in: Internet Dreams - Archetypes, Myths and Metaphors, MIT Press 1996
  – Defined a complex Digital Property Rights Definition Language (DPRL)
    » Lisp-like syntax
• ContentGuard (Xerox spin-off company, partially owned by Microsoft)
  – Transformed DPRL into XML syntax: XrML (Extensible Rights Management Language)
    » Current version: 2.0
    » Submitted to OASIS for standardization
    » ContentGuard holds key patents
  – www.xrml.org
• Impact of XrML:
  – Microsoft implements XrML in its Unified DRM solution
  – ISO standard MPEG-21 bases its "Rights expression language" on XrML
• Two key questions, to be separated:
  – How to specify the rights which are adequate in a certain situation
  – How to enforce that the usage obeys the rights
**XrML Terminology: Grant**

- **Principal**: Identification of a party to which rights are granted
- **Right**: A “verb” that the principal is granted to execute on a resource
- **Resource**: Object to which the grant refers (e.g. audio file or service)
- **Condition**: Specifies the terms under which the grant is valid

From XRML 2.0 Technical Overview

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**XrML Terminology: License**

- **License** defines a set of grants
  - plus identification of issuer(s)
  - plus additional information like description, validity date, ...

From XRML 2.0 Technical Overview
**XrML Content Extension**

- Specific XrML language elements for digital multimedia content
- Specific rights:
  - File Management Rights (accessFolderInfo, backup, delete, ...)
  - Render Rights (export, play, print)
  - Transport Rights (copy, loan, transfer)
  - Derivative Work Rights (edit, embed, extract)
  - Configuration Rights (install, uninstall)
- Specific resources:
  - DigitalWork
  - DigitalWorkMetadata
- Specific conditions:
  - Helper (software to exercise a right)
  - Renderer (device to render a work)
  - Watermark (information to be embedded)

From XRML 2.0 Technical Overview

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**ODRL**

- Open Digital Rights Language ODRL (www.odrl.net)
  - International initiative of various supporters (e.g. Nokia)
  - Officially accepted by the Open Mobile Alliance (OMA) (formerly known as WAP Forum)
  - XML language, standardized through W3C