DRM and the Repository

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DRM and the Repository

- DRM Starts with copyright ©

---But it doesn’t stop there

- Libraries have always mediated between copyright holders and end users for broad yet appropriate use

- Repositories are publishers, with the integrity of their resources to manage

- DRM is about seamless resource access, regardless of rights status
DRM and the Repository

Presentation Goals

- Suggest a DRM agenda for repositories
- Examine a data model for DRM in repositories
- Review the current legal and technical landscape of DRM
- Claim a place for repositories in an exciting, emerging area--DRM
DRM and the Repository

DRM Agenda for Repositories

- Restore copyright balance between rights holder and resource user ("society")
- Support resource security; user privacy
- Integrate commercial and open access resources – the "one stop shop"
- Develop best practices for rights documentation
- Educate—the rights holder and the user
- Develop the "Phase 4" user-focused DRM System
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International Treaty

Regional law

National Law

License contract
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Berne Convention, Paris, 1971

- Amended 1979
- Foundation of International copyright
- Minimum enforceable standards to harmonize across member states. General term: life of creator plus 50
- Registration not required. Burden of proof rests with user/plaintiff
- Governance of copyright falls to country of origin (country of first publication)
- Moral rights (mutilation or distortion of work; harmful to reputation or honor of creator)
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WIPO Copyright Treaty (WCT), WIPO Performances and Phonograms Treaty (WPPT), Geneva 1996

- Bring copyright law into the digital age
- Provide legal protection and remedies against the circumvention of copyright information & technological protection measures that protect the exercise of author’s rights or restrict uses that are not authorized by authors or permitted under law.
- WCT provides protection for computer programs, compilations of data involving creativity.
- Reinstates the “Berne 3-Step test” for copyright exceptions
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WPPT

- Extends the rights of performers and phonogram producers for the exclusive disposition of their creative works: fixation, authorize broadcasting, public performance, commercial rental, performances available on demand

- Gives producers exclusive right to distribute the original or copies of phonograms

- Establishes the single equitable remuneration for use of commercial fixed performances and phonograms. Leaves division of remuneration between producers and performers to individual state to decide.
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Berne Three Step Test for Copyright Exceptions

1. Restricted to *special cases* rather than normal resource use

2. Must not conflict with *normal exploitation of the work*

3. Must not *unreasonably prejudice the legitimate interests of the author*

Examples: Fair use/fair dealing

Orphan works – unknown or unlocatable authors
WIPO Treaty on the Protection of Broadcasting Organizations-- in Development

- Accepted public comment and decided in 2008 sufficient need to develop a treaty

- Object of protection – “program-carrying signal” itself, not the content.

- Rights include “retransmission” and “deferred transmission”

- Period of protection not currently defined.

- Maintains state’s right to enact exceptions, subject to the “Berne Three-Step Test”
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Copyright Legislation Trends

Increasing governance via trade treaty and legislation:

-- TRIPS (WTO Agreement on Trade-Related Aspects of Intellectual Property Rights) – 1995

--Australia/US Free Trade Agreement – extended Australia’s copyright protection to 70 years

Terms of protection range from Berne-required 50 years to 70. Unpublished works generally have longer protection than published.

UK “Publications Right” 25 years of rights to anyone publishing unpublished material that is no longer copyright protected.
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Other Rights Issues

Right of Publicity – Right to the commercial exploitation of the “persona” or the attributes that create identity

Underlying Rights

Copyright protection of the content may exist separately from the copyright of the fixed form (cinematographic work, broadcast, typographical edition)

Layered underlying rights. For musical track in a motion picture – sync rights and publishing rights
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DRM Data Model
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The Object

- Availability Resource can be obtained at any time by authorized users.

- Integrity “digital document must be whole and undisturbed”
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IDENTIFIER

- Globally Unique
- Actionable – Can associate with Metadata; Resolves to the resource, regardless of changes to location
- Unambiguous – know what is identified
- Consistently created and applied
- Scalable
- Interoperable
- Opaque vs. Intelligible?
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Standards-Based Identifier Strategy

- CNRI Handle http://handle.net”
- ARK Archival Resource Key – NOID Utility
  “http://www.cdlib.org/inside/diglib/ark/ “
- URI – Uniform Resource Identifier
  “http://www.ietf.org/rfc/rfc3986.txt”
- XRI eXtensible Resource Identifier
  “http://docs.oasis-open.org/xri/2.0/specs/xri-syntax-V2.0-cd-02.pdf”
Maintaining Integrity of Resource

- **Digital Checksum**
  Unique “hash” based on the resource that, if changed, indicates a resource has changed (checksum)

- **Digital Signature / Digital Fingerprint**
  Cryptographic “key” used to encrypt a resource that requires either a shared private key or freely published public key to unencrypt. (digital signature or fingerprint)

- **Digital Timestamp**
  Adds time and referential integrity to checksum or other cryptographic hash
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Encryption for Resource Protection

- Scrambling the content and requiring a key to make it intelligible

- Symmetric or private key. Requires both parties to possess a private key

- Asymmetric or public/private key: Public key widely available. Private key known only to owner. Anyone may encrypt with public key, but private key required to decrypt

- PKI – infrastructure, requiring trusted third party, CA, to issue and revoke certificates that enable public and private key distribution.
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Checksum

Resource

256

257

Encrypted Resource – encrypted with public key

Private key used to decrypt resource
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Rights Metadata for Resource Should Provide:

- Rights status for the resource: copyright-protected, public domain, unknown
- Provenance – date of creation, creator; publisher, etc.
- Publication – status (published; unpublished; publication pending)
- Rights Holder: name; role; contact information; verification date
- Copyright notice; usage statement
- Durable link to deed of gift, license or permission
This object may be copyright protected. You may make use of this resource under a Creative Commons Attribution-Non-Commercial 2.5 license (see http://creativecommons.org/licenses/by-nc/2.5/). For any use not specifically declared under this license, please contact the rights holder for permission for further use. For evidence on attribution or soliciting this rights holder, the object is in the public domain.
**Rights Event**

Rights event entries for: Event 1  
[Existing event(s): 0]

<table>
<thead>
<tr>
<th>Type</th>
<th>Deed of gift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>Deed of gift signed by Doc Cheatham</td>
</tr>
<tr>
<td>Place</td>
<td>New York, NY</td>
</tr>
<tr>
<td>Date &amp; Time</td>
<td>1985-11-04</td>
</tr>
</tbody>
</table>

**Associated Entity**

<table>
<thead>
<tr>
<th>Role</th>
<th>Donor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Adolphus &quot;Doc&quot; Cheatham</td>
</tr>
<tr>
<td>Affiliation</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>Detail</td>
<td>Deed of gift signatory</td>
</tr>
</tbody>
</table>

**Associated Object**

Associated Event Entry List

Add More
In the digital space, almost everyone who uses the web is a creator.

Creators may not think of themselves as rights holders, and they may not think of others as rights holders.

Web creators rarely think of privacy implications.

Term of copyright is longer, for most works, than the term of commercial exploitation (e.g., 50, 70, 95 years).

Non-commercial creators are interested in impact, not $$$

Maintaining a durable link between resource and creator is critical for future availability.
Tools for Enabling Creators to Continue Impact

Creative Commons licenses

-- Creative works, software applications, data

-- New metadata cc:REL; RDF-based schema; Supports XMP transmission

-- Web services enable repositories to offer CC licenses directly

www.creativecommons.org
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Tools for Enabling Creators to Continue Impact

♫ SPARC Resources for Authors / Author’s Addendum.
http://www.arl.org/sparc/author/

♫ SHERPA/RoMEO Publisher Copyright Policies & Self-archiving database
http://www.sherpa.ac.uk/romeo.php
Your personal story: document and preserve your family history

Give the Gift of Understanding to Future Generations!

Postcard, 1890, American Labor Museum / Botto House National Landmark

Who are these ladies?

We wish we knew!

You and your family enjoy the photos and memorabilia you collect in scrapbooks, in photo albums, in boxes or files. Families like to remember grandparents and great grandparents. Everyone likes to remember holidays past and trips to the beach.
Deed of Gift
Photographs, Mementos and Family Documents

Date of Document (month) (day) (year)

This document is a deed of gift for the photographs, mementos, correspondence and family documents included in this container:

- Box
- Album or book
- File or folder.

Container label: ________________________________

Brief description of contents of container: ______________________________________________________

This document gifts to any interested cultural heritage information organization (library, museum, historical society, archive, etc.) the following rights, as checked by me. Any right that is not checked is not provided.

- The right to own, preserve and make available by any means, including digital transmission, the original source materials (photographs, mementos, correspondence and documents). These materials may be used in any manner to further the educational and informational mission of the organization.

- A nonexclusive right to make the source materials in this container available for others to use through digitizing and sharing this information over the Web or by any other means of reproducing and sharing this information. The source materials may remain with my heirs, but permission to digitize and make available in any manner that furthers the educational and informational mission of the organization is granted.

Limitations to the deed of gift:

- Source materials may be digitized but may not be publicly displayed, distributed or shared until ___years after the end of the year of my death.

- Full names and addresses of subjects in each photograph should not be provided in public display and distribution until ___years after the end of the year of my death. First names and location at the city, county or state or country level may be provided.

I am the creator or owner of these source materials and have the right to dispose of them as I choose.

Signed____________________________________
Name printed_________________________________
Date of signature_________________________________
DRM and the Repository

**Topic** Clergy

**Topic** Ordination

**Temporal** Contemporary America (1968-present)

**Country** UNITED STATES

State New Jersey

**County** Essex County

**City** Newark (N.J.)

**Title** Remembering Newark's Greeks: An American Odyssey

**Identifier (local)** NPLRNG

**Identifier (hdl)** http://hdl.rutgers.edu/1782.3/NPLRNG.Photograph.3605

**Physical Location** (Newark Public NjN)

Librarymarc.org

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**SOURCE Record**

**Availability** Yes

**Locator (Other)** Object 2-B-12

**Provenance Event ID** PROV001

**Provenance Event Type** Exhibition

**Provenance Event Label** Remembering Newark's Greeks: An American Odyssey

**Provenance Event Place** Newark Public Library

**Provenance Event Date Time** 2002-10-24

**Provenance Event Detail** "Remember Newark's Greeks: An American Odyssey: A look at 100 years of the Greek Community in Newark, Photographs, Documents and Memorabilia, October 21, 2002 -December 31, 2002." Curated by Angelique Lampros and Peter Markos, Exhibit Committee Co-Chairs, assisted by Charles F. Cummings, Special Collections the Newark Public Library and City Historian.

**Associated Entity ID** ASSOCENTITY001

**Associated Entity Name** Angelique Lampros
The Resource User

- Authentication and Authorization practices that maintain user privacy; provide efficient access to resources
- Maintain confidentiality of resource use
- Enable reuse of resources through ability to contact creator/rights holder
- Use of DRM and Licenses are clearly exposed and understandable
**DRM and the Repository**

![Lock icon]

**Authentication**: Who the user is

**Authorization**: What the user has the right to do

**Authentication Factors**

- What the user **is** or **does** (fingerprint; signature)
- What the user **has** (email account, smart card, OTP token)
- What the user **knows** (password)

All authentication should be at least two factor
OpenID – web based authentication at OpenID-enabled websites on open web.

XACML (eXtensible Access Control Markup Language) codify and enforce access policies for targets (resources, subjects (“users”) and actions

Shibboleth – federated architecture for Authentication and Authorization
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XACML Request Process

1. Makes request
2. Forms request
3. Sends Request
4. Forms Decision
5. Returns Decision

Attributes
(resource, environment, subject)
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Shibboleth Process

IdP

1. Request

2.

3. Handle Service

4.

5.

6.

7. ARPS

8.

9. Access

SP

WAYF

Assertion Consumer Services

Shibd

Resource Manager

application
Digital Licenses

- ERMI (Digital Library Federation)
- ONIX-PL (publication licensing)
- PLUS Picture Licensing Universal System
- Enabling technology: XMP (Extensible Metadata Platform)
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Embedded Licenses

- Can provide micro licensing for individual resources or components
- Can support usage control and tracking
- Will change library acquisition and resource management workflow
- Need to be transparent to user—legal contract
DRM Systems – 3 Stages of Development

**Stage One**
- Enclosed
- “Trusted System”
- Tethered to device
- Hidden from user
- Examples:
  - WMDRM
  - FairPlay
  - CPSA

**Stage Two**
- Modular
- Flexible Implementation
- Enables modular use of DRM services
- interoperable
- Examples:
  - OMA DRM 2.0
  - MPEG IPMP

**Stage Three**
- Global
- Interoperable
- Supports multiple business models
- Supports “community of trust” definition and use
- Examples:
  - Coral Consortium
  - Project DReaM (Sun)
Phase I DRM Transaction
Enabling Technology – The Watermark

“Pseudo-noise” embedded in area imperceptible to user but detectable with software

Contains copyright and provenance information, copy control information

Qualities:

- Robust
- Imperceptible (unless intentionally visible)
- Reversible
- Secure

Often compromised through “collusion”
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CPSA – Content Protection Systems Architecture

- Content protection framework that uses copy control information, watermarks and encryption to protect content at source, transmission and receiving or sink device

- Particularly used for broadcast to set tops, DVD and Blu-ray optical media

- Requires enabled devices

- Renewable protection; can revoke certificates of infringing devices
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CMSA Technologies

- CSS – Content Scrambling Systems – DVD
  openly compromised

- CGMS – Copy Generation Management System.

- CGMS-A plugs “analog hole” NTSC line 20 or 21, recognized by most digital camcorders and some video capture cards

- CPRM – Content Protection for Recordable Media (DVD-R/RW)

- AACS – Advanced Access Content System – Blu-ray encryption. Already compromised

- HDCP (High-bandwidth Digital Content Protection), DTCP (Digital Transmission Content Protection) and DTCP-IP – Encrypted transmission for interfaces (DVI, Firewire, etc.)
Coral Architecture

Ecosystem Specifications

Coral Domain architecture

DRM System 1

... DRM System N

Coral Core Architecture

Coral Trusted Communications Layer

Lower-Level Networking Specifications

License derivation using standardized rights tokens
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Sun Microsystems’ Project DReaM

CAS (Conditional Access System) – “DRM Lite” using standardized components

MMI (“Mother May I”) clients negotiate for rights from a range of DRM systems using standardized protocols.
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MMI for U.S. Fair Use Scenario

User

Anonymizing agent

Resource Provider

Resource

Use not as described

Forensic watermark

Fair use purpose form; Disclosure agreement

Request from “Student of Univ X”
Phase IV: “OpenPeople” Design

AA Directory

Opt in

Rights Holder

Resources

XRI identifier – LDAP compliant, or could use cross-reference
Shameless

Chandos Press, July 2008