

Rights Expression Languages

Or, Copyright Law Rumbles with Technology in a Dark Alley

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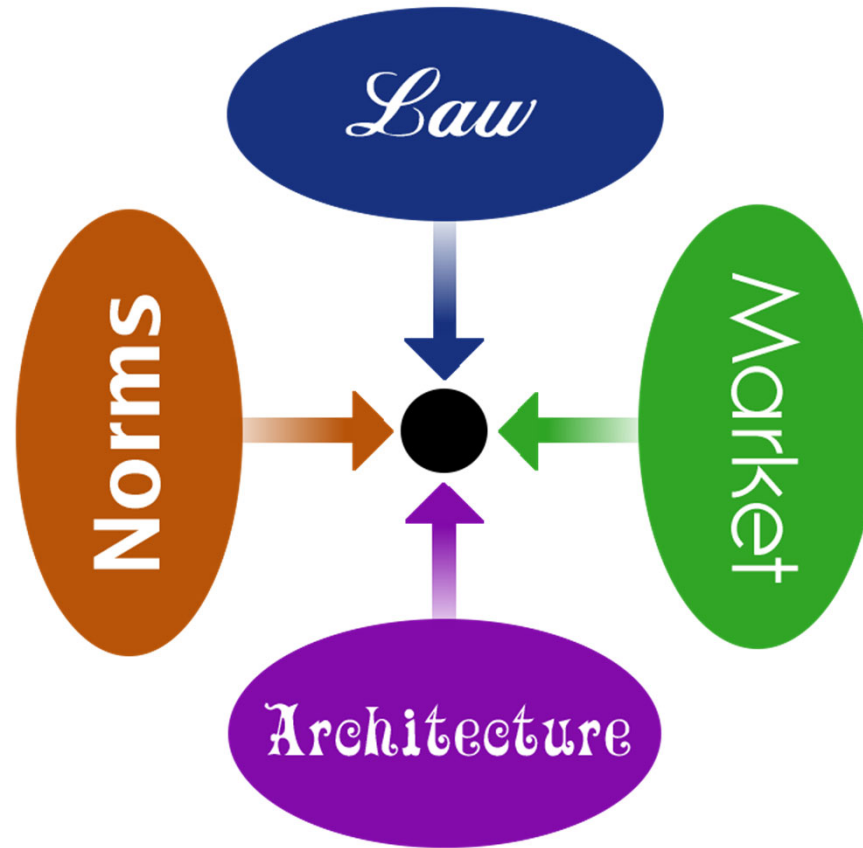
GiantSteps Media Technology Strategies

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Larry Lessig's Four Forces of Regulation

(a/k/a Pathetic Dot Theory)



Source: Lessig, Lawrence, *Code: And Other Laws of Cyberspace* (1999), Ch. 7
Figure: http://libreria.sourceforge.net/library/Free_Culture/CHAPTER10.html

Copyright Law: Rights

(17 U.S.C. 101 *et seq*)

- Applies to “material objects” (§ 101)
 - Not to files (piles of bits) independent of physical storage medium
- Copyright owner’s exclusive rights (§ 106):
 - Reproduction
 - Distribution
 - Creation of derivative works
 - Public display
 - Public performance
- Additional rights for certain visual works (§ 106A):
 - Proper attribution
 - Prevention of reputational harm by damage or mutilation of work
- First sale a/k/a exhaustion (§ 109):
 - If you obtain it legally, you can dispose of it w/o involvement from author
 - (Doesn’t apply to most software)

Copyright Law: Ways for Others to Use Content

- Use it personally
- License rights from copyright owner (contract)
- Fair use (§ 107)
 - A defense to allegation of infringement, not a “right”¹
 - Decided by courts, based on four factors
 - Examples in statute:
criticism, education, research, news reporting
 - “Transformative use” theory from case law²
 - Not “machine decidable”³

¹Though see *Lenz v Universal Music Corp*, 801 F.3d 1126 (9th Cir. 2015).

²Leval, Pierre N., *Toward a Fair Use Standard*. 103 Harv. L. Rev. 1105 1989-1990

³“We should not adopt a bright-line standard unless it were a good one - and we do not have a good one.” *Id.*

Rights Expression Languages

- Machine readable rights descriptions
- Make rights and licenses understandable and actionable at Internet speed
- Avoid “trap door into the legal system”¹
- Two distinct, overlapping goals:
 1. Enforce rights
 2. Automate licensing

¹Author's remarks at National Academies' workshop on the Impact of Copyright Policy on Innovation in the Digital Era, October 15, 2010. Available at <https://copyrightandtechnology.com/2010/10/17/my-remarks-at-the-national-academies/>.

RELs for Rights Enforcement (DRM)

- Mark Stefik's mid-1990s work at Xerox PARC
 - Computer science researcher with AI background
- Landmark paper: “Letting Loose the Light: Igniting Commerce in Electronic Publication” (1996)¹
- U.S. Patent 5,715,403 (1998),
“System for controlling the distribution and use of digital works having attached usage rights where the usage rights are defined by a usage rights grammar”
- Original language: Digital Property Rights Language (DPRL)
 - Based on LISP
- Xerox commercializes this as ContentGuard

¹Published as chapter in Stefik, Mark J. *Internet Dreams: Archetypes, Myths, and Metaphors*. 1996, MIT Press.

Original Goals of DRM

- “Make the Internet safe for publishers”
- Emulate physical-world content models
 - Ownership
 - Lending
 - Rental
- Implement non-physical-world content models
 - “Celestial Jukebox”¹
- Prevent “piracy”

¹Goldstein, Paul, *Copyright's Highway: From Gutenberg to the Celestial Jukebox*, 1994, Stanford University Press (Rev. Ed., 2003; 2nd Edition forthcoming Spring 2019)

The Establishment REL: XrML

(eXtensible Rights Markup Language)

- 1994-1998: Xerox
 - ContentGuard DRM system
 - One of several early DRMs
 - DPRL 2.0 released, based on XML
- 1999-2002: ContentGuard
 - Xerox spins out ContentGuard Inc., Microsoft part-owner
 - XrML released, expands DPRL 2.0
 - ContentGuard drops DRM product in 2002 to focus on patent licensing
- 2004-2005: Standards & Microsoft
 - XrML 2.0 submitted to MPEG
 - Variant becomes MPEG-REL standard
 - Microsoft implements XrML in its DRMs
 - Time Warner takes stake in ContentGuard
 - ContentGuard granted US 6,925,448, continuation of '403 patent
- 2005-present: Virtual irrelevance
 - Microsoft uses XrML for software license management
 - No one else uses XrML or MPEG-REL
 - ContentGuard sold to Pendrell, patent aggregator

XrML Example Code

```
<keyHolder>
  <info>
    <dsig:KeyValue>
      <dsig:RSAKeyValue>
        <dsig:Modulus> Efgao6NYfm...</dsig:Modulus>
        <dsig:Exponent> AQAQAA==</dsig:Exponent>
      </dsig:RSAKeyValue>
    </dsig:KeyValue>
  </info>
</keyHolder>
<!-- Consumer must pay a one time fee of $15.00 for rights -->
<sx:fee>
  <sx:paymentFlat>
    <sx:rate currency="USD"> 15.00</sx:rate>
    <sx:paymentRecord>
      <sx:stateReference>
        <uddi>
          <serviceKey>
            <uuid> D04951E4-332C-4693-B7DB-D3D1D1C20844</uuid>
          </serviceKey>
        </uddi>
      </sx:stateReference>
    </sx:paymentRecord>
  </sx:paymentFlat>
</sx:fee>
  <grant>
    <!-- The right to play/view is granted -->
    <cx:play/>
    <!-- the book -->
    <digitalResource licensePartIdRef="eBook">
  </grant>
  <grant>
    <!-- The right to print is granted -->
    <cx:print/>
    <!-- the book -->
    <digitalResource licensePartIdRef="eBook">
  </grant>
</grantGroup>
</license>
```

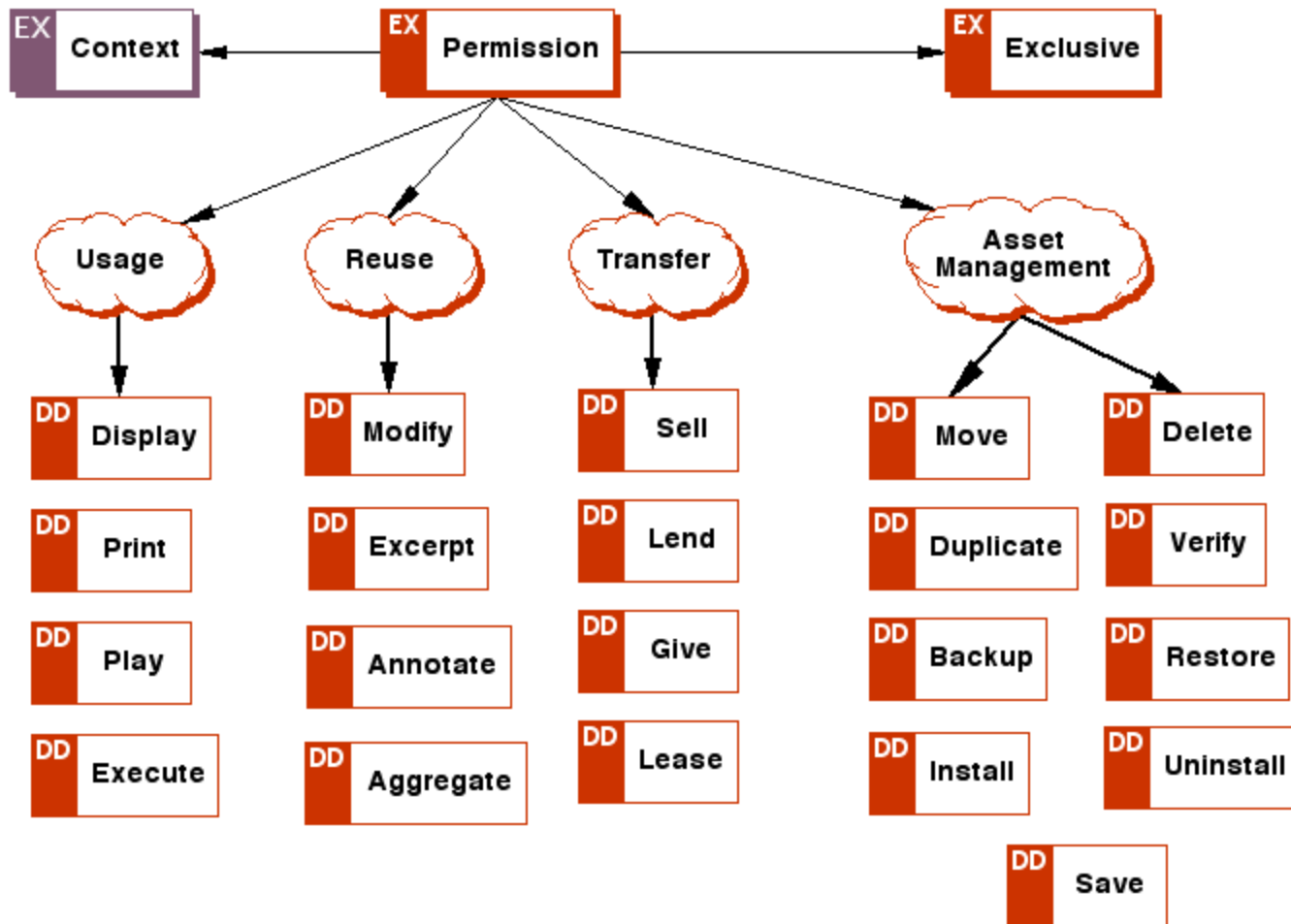
Source: Fernandez-Medina, Eduardo et al, Multimedia Security and Digital Rights Management Technology.
In Fugini, Mariagrazia and Carlo Bellettini, eds., *Information Security: Policies and Actions in Modern Integrated Systems*.
Hershey, PA: IDEA Group Publishing, 2004.

The Scrappy Independent REL: ODRL

(Open Digital Rights Language)

- 2000: V1.1 created by Renato Iannella in Australia
 - With help from Susanne Guth in Austria [not a typo]
 - Not tied to any companies or standards body
- 2001-2005:
 - Subsets used in Open Mobile Alliance DRM (OMA DRM) standards
 - Widely implemented in mobile music services in Europe
- 2006-2007
 - OMA DRM momentum dies on fears of “patent overhang” with ContentGuard and others
 - ODRL goes dormant ...

ODRL 1.1 Permission Model



Other Enforcement-Oriented RELs

➤ RealNetworks XMCL

(eXtensible Media Commerce Language)

- Used in RealNetworks Helix DRM for audio & video in mid-2000s
- Abandoned as Microsoft and Apple dominated the market

➤ Adobe EBX

(Electronic Book eXchange)

- Part of Adobe Content Server DRM for e-books
- Acquired from Glassbook in 2000
- Still used in Barnes & Noble Nook, OverDrive (library e-lending), and dozens of others worldwide today

RELs for License Automation

- Machine-readable license terms
 - B-to-B distribution schemes
 - Enforcement (if any) done through legal means, not technological (DRM)
- Original work: Henry Perritt, Villanova Law School
 - Law professor with engineering & business degrees from MIT
 - 1993 paper: “Permission Headers and Contract Law”
 - Presented at seminal conference at Harvard Kennedy School¹
- Information and Content Exchange (ICE), 1998
 - First attempt at standard, led by Vignette Corp. (now OpenText)
 - Oriented toward “content syndication”, 1st bubble era fad
 - Made redundant by much simpler RSS
 - Faded after bubble burst

¹In Proc. Technological Strategies for Protecting Intellectual Property in the Networked Multimedia Environment, 1993. Available at <https://www.cni.org/resources/historical-resources/technological-strategies-for-protecting-intellectual-property-in-the-networked-multimedia-environment>

Interlude: Creative Commons

- Created in 2000-2001 by Larry Lessig et al, launched in 2002
- Motto: “Some Rights Reserved”
 - Give licensee more rights than copyright bundle
 - Assume/pretend copyright bundle applies to piles of bits
- Licenses = legal text + machine readable code in content files
- Creators choose a license for content based on attributes:
 - Attribution: user must attribute work to author
 - Share alike: user must share content w/others on same terms
 - Non-commercial: no commercial uses allowed
 - No derivative works: content must be published “as is”

ccREL

(Creative Commons Rights Expression Language)

- Created by Hal Abelson of MIT in 2008
- Make Creative Commons license terms more machine readable
 - Commercial use allowed or not?
 - Attribution to whom?
- Syntax-independent
 - Expressible in RDF for XML content
 - Expressible in Adobe XMP for media files with headers
- Meant to replace HTML comment syntax for CC
 - Increase machine-readability
 - Eliminate redundancy (DRY principle)
- Not meant to turn CC into a DRM scheme

ccREL Example

```
<div xmlns:dc="http://purl.org/dc/elements/1.1/"
  xmlns:cc="http://creativecommons.org/ns#"
  xmlns:flickr="http://flickr.com/ns#"
  about="http://www.flickr.com/photos/laughingsquid/2034629532/">
...
    <h1 property="dc:title">NewTeeVee Live Game Show</h1>
...
    
...
    <div property="dc:description">
      See the blog post for more info:
      <a href="http://laughingsquid.com/a-few-random-newteevee-live-photos/">
        A Few Random NewTeeVee Live Photos
      </a>
    </div>
...
```


ccREL Example (cont'd)

This photo is licensed under a

```
<a rel="license" href="http://creativecommons.org/licenses/by-nc-nd/2.0/">
```

Creative Commons license

```
</a>.
```

If you use this photo within the terms of the license or make special arrangements to use the photo, please list the photo credit as

```
<span property="cc:attributionName">Scott Beale / Laughing Squid</span>
```

and link the credit to

```
<a rel="cc:attributionURL" href="http://laughingsquid.com">
```

laughingsquid.com

```
</a>.
```

...

```
</div>
```

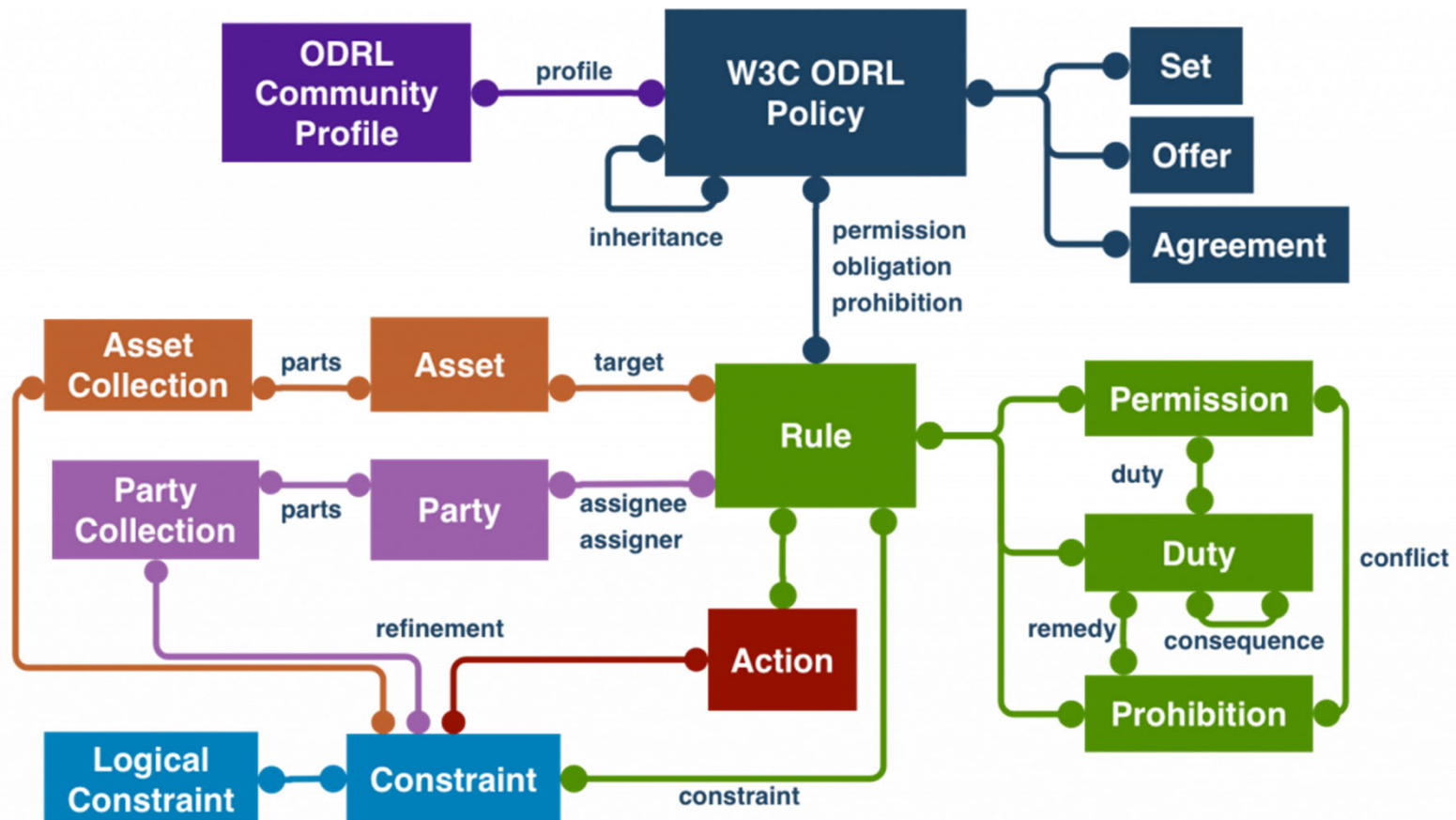
ODRL 2.x

- ODRL reborn as license automation language
- Submitted to W3C in 2011, Recommendation in early 2018
- Multiple syntaxes
 - Various RDF syntaxes, JSON
- Addressing the patent overhang issue:
 - REL not used in DRM scheme
- Core concepts of Permissions and Duties/Obligations
- Manifestations:
 - W3C Permissions and Obligations Expressions (POE)¹
 - IPTC RightsML (ODRL profile) (news industry)²

¹ <https://www.w3.org/TR/2018/REC-odrl-model-20180215/> and <https://www.w3.org/TR/2018/REC-odrl-vocab-20180215/>.

² <https://iptc.org/standards/rightsml/>.

ODRL 2.2 Information Model



Source: Iannella, Renato, ODRL: A Path Well Traveled.
Available at <https://www.w3.org/blog/2018/02/odrl-a-path-well-travelled/>.

ODRL 2.1 Examples

Picture can only be displayed in Germany after 2018

```
{
  "@context": "http://www.w3.org/ns/odrl.jsonld",
  "@type": "Set",
  "uid": "http://example.com/policy:1010",
  "permission": [{
    "target": "http://example.com/asset:9898.movie",
    "action": "display",
    "constraint": [{
      "leftOperand": "dateTime",
      "operator": "gt",
      "rightOperand": { "@value": "2019-01-01", "@type": "xsd:date" }
    }, {
      "leftOperand": "spatial",
      "operator": "eq",
      "rightOperand": "https://www.wikidata.org/wiki/Q183",
      "comment": "i.e Germany"
    }
  ]
}]
}
```

ODRL 2.1 Examples

Allow distribution of movie over mobile networks only

```
{
  "@context": "http://www.w3.org/ns/odrl.jsonld",
  "@type": "Set",
  "uid": "http://example.com/policy:6161",
  "permission": [{
    "target": "http://example.com/asset:9898.movie",
    "assigner": "http://example.com/org:616",
    "action": [{
      "action": "distribute",
      "refinement": [{
        "leftOperand": "deliveryChannel",
        "operator": "eq",
        "rightOperand": "http://example.com/cv/audMedia/MOBILE"
      }]
    }]
  }]
}
```

Other License Automation RELs

- PLUS (images)¹
- PRISM Rights Language (magazine publishing)²
- METSRights (gov't & academic libraries)³

¹ <http://www.useplus.com/index.asp>.

² http://www.prismstandard.org/specifications/3.0/PRISM_usage_rights_metadata_3.0.pdf.

³ <https://www.loc.gov/standards/rights/>.

RELs, DRMs, Licenses, and Copyright

- DRM: technologically enforced rights & restrictions
- Licenses: legally enforced rights & restrictions
- RELs enable precision for both
- RELs can encode licenses that confer *more* rights than copyright (basic idea of Creative Commons)
- ... or licenses that confer *less* rights than copyright (true of most EULAs)
- DRM is incapable of emulating copyright rights, even with RELs

The Digital Media Project

An attempt to make a DRM that emulates copyright accurately

- Dr. Leonardo Chiariglione, founder of MPEG standards body
- Attempt to create open interoperable DRM standards that respect and emulate real-world content usages, incl. copyright
- Started in 2003, on “low simmer” since ~2007
- Mappings of “Traditional Rights and Usages” to REL expressions
- Promising work, never completed

Final Thoughts

Thank You!

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