



Rights Expression Languages

Or, Copyright Law Rumbles with Technology in a Dark Alley

Bill Rosenblatt

GiantSteps Media Technology Strategies

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Source: WikiMedia Commons, The Rumble from West Side Story, 1957

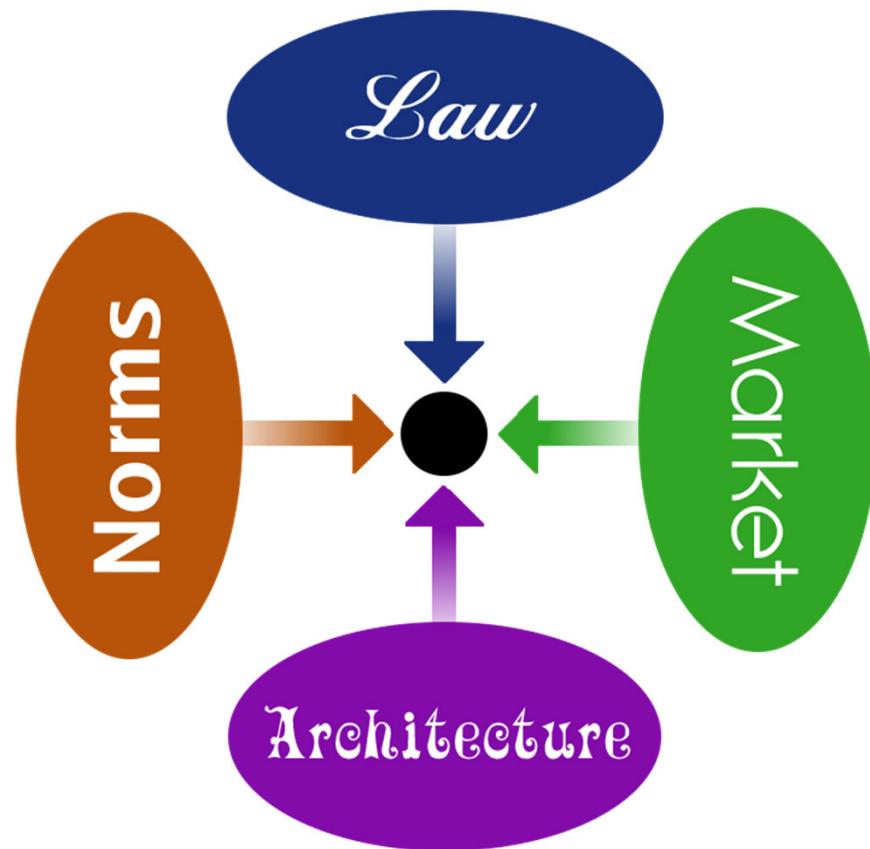


Background

- Consultant with focus on digital media and copyright age since 2000
- Background: software engineer, media industry IT executive, technology market strategist, author, editor, radio producer
- Author: *Digital Rights Management: Business and Technology* (Wiley), copyrightandtechnology.com blog, journal articles, *Forbes* columnist, etc.
- Chair of annual Copyright and Technology conferences
- Speaker at World Economic Forum and other events worldwide
- Guest lecturer at law, business, and music schools
- Expert witness in copyright and patent litigation in US, Canada, Europe

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: The “Rights Bundle”

(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 publisher
 - (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 Stefk'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 Stefk, Mark J. *Internet Dreams: Archetypes, Myths, and Metaphors*. 1996, MIT Press.

The “Establishment” REL: XrML (eXtensible Rights Markup Language)

- 1995-1998: 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 buys share of 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
 - Pendrell, patent aggregator, buys ContentGuard

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 --&gt;
&lt;sx:fee&gt;
  &lt;sx:paymentFlat&gt;
    &lt;sx:rate currency="USD"&gt; 15.00&lt;/sx:rate&gt;
    &lt;sx:paymentRecord&gt;
      &lt;sx:stateReference&gt;
        &lt;uddi&gt;
          &lt;serviceKey&gt;
            &lt;uuid&gt; D04951E4-332C-4693-B7DB-D3D1D1C20844&lt;/uuid&gt;
          &lt;/serviceKey&gt;
        &lt;/uddi&gt;
      &lt;/sx:stateReference&gt;
    &lt;/sx:paymentRecord&gt;
  &lt;sx:paymentFlat&gt;
&lt;/sx:fee&gt;
&lt;grant&gt;
  &lt;!-- The right to play/view is granted --&gt;
  &lt;cx:play/&gt;
  &lt;!-- the book --&gt;
  &lt;digitalResource licensePartIdRef="eBook"&gt;
&lt;/grant&gt;
&lt;grant&gt;
  &lt;!-- The right to print is granted --&gt;
  &lt;cx:print/&gt;
  &lt;!-- the book --&gt;
  &lt;digitalResource licensePartIdRef="eBook"&gt;
&lt;/grant&gt;
&lt;/grantGroup&gt;
&lt;/license&gt;</pre>
```

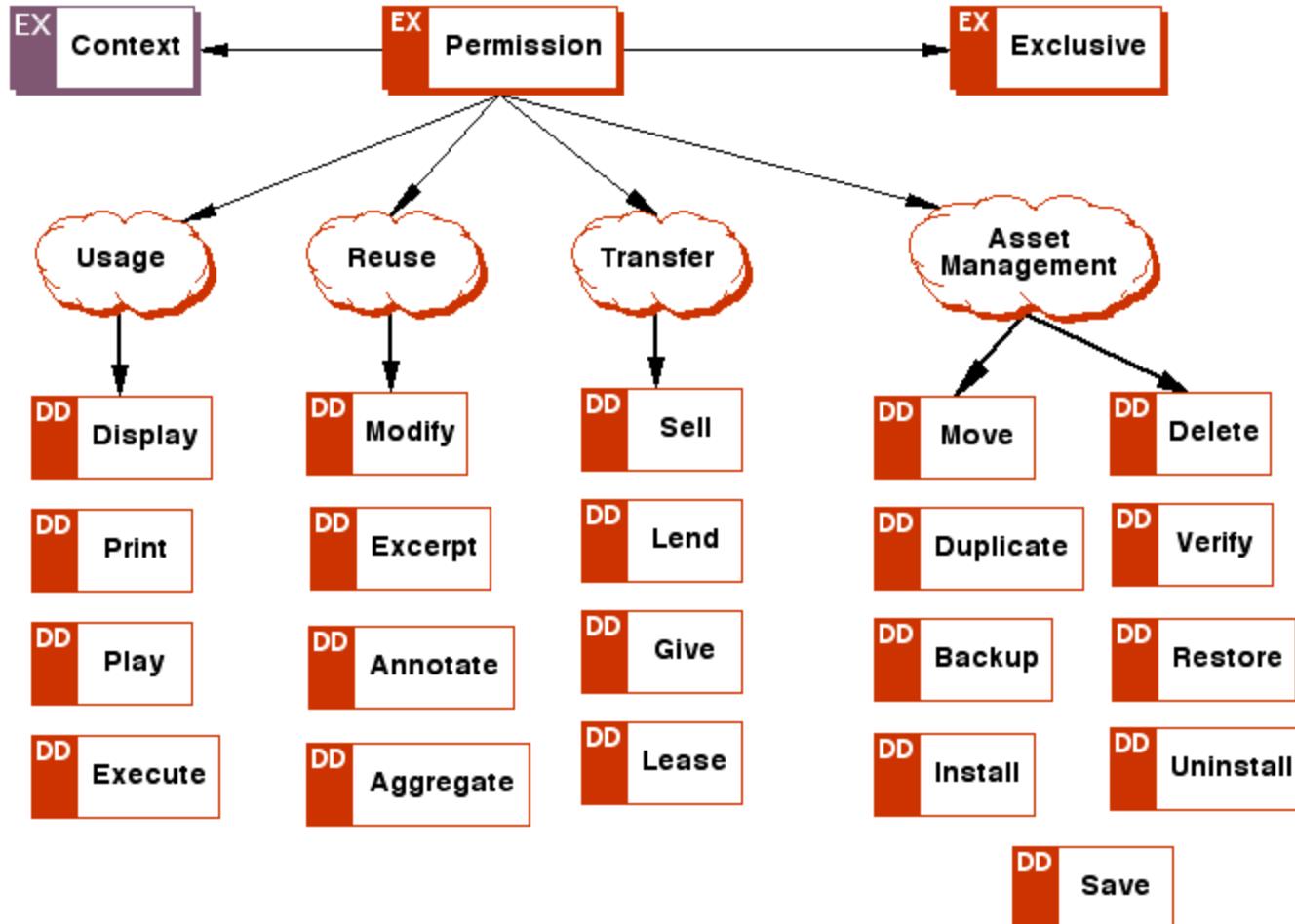
Source: Fernandez-Medina, Eduardo et al, Multimedia Security and Digital Rights Management Technology. In Fugini, Mariagrazia and Carlo Bellettini, eds., *Information Security: Policies and Actions in Modern Integrated Systems*. Hershey, PA: IDEA Group Publishing, 2004.

The “Indie” 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 digital 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



Source: Open Digital Rights Language (ODRL) Version 1.1, W3C Note 19 September 2002,
<https://www.w3.org/TR/odrl/>.

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”, dot-com 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 I: 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>  
...  
...
```

Source: Abelson, Hal et al, ccREL: The Creative Commons Rights Expression Language, 2008. Available at <https://wiki.creativecommons.org/images/d/d6/Ccrel-1.0.pdf>.

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>
```

Source: Abelson, Hal et al, ccREL: The Creative Commons Rights Expression Language, 2008. Available at
<https://wiki.creativecommons.org/images/d/d6/Ccrel-1.0.pdf>.

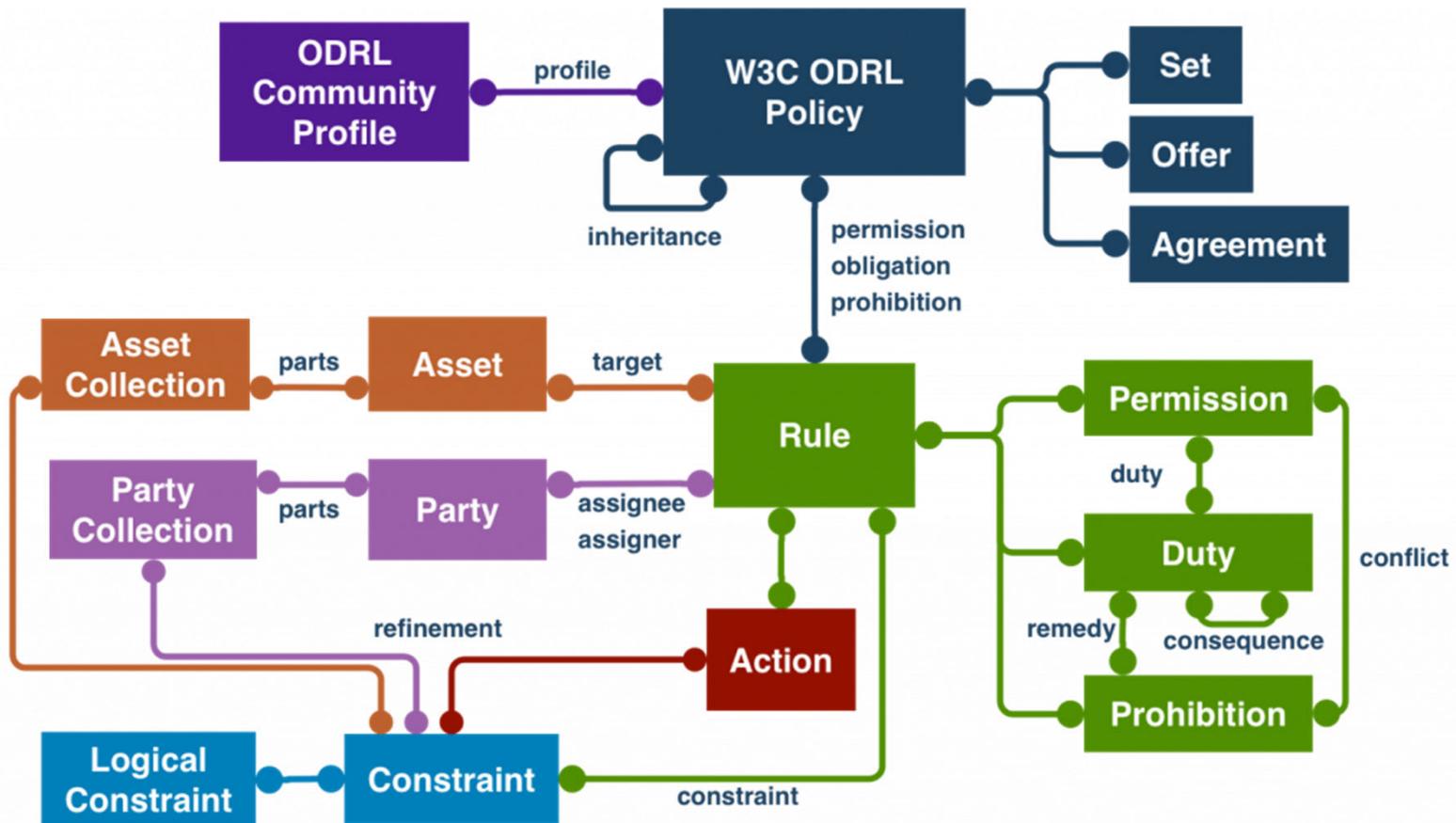
ODRL 2.x

- ODRL reborn as license automation language!
- Submitted to W3C in 2011, becomes Recommendation in early 2018
- Multiple syntaxes
 - Various XML/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/rightsmi/>. See also <https://www.slideshare.net/smyless/rights-for-photo-and-video-archives-at-the-associated-press>.

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

Movie can only be played in Germany after 2018 (JSON)

```
{  
  "@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"  
        }]  
    }]  
}
```

Source: <https://w3c.github.io/odrl/bp/#styles>

ODRL 2.1 Examples

Allow distribution of movie over mobile networks only (JSON)

```
{  
  "@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"  
            }  
          ]  
        }  
      ]  
    }  
  ]  
}
```

Source: <https://w3c.github.io/odrl/bp/#styles>

RightsML Example

Picture can be displayed by EPA licensee within Germany
(RightsML Data Structure template)

Policy:

type: "http://www.w3.org/ns/odrl/2/Set"

uid: "http://example.com/RightsML/policy/idGeog1"

profile: "https://iptc.org/std/RightsML/odrl-profile/"

permission:

- target: "urn:newsml:example.com:20120101:180106-999-000013"

assigner: "http://example.com/cv/party/epa"

assignee:

type: "http://www.w3.org/ns/odrl/2/PartyCollection"

uid: "http://example.com/cv/partygroup/epapartners"

action: "http://www.w3.org/ns/odrl/2/distribute"

constraint:

- leftOperand: "http://www.w3.org/ns/odrl/2/spatial"

operator: "http://www.w3.org/ns/odrl/2/eq"

rightOperand: "http://cvx.iptc.org/iso3166-1a3/DEU"

RightsML Example

The same code in JSON

```
{  
  "@context": ["http://www.w3.org/ns/odrl.jsonld",  
              "https://iptc.org/std/RightsML/odrl-profile/rightsml.jsonld"],  
  "@type": "Set",  
  "uid": "http://example.com/RightsML/policy/idGeog1",  
  "profile": "https://iptc.org/std/RightsML/odrl-profile/",  
  "permission": [  
    {  
      "target": "urn:newsml:example.com:20120101:180106-999-000013",  
      "assigner": "http://example.com/cv/party/epa",  
      "assignee": {  
        "@type": "PartyCollection",  
        "uid": "http://example.com/cv/partygroup/epapartners" },  
      "action": "distribute",  
      "constraint": [  
        {  
          "leftOperand": "spatial",  
          "operator": "eq",  
          "rightOperand": "http://cvx.iptc.org/iso3166-1a3/DEU"  
        }]  
    }]  
}
```

Other License Automation RELs

- PLUS (images)¹
- PRISM Rights Language (magazine publishing)²
- METSRights (gov't & academic libraries)³
- ONIX-PL (books)⁴

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/>.

⁴ <https://www.editeur.org/21/ONIX-PL/>.

RELS, DRMs, Licenses, and Copyright

- Licenses: legally enforced rights & restrictions
- DRM: technologically 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)
- Relevant point of law:
You don't get the copyright bundle with pure digital content.¹
- Relevant point of technology:
RELS don't make DRM capable of emulating copyright rights accurately.

¹ Capitol Records, LLC v. ReDigi Inc., No. 16-2321 (2d Cir. 2018)

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

Interlude II: Music Rights and Services

(Typical cases)

- All music recordings carry two copyrights:
 - One for the composition a/k/a musical work
 - One for the sound recording
- Subscription digital music services (DSPs) typically offer:
 - Interactive streams (user chooses each track)
 - Conditional a/k/a tethered downloads (plays until subscription cancelled)
 - Permanent downloads (users pay extra)
- Subscription DSPs must pay these royalties:
 - Reproduction & distribution of sound recording: to record label
 - Reproduction & distribution (“mechanical”) of composition:
to music publisher (compulsory under § 115)
 - Public performance of composition: to PRO (ASCAP, BMI, SESAC, GMR)
or direct to music publisher

The Music Modernization Act

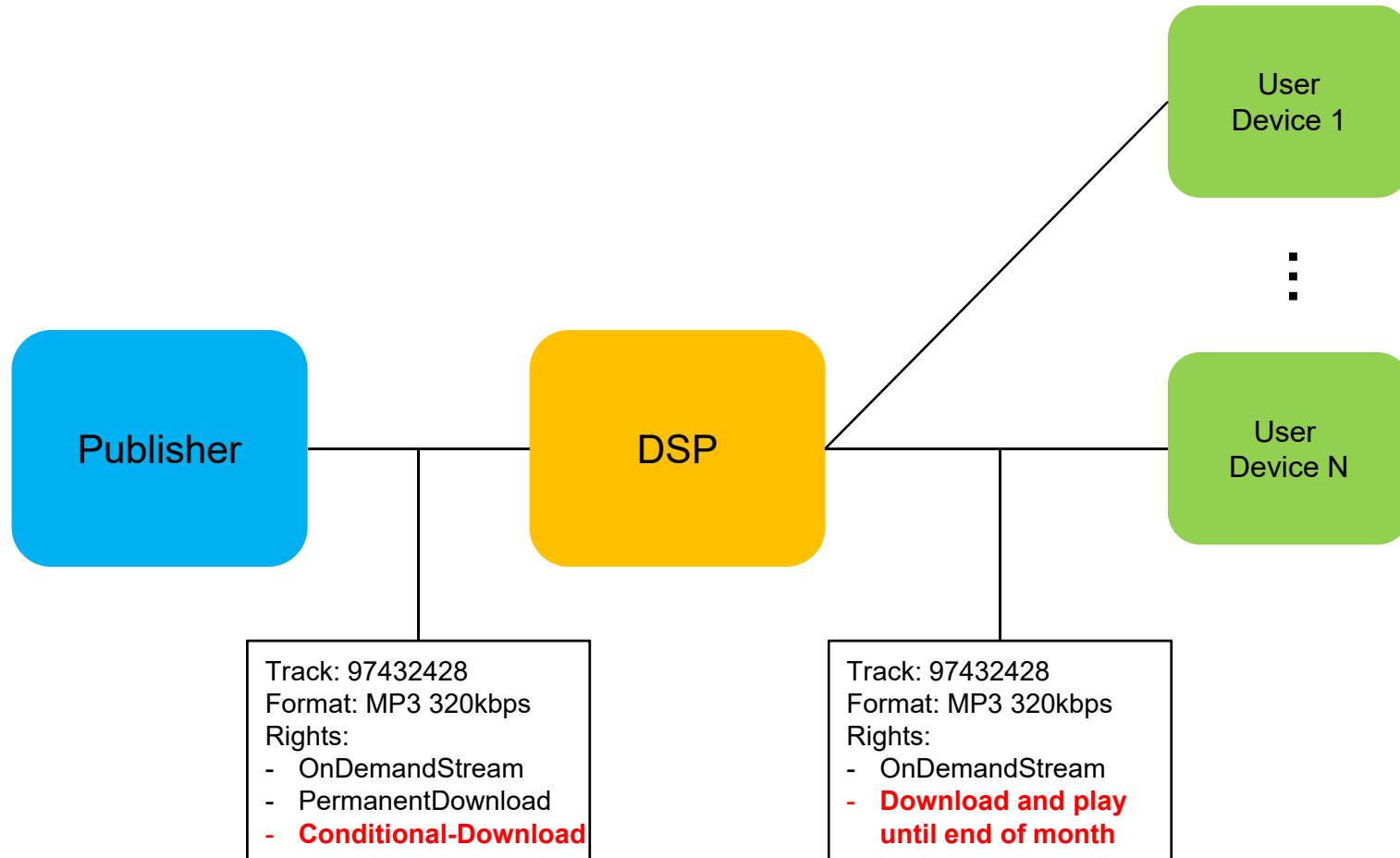
Revisions to § 115

- § 115: compulsory license for composition mechanicals
- Replaces track-by-track with blanket license
- Solves “matching problem”:
 - DSPs take in >10,000 tracks/day
 - They must find compositions underlying sound recordings
 - And issue license paperwork for each, or risk infringement actions
 - Old, incorrect, missing, disputed data makes this a huge burden
 - Spotify and Apple have been sued over this
- Creates single agency to process all these mechanicals
 - Instead of each DSP doing this itself (or hiring 3rd party agency)

Representing MMA License in a REL

- Rights publisher grants to DSP:
 - Blanket statutory mechanical license, no need to get it for each track
 - (Performance license not affected, though royalty rate may change)
- DDEX: music industry messaging standard
 - Used by many labels & indie aggregators for metadata sent with music to DSPs
 - Codes for rights granted (distribution channels), e.g.:
 - OnDemandStream
 - Conditional-Download
 - PermanentDownload

Representing MMA License in a REL?



Exercise: Represent MMA Rights in REL

1. As RightsML style data structure
2. Extra credit: in ODRL JSON or RDF syntax
3. Extra extra credit: represent all rights for interactive music DSPs as ODRL profile
 - a. Stream, conditional download, permanent download
 - b. Composition and sound recording rights

Thank You!

Bill Rosenblatt

GiantSteps Media Technology Strategies

billr@giantstepsmts.com

Blog: <https://copyrightandtechnology.com/>

Twitter: @copyrightandtec

LinkedIn: <https://www.linkedin.com/in/billrosenblatt/>