

## 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:

Bill Rosenblatt, Bill Trippe, Stephen Mooney: Digital Rights Management – Business and Technology, M&T Books 2002  
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](http://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, weitere 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](http://www.copyright.com)
    - » Germany: VG WORT (Verwertungsgemeinschaft Wort, [www.vgwort.de](http://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
  - U.S.: American Society of Composers, Authors and Publishers (ASCAP, [www.ascap.com](http://www.ascap.com)), Broadcast Music International (BMI, [www.bmi.com](http://www.bmi.com))
  - Germany: “Gesellschaft für musikalische Aufführungs- und mechanische Vervielfältigungsrechte” (GEMA, [www.gema.de](http://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 is not covered by the license obtained with e.g. a CD
  - Additional fees are collected

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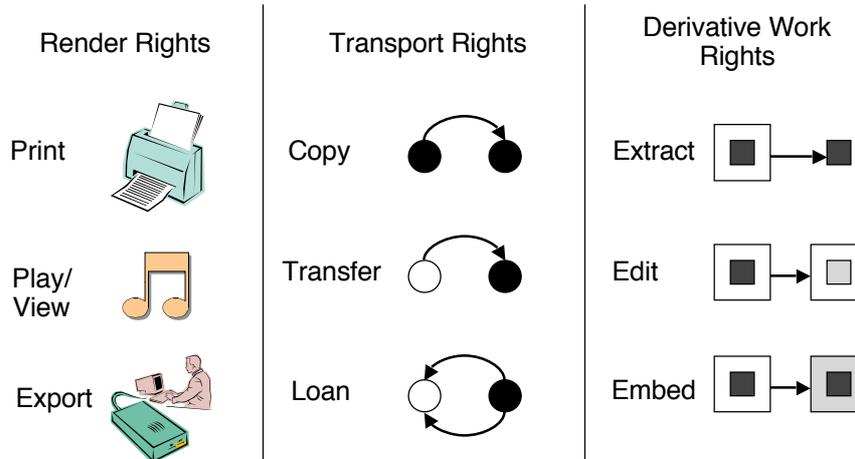
Gerald Fränkl, Philipp Karpf: Digital Rights Management Systeme – Einführung, Technologien, Recht, Ökonomie und Marktanalyse, pg-Verlag 2004

## 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”)

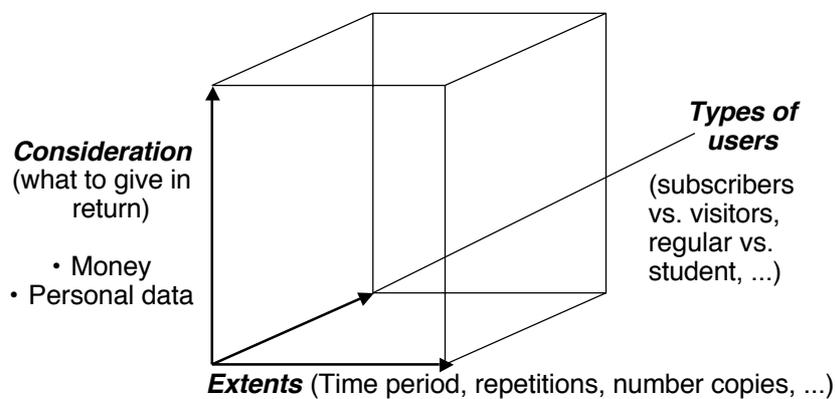


## Utility Rights

- 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

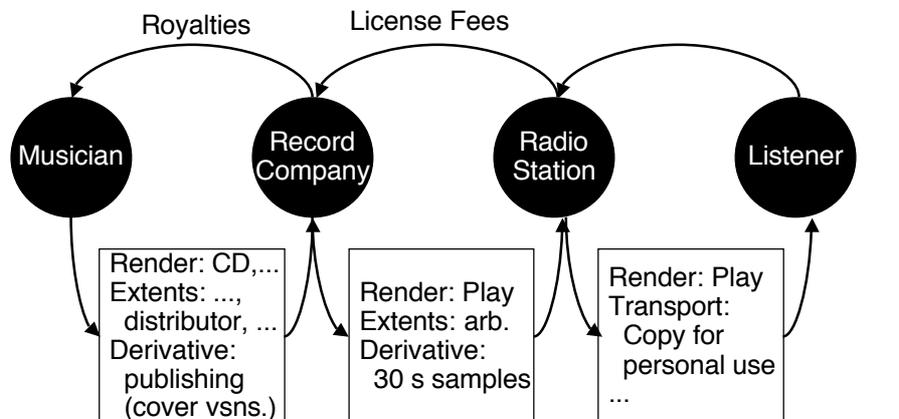
- Example: Music or video download service
  - **Render rights:** View
    - » Consideration: Price of the download
    - » Extent: Forever
    - » Type of user: No distinction
  - **Transport rights:** None
  - **Derivative rights:** None
- Practical questions:
  - How to ensure that the transport rights 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

- Brad Cox: Superdistribution, *Wired Magazine*, Issue 2.09, Sep 1994 ([www.wired.com](http://www.wired.com))
- 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:



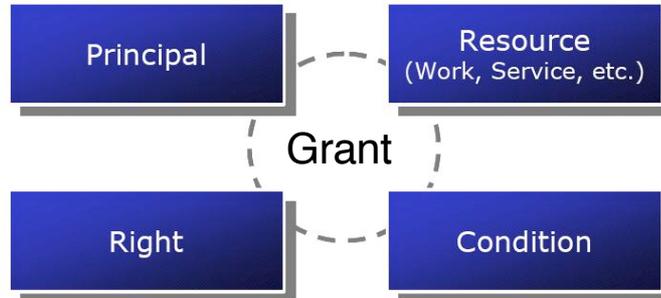
## Superdistribution Chains

- 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](http://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

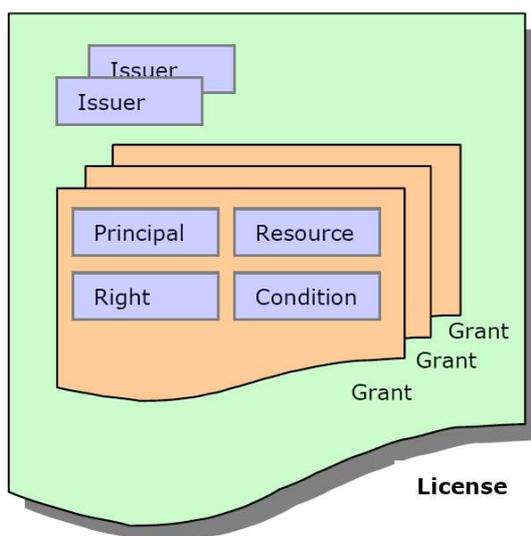
## XrML Terminology: Grant



- 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

## 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

## ODRL

- Open Digital Rights Language ODRL ([www.odrl.net](http://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

