EBU

OPERATING EUROVISION AND EURORADIO

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REPORT ON AUDIOVISUAL RIGHTS

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Contents

EBU Report on Audiovisual Rights

1. Scope

1.1 Handling rights

Handling rights is part of the audiovisual life-cycle.

Audiovisual works are the result of creations of the mind for which rights are recognised in the legal concept of intellectual property, protected by the law. Among those rights, the legal framework establishes which are the "exploitation rights" that can be object of trades and thus can be transferred. The trade of rights is done by means of contracts in which the parties agree on terms and conditions. Of course such contracts and the parties are subject to the Law.

It is assumed that any individual or organisation intending to act over an Intellectual Property Entity (IP-Entity) in an exploitation context has checked about the rights beforehand.

For example, media organisations hold large collections of AV materials, which are the manifestations of IP-Entities. in order to re-use archival items, it is clear that knowledge about rights is required. Otherwise, for instance, the cost of preservation might be wasted and the future (long tail) fruition of AV assets would be in jeopardy.

In this context, it is useful to keep the distinction between:

- handling rights transferred between business entities
- handling rights granted to the final users (consumers)

Most general concepts might apply to both cases, however a significant difference exists in practice. While business entities are expected to avoid infringements without enforcement, because they have a number of good motivations so to do (e.g. honour, ability and reputation, costs of judgement), the final users can be expected to be tempted to consider any action which is actually possible.

So rights technologies related to consumers are often focused on rights enforcement.

1.2 Rights formats and technologies

Over the last years, considerable research work has been carried out on rights management.

The motivations of such effort can be found in the need to address a number of issues:

- the text of narrative contracts could be unclear/ambiguous: this occurrence implies the need to verify such text with the help of lawyers or specialised people, while the risk of infringements is not completely void;
- the introduction of automated processing on rights information is welcome to assist rights handling, when the amount of work grows;

- rights technology are often expected to assist in preventing infringements and/or increasing revenues.

Formats are related to technologies. Formats are required to be able to unambiguously represent "real" rights. Then tools supporting these formats can be developed and used. However it is important to have standard formats in order to build an open interoperable framework for rights management.

2. Introduction

This EBU MIM Strategic Programme regularly publishes reports on strategic aspects of information management. After metadata and semantic web, this report addresses the essential problem of rights management.

This report is organized as follows.

§ 3 lists a number of needs, related to activities dealing with rights on relying on an effective rights management process.

§ 4 gives some information about the legal framework, as background for the subsequent sections.

§ 5 collects an overview on the rights standards, and other initiatives related to rights, which have been carried on during the last years. A simple but meaningful example of rights agreement has been used with the various standard formats for giving the idea of how they can express such rights.

§ 6 presents the perspectives of user organizations, who contributed to this report with their experience and outcomes of various extent.

§ 7 briefly provides some example of real narrative text used for defining rights terms in media contract.

§ 8 contains a comparison table for the latest rights standard formats.

§ 9 list the identified areas of intervention for the improvement of the same standards.

3. Description of needs

The expectations from rights technologies are manifold.

3.1 On contracts

The final aim is to have binding contractual documents expressed in a “machine-readable” form.

A binding contract is signed by all the interested parties.

Non binding contracts can be useful documents as well for defining general terms and offers during negotiations.

Regarding pre-existing textual contracts, it is required to be able to map them in a “machine-readable” form, although it is understood that these cannot themselves be binding without signatures and statements for superseding e.g. an older version.

3.2 On rights clearance

The goal is ability to perform clear "check-with" operations, which can be defined as automated verification of rights availability with respect to a user defined target exploitation.

This operation can be requested either after identification of appropriate content or exactly for identifying which content (and associated version) has associated matching rights.

For example Media Asset Management (MAM) systems have operational constraints that require the "rights-cleared" information to be rapidly and readily available. Sometimes the "rights-cleared" information is returned in the form of a traffic light, where "green" is for cleared rights (ok) and "red" is for rights not available (don't use), but the warning given by "yellow" is usually not helpful, unless used for a very temporary status, meaning "clearance in progress".

3.3 Optimisation of assets exploitation

The aim is to have the knowledge on owned rights organised in a way appropriate to support their best management. Examples include estimating value of exploitation opportunities and keeping track of rights close to expiration date.

3.4 Security / Confidentiality / Privacy

This need is about support to keeping part of rights information confidential, when requested.

3.5 Enforcing

This is about mechanisms deployed to automatically avoid rights infringements. The expected configuration of such mechanisms can vary considerably, from raising simple warning/exception to absolute prevention of action.

Enforcing can be requested for automating obligations.

3.6 Usage reporting

This need is originated by various cases: (1) reporting use of content to collecting societies; (2) reporting use of content to original rights holder, as part of agreed terms; (3) keeping up-to-date rights status depending on conditions on related actions or runs.

3.7 Licensing towards final users

In this case the goal is to support the definition and issue of licenses for the final users. This may be related to specific exploitation conditions on delivery modalities or technologies.

3.8 Establishing rights ownership

This need is about the process for completing the knowledge on rights ownership when information available from legacy system is not directly sufficient.

3.9 Performing operations on contracts and rights

This need relates on one hand with the simplest CRUD (Create, Read, Update, Delete) editing operations, while on the other hand with more complex operations such as:

- Validate – check standard compliance, information completeness and consistency;
- In/Out, Store - importing and exporting, and saving rights information in a non volatile way;
- Check-with – provide answer to rights clearance requests;
- Search – for finding which rights information match a given query;
- Sales/Purchase – updating rights holdings information of a given party, on the basis of a media contract in which that party issues/receives some rights.

4. Background on the legal framework

4.1 Origin of the "common" legal framework

The domain of rights is based on a legal framework, which regulates the rights of authors, performers, producers, and broadcasters, and over which the parties can freely define terms in agreed contracts.

Each country has its own laws and thus important differences from one country to another may exist. However a "common" legal framework does exist and is built over a number of international agreements or treaties and within the European Union by the EU directives.

To mention a few, international laws include: the Berne Convention (1886), the Universal Copyright Convention of Geneva (1952) and its revision of Paris (1971), the Rome Convention (1961), the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty (1996). The various European Directives range from 89/552/EEC (Television Without Frontiers) to 2007/65/EC (Audiovisual Media Service Directive).

4.2 Intellectual property of authors, performers, producers, and broadcasters

The authors are the holders of the inalienable "moral rights", which make the right of the author to be identified as such and to object to distortions of her work. The authors are also the original holders of the "economic rights", which can be transferred to other parties by means of contracts and deals.

Performers, producers, and broadcasters are also the original holders of rights related to their contribution. Such related rights are independent from the authors' rights because their owners are auxiliary in the intellectual creation process since they lend their assistance to the authors.

Economic and related rights have duration of validity given by the law as a number of years after death, for the authors, or after performance, first publication or broadcast for performers, producers, and broadcasters.

4.3 Special permissions and restrictions

Special permissions allow the fruition of work without the authorisation of the copyright holder. Those copyright exceptions are governed by the law and include: temporary reproduction (without independent economic significance), private copy (of legally owned copy) not used commercially, research and educational purpose (not commercial), quotation, criticism, review and news reporting for the exercise of press freedom.

On the other hand laws also protect the personal rights to safeguard privacy, identity, and dignity. In principle the person rights includes also the "right to oblivion", i.e. to have the person details forgotten after a certain time. The objective evaluation of these exceptions is difficult, but in

specific cases the person rights are the object of court sentences.

4.4 Exploitation Rights

Derived from the economic rights of the legal framework, it is possible to identify the actions which are the concept of exploitation of rights. The exploitation rights are the main object of trades in contracts.

- Fixation or Transcription – the action by which a work or a performance is materially recorded.
- Communication to the public - the action of making available the work to the public through a communication mean. This is what broadcasters do.
- Duplication – the action of producing copies
- Distribution – the action of issuing copies to the public, renting and/or lending
- Public Performance - to perform, or show, play the work in public (e.g. in a theatre)
- Transformation – the action of making adaptation or transformation of the work. This action results in a derivative work

5. Technologies

5.1 Latest evolution of rights standards and initiatives

The domain of rights standards has rapidly evolved since 2011 making it imperative that broadcasters maintain an active interest.

The MPEG-21 framework, described in clause 5.2, which deals with multimedia delivery and consumption across different networks and devices, provided a number of standards on rights along the years. MPEG REL and RDD (respectively Rights Expression Language and Rights Data Dictionary) were published first in 2004, while the latest initiatives CEL (Contract Expression Language) and MCO (Media Contract Ontology) were published in 2013.

Another major framework for rights representation is that of ODRL (Open Digital Rights Language), detailed in clause 5.3, issued by a W3C Community and Business Group, that got evolved from first versions (Core Model & Common Vocabulary) of 2002, later enriched with Profiles, till the version 2.0 of 2012. An initiative of IPTC (RightsML 1.1) is an experimental profile of ODRL 2.0 for “news”.

Clause 5.4 describes the result of a non standard initiative, the Copyright Ontology (2007), which was implemented in the European Project MediaMixer [26] for media fragment mash-up in 2012.

The topic of rights has otherwise been addressed in projects and activities on multimedia preservation.

Developed by the Stanford University, but maintained at the Library of Congress, there was METSRights, published in 2003 (XML Schema available at http://www.loc.gov/standards/rights/METSRights.xsd and announcement resource available at http://www.loc.gov/standards/mets/news080503.html). However the Library of Congress, and METS (Metadata Encoding and Transmission Protocol http://www.loc.gov/standards/mets/) haven’t worked much on this afterwards.

Within another European project focused on preservation, namely PrestoPRIME (www.prestoprime.eu), active from 2008 to 2012, an activity (lead by RAI) was entitled to address the topic of rights, having as outcomes: a Glossary of Rights [30], a rights Ontology [9] which was contributed to MPEG-21 for CEL and MCO, and “RightsDraw”, a Proof of Concept Rights Management System [10][11], released December 2012, published November 2013.

The thread of rights formats and technologies is also included in the Presto4U project (2013-2014, [25]).

Almost all of the mentioned initiative share the aim of expressing rights information in a machine readable format, beyond the simpler objective of providing a copyright notice text or a reference to a supposed copyright holder.

A technical difference in the approach is represented by the choice between XML , for which the formats are formally defined by means of XML Schemas, an RDF, for which both the model and the knowledge are based on ontologies.

Eventually just a mention to Creative Commons http://creativecommons.org/, which is not a format for expressing rights, but it's rather a licensing concept, with a few defined variants, aiming at supporting content sharing. Beyond having Creative Commons as text licenses, there exists an official machine-readable representation of the licenses in RDF. The initiative http://wiki.creativecommons.org/CcREL has not been fully abandoned nor massively adopted, and it remains as an interesting endeavour.

5.2 MPEG-21

This chapter provides a summarized description of the MPEG-21 framework and of some of its parts. More details are given regarding the latest standardized parts, namely: part 19: Media Value Chain Ontology; part 20: Contract Expression Language; and part 21: Media Contract Ontology.

5.2.1 Introduction

The Moving Picture Experts Group (MPEG), formally ISO/IEC JTC 1/SC29/WG11, recommends the MPEG-21 framework (ISO/IEC 21000) for representing and managing digital multimedia content.

MPEG-21 has specified a number of standard parts as shown in Table 1, from 2002 to 2013. All the specifications are available, with fee, on www.iso.ch, while some related resources are publicly available for free on http://www.iso.ch/iso/en/ittf/PubliclyAvailableStandards.

Table 1: List of MPEG-21 parts

MPEG-21 part with year	Title
ISO/IEC 21000-1:2004	Vision, Technologies and Strategy
ISO/IEC 21000-2:2002	Digital Item Declaration. (amendment 2012)
ISO/IEC 21000-3:2003	Digital Item Identification. (amendments 2007 and 2013)
ISO/IEC 21000-4:2006	Intellectual Property Management and Protection Components. (amendments 2007 and 2012, corrigendum 2012)
ISO/IEC 21000-5:2004	Rights Expression Language. (amendments 2007 and 2008)
ISO/IEC 21000-6:2004	Rights Data Dictionary (amendment 2006, corrigenda 2005 and 2007)
ISO/IEC 21000-7:2007	Digital Item Adaptation. (amendment and corrigendum 2008)
ISO/IEC 21000-8:2008	Reference Software. (amendments 2009 and 2011, and 2014?)
ISO/IEC 21000-9:2005	File Format. (amendment 2008)
ISO/IEC 21000-10:2006	Digital Item Processing. (amendment 2006)
ISO/IEC 21000-11:2004	Evaluation Tools for Persistent Association Technologies
ISO/IEC 21000-12:2005	Test Bed for MPEG-21 Resource Delivery
ISO/IEC 21000-13:	▫
ISO/IEC 21000-14:2007	Conformance Testing
ISO/IEC 21000-15:2006	Event Reporting. (amendment and corrigendum 2008)

MPEG-21 part with year	Title
ISO/IEC 21000-16:2006	Binary Format
ISO/IEC 21000-17:2006	Fragment Identification of MPEG Resources
ISO/IEC 21000-18:2007	Digital Item Streaming (amendment 2008)
ISO/IEC 21000-19:2010	Media Value Chain Ontology
ISO/IEC 21000-20:2013	Contract Expression Language
ISO/IEC 21000-21:2013	Media Contract Ontology (corrigendum 2014)

5.2.2 Digital Item Declaration and Identification

ISO/IEC 21000-2 is MPEG-21 part 2: Digital Item Declaration (DID) while ISO/IEC 21000-3 is MPEG-21 part 3: Digital Item Identification (DII).

The Digital Item is the unit of distribution and transaction in the MPEG-21 framework. Its "declaration" implies the specification of the resources, the metadata, and the relationships information, according to the abstract model given in Figure 1. Part 2 of MPEG-21 also specifies an XML Schema, publicly available at http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-21_schema_files/did/didl.xsd, as the definition of the XML based Digital Item Declaration Language (DIDL).

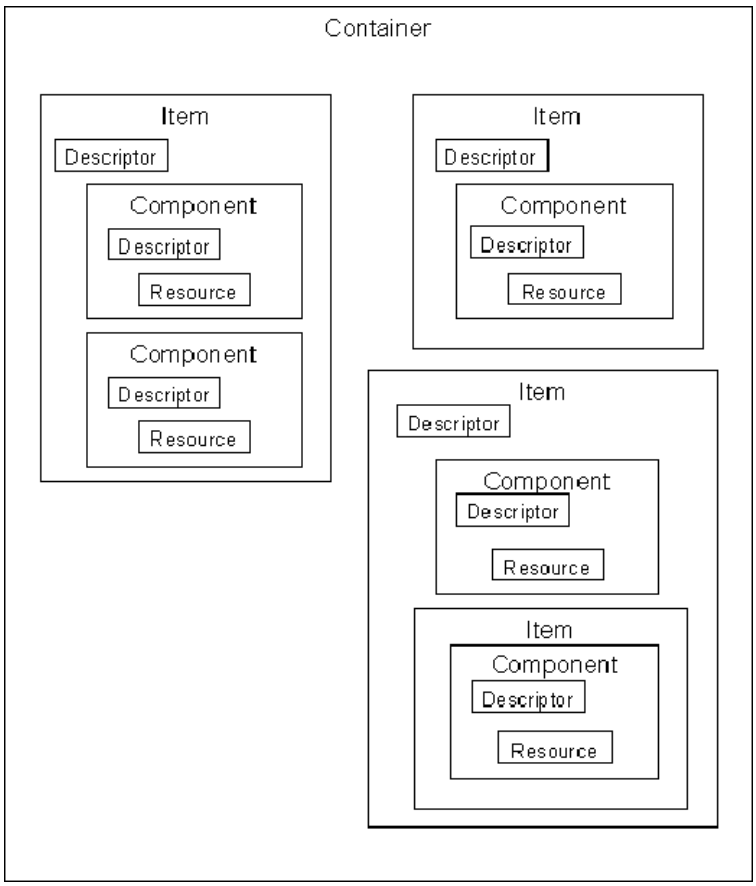

Figure 1: Digital Item Declaration Model

Part 3 of MPEG-21 provides a method, based on URNs, to use existing identification schemes to identify Digital Items, so that resources are uniquely identified together with the governing identification scheme. For example, the identifier element `<dii:Identifier>urn:mpegRA:mpeg21:dii:isan:0000-0000-3A8D-0000-Z-0000-0000-6</dii:Identifier>` contains the ISAN of "Gone With The Wind".

5.2.3 Rights Expression Language

ISO/IEC 21000-5 is MPEG-21 part 5: Rights Expression Language (REL). Standardised in2004, it got later the following amendments to specify three different profiles:

- AMD1: MAM (Mobile And optical Media) profile, 2007
- AMD2: DAC (Dissemination and Capture) profile, 2007
- AMD3: OAC (Open Access Content) profile, 2008

REL aims at representing rights expression and, especially intended for licenses, is prevalently oriented to the business-to-consumer (B2C) scenario. MPEG-21 REL adopts a simple and extensible data model. For defining a rights expression a few basic entities and the relationship among those entities are given. The basic assertion is the "grant", which consists of the following:

- The Principal to whom the Grant is issued
- The Right that the Grant specifies
- The Resource to which the Right in the Grant applies
- The Conditions that must be met before the Right can be exercised

A typical REL license is made of a number of "grants" and an "issuer", which is the entity granting a right to the principal. The rights usually specify the action that can be performed by the principal on the resource.

REL, together with its profiles, is defined by means of XML Schemas that can be found at the link: http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-21_schema_files/rel-*/.

A possible limitation of REL in some broader scenarios is that no obligations or prohibitions can be expressed, unless as "conditions of rights". Besides REL is not symmetric regarding the two agents, i.e. "Principal" and "Issuer", as there cannot be exchange of rights and conditions affecting both parties in the same REL document, but two distinct documents would be necessary.

5.2.4 Rights Data Dictionary

ISO/IEC 21000-6 is MPEG-21 part 6: Rights Data Dictionary (RDD). Standardised in2004, it got later one amendment (2006) and two corrigenda (2005, 2007). It is conceived to support REL.

It contains about 2000 terms, with a single defined meaning, however terms governed by other organisations (than MPEG) can be incorporated by using a mapping mechanism. The fourteen basic terms used to define rights in REL (actions) are:

Adapt	Play
Install	Enhance
Delete	Print
Modify	Enlarge
Diminish	Reduce
Move	Execute
Embed	Uninstall

There is a "Registration Authority" in charge of extending the vocabulary with additional terms at http://www.iso21000-6.net/ .

5.2.5 Media Value Chain Ontology

ISO/IEC 21000-19 is MPEG-21 part 19: Media Value Chain Ontology (MVCO). Standard published in 2010.

The ontology itself can be found at its IRI (which is a URL) http://purl.org/NET/mvco.owl, a good source of further information is found at http://dmag.ac.upc.edu/ontologies/mvco/.

The essence of MVCO is made of Intellectual Property Entities (IP Entities) and Actions that can be performed on them by Users, according to Permissions issued by Users. New IP Entities can results from the execution of permitted actions.

The value chain of the IP-Entity begins with "Work" (a creation that retains intellectual or artistic attributes independently of its Manifestations) and ends with "Product", with the intermediated entities shown in Figure 2 (taken from [4]).

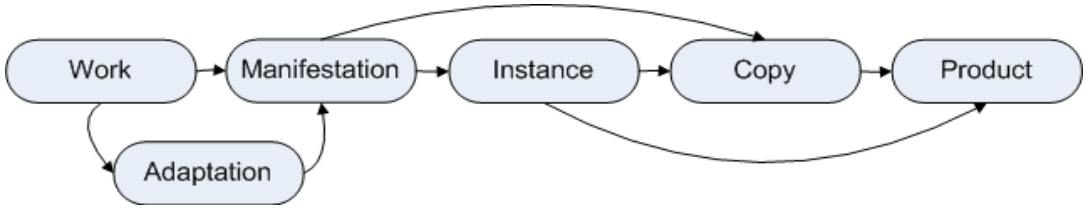

Figure 2: Value chain of the IP-Entities in MVCO

MVCO was found particularly interesting for subsequent initiatives because of its permission model shown in Figure 3, where the Permission to be valid may require that a number of Facts hold (are true), allowing thus the definition of conditions.

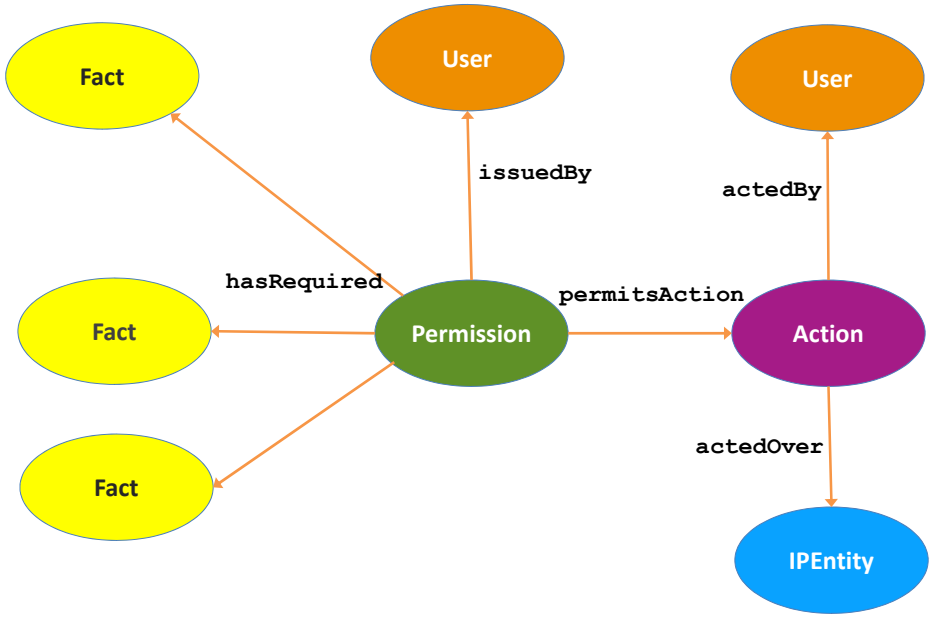

Figure 3: Diagram of MVCO Permission Model

5.2.6 Contract Expression Language

ISO/IEC 21000-20 is MPEG-21 part 20: Contract Expression Language (CEL). Standard published in 2013.

This standard is one of the two electronic formats for the representation of media contracts, resulting from the latest initiative in MPEG-21 framework, the other one being part 21 Media Contract Ontology (MCO), described in § 5.2.7.

CEL is purposely defined as an XML format, normatively specified by XML Schemas. As it is conceived for extensions, one XML Schema is that of the core, with the structural elements; a first extension, namely for "the exploitation of intellectual property rights", is already defined with its XML Schema.

Most of the addressed requirements are the same than for MCO: identification of the contract itself, relationships with pre-existing contracts, identification of the parties, identification of the object of the contract, definition of deontic-expressions (permissions, obligation, prohibitions), with support to complex logical constructs, signatures and encryption (partial or complete).

Also CEL and MCO are similar in much more detail. For instance they share the approach for expressing complex constraints by means of logical constructs (intersection, union, or negation) and possible inter-dependencies between deontic-expressions (pre-conditions on actions), and their respective IPRE extensions address exactly the same domain.

It is possible to say that CEL and MCO are interchangeable, that is they can conceptually replace each other easily, although they were not defined to ensure 100% equivalence.

An example of CEL contract, implementing a simple narrative contract sample provided by RAI, is given in Box 1. The party details are given only for RAI, the party signatures have been omitted. The contract is about RAI being granted, with exclusivity for free linear communication to the public of an Animated Series (no details given), in Italy (including San Marino and the Vatican City), in Italian language, limited to 10 runs, with a license period of 5 years.

```
<cel-core:contract contractId="x275"
xsi:schemaLocation="urn:mpeg:mpeg21:cel:ipre:2012
http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-21_schema_files/celx
sd-mcoowl/cel-ipre.xsd" xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:cel-ipre="urn:mpeg:mpeg21:cel:ipre:2012"
xmlns:dii="urn:mpeg:mpeg21:2002:01-DII-NS"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:cel-core="urn:mpeg:mpeg21:cel:core:2012">
    <cel-core:party id="rai.it">
        <cel-core:organization>
            <cel-core:name>RAI - Radiotelevisione Italiana S.p.A.</cel-core:name>
            <dc:identifier>VATIN:06382641006</dc:identifier>
            <dc:description>the Italian public broadcasting
company</dc:description>
            <cel-core:signatory>
                <cel-core:name>LG</cel-core:name>
                <cel-core:jobTitle>CEO</cel-core:jobTitle>
            </cel-core:signatory>
        </cel-core:organization>
        <cel-core:address>viale Mazzini 14, 00195 Roma, Italy</cel-core:address>
    </cel-core:party>
    <cel-core:party id="XXXX">
        <cel-core:organization>
            <cel-core:name>XXXX</cel-core:name>
            <cel-core:signatory>
                <cel-core:name>XX</cel-core:name>
                <cel-core:jobTitle>CEO</cel-core:jobTitle>
            </cel-core:signatory>
        </cel-core:organization>
```

```
    </cel-core:party>
    <cel-core:body>
        <cel-core:operativePart>
            <cel-core:deonticStructuredClause id="x276" deonticType="Permission">
                <cel-core:subject partyRef="rai.it"/>
                <cel-core:act>
                    <cel-ipre:communicationToThePublic/>
                </cel-core:act>
                <cel-core:object>
                    <cel-core:item name="AnimatedSeries">
 <dii:Identifier>isan:ab123yz</dii:Identifier>
 </cel-core:item>
                </cel-core:object>
                    <cel-core:constraint>
                        <cel-ipre:accessPolicy
access="freeOfCharge"></cel-ipre:accessPolicy>
                        <cel-ipre:deliveryModality
mod="linear"></cel-ipre:deliveryModality>
                        <cel-ipre:temporalInterval>

<cel-ipre:afterDate>2011-04-15T00:00:00</cel-ipre:afterDate>

<cel-ipre:beforeDate>2016-04-15T23:59:59</cel-ipre:beforeDate>
                        </cel-ipre:temporalInterval>
                        <cel-ipre:spatialLocation>
                            <cel-ipre:location>
                                <cel-ipre:country>IT</cel-ipre:country>
                                <cel-ipre:country>VA</cel-ipre:country>
                                <cel-ipre:country>SM</cel-ipre:country>
                            </cel-ipre:location>
                        </cel-ipre:spatialLocation>
                        <cel-ipre:runs number="10"></cel-ipre:runs>
                        <cel-ipre:language lang="it"/>
                        <cel-ipre:isExclusive value="true"/>
                </cel-core:constraint>
                <cel-core:issuer partyRef="XXXX"/>
            </cel-core:deonticStructuredClause>
        </cel-core:operativePart>
    </cel-core:body>
</cel-core:contract>
```

Box 1: example of CEL contract

5.2.7 Media Contract Ontology

ISO/IEC 21000-21 is MPEG-21 part 21: Media Contract Ontology (MCO). Standard published in2013. A corrigendum was approved in 2014 (waiting for publication).

This standard is one of the two electronic formats for the representation of media contracts, resulting from the latest initiative in MPEG-21 framework, the other one being CEL, described in 5.2.6.

MCO is based on MVCO. The MVCO permission model is extended to cover the other deontic expressions (prohibition and obligation in addition to permission), and structurally MCO addresses the same set of requirements than CEL, apart that MCO is clearly an OWL-based format. Similarly to CEL, also MCO is organized in a core/extensions structure, the first extension being again that

for “the exploitation of intellectual property rights”.

Although the text of the specification is available for purchase at www.iso.ch , the two ontologies mco-core.owl and mco-ipre.owl are publicly available resources.

An informative documentation is available at the following persistent links:

- http://purl.oclc.org/NET/mco-core
- http://purl.oclc.org/NET/mco-ipre

The contract model of MCO is shown in Figure 4, while the main elements of MCO contracts are represented in the diagram of Figure 5.

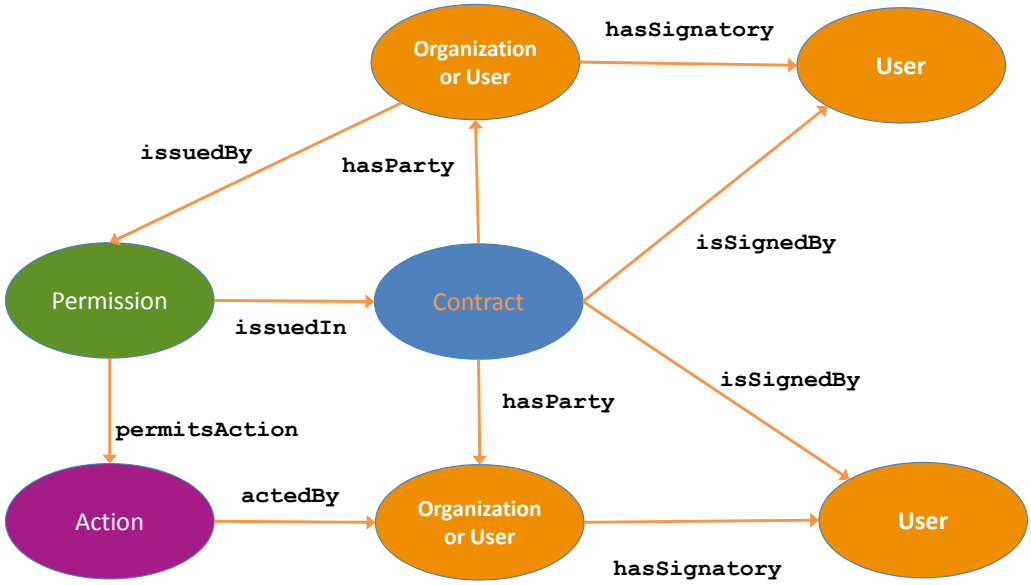

Figure 4 : Diagram of MCO Contract Model

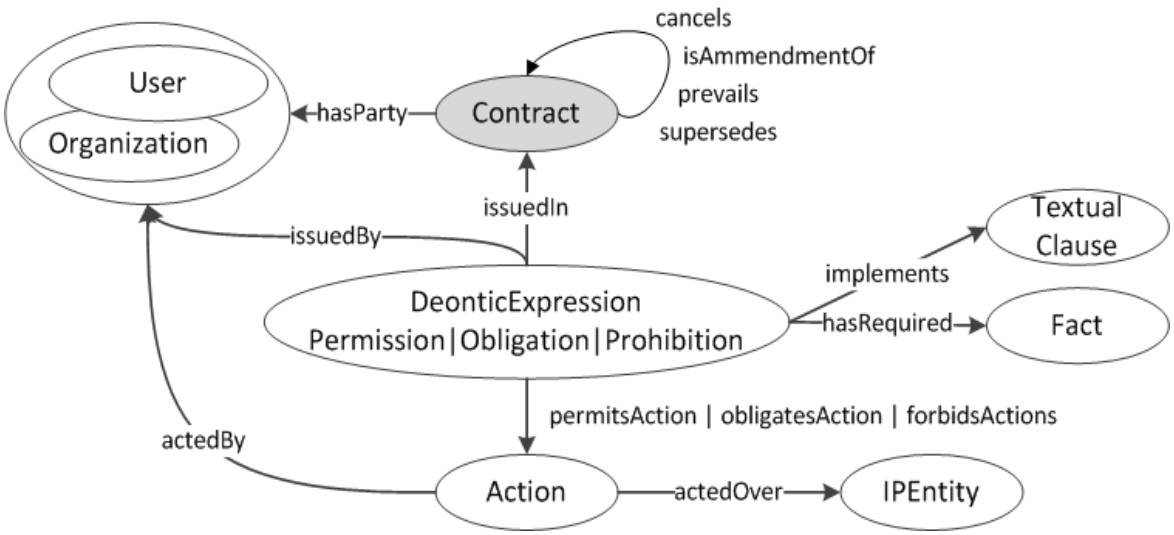

Figure 5: Main elements of MCO contract

In MCO-IPRE the possible defined “actions”, under the generic exploitation of intellectual property rights, are those mentioned in the common legal framework, specifically: “Fixate”, “Transform”, Duplicate”, “Distribute”, “Public-Performance”, and “Communication-to-the-Public”. They are organized in a hierarchy, as shown on the left side of Figure 6, so that it’s possible to indicate an

action with the desired level of generality/specificity. For example if a generic action is permitted, this is also true for any action defined by its sub-classes. Therefore the permission to "ExploitIPRights" is equivalent to the permission for any action under its hierarchy, i.e. having all the commercial rights.

Such basic rights are then refined within contracts by the definition of conditions. MCO allows the expression of conditions by requiring a number of "Facts" to be true, in order to make a deontic expression valid. MCO-IPRE defines a hierarchy of exploitation conditions, shown on the right side of Figure 6, which cover, with the desired degree of generality/specificity, the various dimensions actually used in real contracts, and specifically:

- the Access Policy - which can be "free of charge" or "pay" under various forms;
- the Means - i.e. conditions on the technology;
- the Delivery Modality - which can be "linear" (i.e. simultaneously to many users) or "non linear" (i.e.at the moment chosen by the end user and at her individual request, a.ka. "make available") under various forms;
- the Service Access Policy - which can be "open" or "restricted";
- the Device - i.e. conditions on the end user's device for content fruition;
- the User Time Access - which can be "limited" (e.g. as for rental) or "unlimited";
- the Run - i.e. conditions on the number of times which an action is executed;
- the Temporal Context - which is the license period;
- the Spatial Context - which is the territory;
- the Language - of the communication to the public (e.g. dubbing or subtitles);
- the Length - the duration of the content resulting from the action;
- the IPEntity Context - a condition on the content to be used within a specified editorial context.

As an example, if the delivery modality is not constrained, then no fact belonging to its sub-hierarchy will be required, otherwise one among "linear", "non linear", and one their subclasses ("broadcasting" and "webcasting" are linear modalities, while "on demand basis", "on demand download", and "on demand streaming" a non linear modalities) will be required.

Two other smart mechanisms are present in MCO for the definition of conditions:

- logical expression of Facts (negation, intersection and union) - for example a condition on the technology can be defined as an alternative between two or more means, doesn't matter which one; or defining a negative spatial context (anywhere but not in a specified country);
- inter-dependency between deontic expressions - one being valid according to the start or completion of an action permitted or obligated or forbidden by another deontic expression.

The latter mechanism can be used for addressing real cases such as the so-called "catchup-TV" (right to make available content on the web in period of time related to its broadcast) or "cascading series" (stopping rights on episodes of series in relation with the publication of the last episode), and so on.

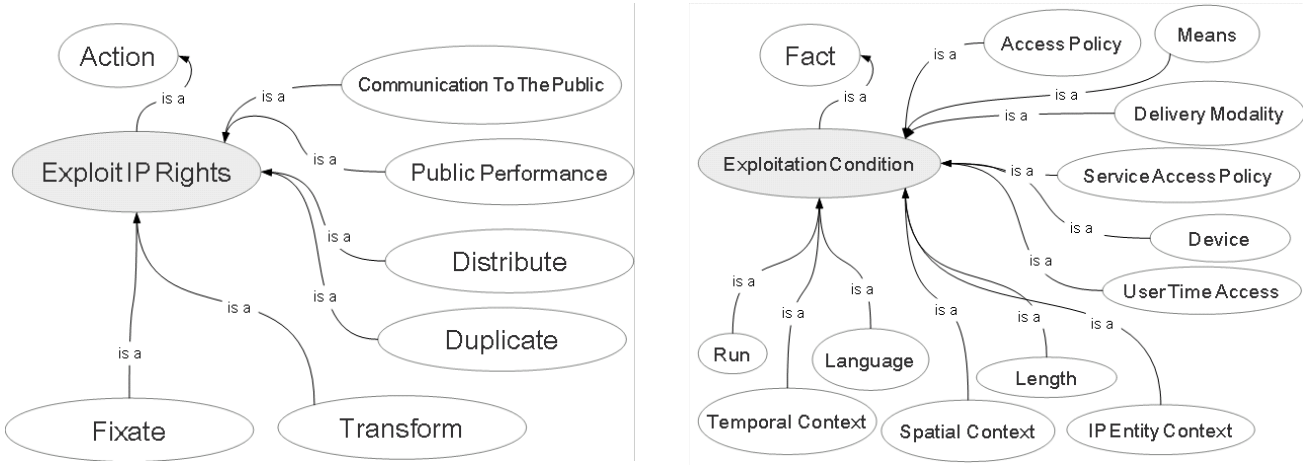

Figure 6: Actions (left) and Conditions (right) for exploitation of Intellectual Property Rights

The same example used mapping to CEL in Box 1 was mapped to MCO and the resulting RDF/XML serialization is given in Box 2. In the case of MCO other equivalent serializations are also possible, such as OWL/XML or Turtle.

While an XML structure is a tree, the OWL document instance is a graph. Therefore its serialized form is not as easy as for that of CEL for a human reading, although none of those formats are normally intended for human processing. However the graph of the same MCO contract can be presented in the form of diagram as shown in Figure 7.

```
<rdf:RDF xmlns="http://www.w3.org/2002/07/owl#"
xml:base="http://www.w3.org/2002/07/owl"
xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"      xmlns:mco-
core="urn:mpeg:mpeg21:mco:core:2012#" xmlns:owl="http://www.w3.org/2002/07/owl#"
xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:mco-
ipre="urn:mpeg:mpeg21:mco:ipre:2012#"
xmlns:mvco="http://purl.oclc.org/NET/mvco.owl#" xmlns:DII-
NS="urn:mpeg:mpeg21:2002:01-DII-NS#">
    <Ontology rdf:about="urn:it.rai:mco-rights-mcosample">
        <imports rdf:resource="urn:mpeg:mpeg21:mco:ipre:2012"/>
    </Ontology>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#AnimatedSeries">
        <rdf:type rdf:resource="http://purl.oclc.org/NET/mvco.owl#IPEntity"/>
        <DII-NS:Identifier >isan:ab123yz</DII-NS:Identifier>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#LG">
        <rdf:type rdf:resource="http://purl.oclc.org/NET/mvco.owl#User"/>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#XX">
        <rdf:type rdf:resource="http://purl.oclc.org/NET/mvco.owl#User"/>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#XXXX">
        <rdf:type rdf:resource="urn:mpeg:mpeg21:mco:core:2012#Organization"/>
        <mco-core:hasSignatory rdf:resource="urn:it.rai:mco-rights-mcosample#XX"/>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#rai.it">
        <rdf:type rdf:resource="urn:mpeg:mpeg21:mco:core:2012#Organization"/>
        <dc:title >RAI-Radiotelevisione Italiana S.p.A.</dc:title>
        <dc:identifier>VATIN:06382641006</dc:identifier>
        <dc:description>the Italian public broadcaster company</dc:description>
```

```
        <mco-core:Address>viale Mazzini14, 00195 Roma, Italy</mco-core:Address>
        <mco-core:hasSignatory rdf:resource="urn:it.rai:mco-rights-mcosample#LG"/>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#x275">
        <rdf:type rdf:resource="urn:mpeg:mpeg21:mco:core:2012#Contract"/>
        <mco-core:hasParty rdf:resource="urn:it.rai:mco-rights-mcosample#XXXX"/>
        <mco-core:hasParty rdf:resource="urn:it.rai:mco-rights-mcosample#rai.it"/>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#x276">
        <rdf:type rdf:resource="http://purl.oclc.org/NET/mvco.owl#Permission"/>
        <mco-ipre:isExclusive>true</mco-ipre:isExclusive>
        <mco-core:issuedBy rdf:resource="urn:it.rai:mco-rights-mcosample#XXXX"/>
        <mco-core:issuedIn rdf:resource="urn:it.rai:mco-rights-mcosample#x275"/>
        <mvco:permitsAction rdf:resource="urn:it.rai:mco-rights-mcosample#x277"/>
        <mvco:hasRequired rdf:resource="urn:it.rai:mco-rights-mcosample#x278"/>
        <mvco:hasRequired rdf:resource="urn:it.rai:mco-rights-mcosample#x279"/>
        <mvco:hasRequired rdf:resource="urn:it.rai:mco-rights-mcosample#x281"/>
        <mvco:hasRequired rdf:resource="urn:it.rai:mco-rights-mcosample#x282"/>
        <mvco:hasRequired rdf:resource="urn:it.rai:mco-rights-mcosample#x283"/>
        <mvco:hasRequired rdf:resource="urn:it.rai:mco-rights-mcosample#x284"/>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#x277">
        <rdf:type
rdf:resource="urn:mpeg:mpeg21:mco:ipre:2012#CommunicationToThePublic"/>
        <mvco:actedOver rdf:resource="urn:it.rai:mco-rights-
mcosample#AnimatedSeries"/>
        <mvco:actedBy rdf:resource="urn:it.rai:mco-rights-mcosample#rai.it"/>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#x278">
        <rdf:type rdf:resource="urn:mpeg:mpeg21:mco:ipre:2012#FreeOfCharge"/>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#x279">
        <rdf:type rdf:resource="urn:mpeg:mpeg21:mco:ipre:2012#Linear"/>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#x281">
        <rdf:type rdf:resource="urn:mpeg:mpeg21:mco:ipre:2012#TemporalContext"/>
        <mco-ipre:afterDate >20110415</mco-ipre:afterDate>
        <mco-ipre:beforeDate >20160415</mco-ipre:beforeDate>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#x282">
        <rdf:type rdf:resource="urn:mpeg:mpeg21:mco:ipre:2012#Run"/>
        <mco-ipre:hasNumberOfRuns >10</mco-ipre:hasNumberOfRuns>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#x283">
        <rdf:type rdf:resource="urn:mpeg:mpeg21:mco:ipre:2012#Language"/>
        <mco-ipre:hasLanguage >#it;</mco-ipre:hasLanguage>
    </NamedIndividual>
    <NamedIndividual rdf:about="urn:it.rai:mco-rights-mcosample#x284">
        <rdf:type rdf:resource="urn:mpeg:mpeg21:mco:ipre:2012#SpatialContext"/>
        <mco-ipre:inCountry >#IT;#VA;#SM;</mco-ipre:inCountry>
    </NamedIndividual>
</rdf:RDF>
```

Box 2: example of MCO contract

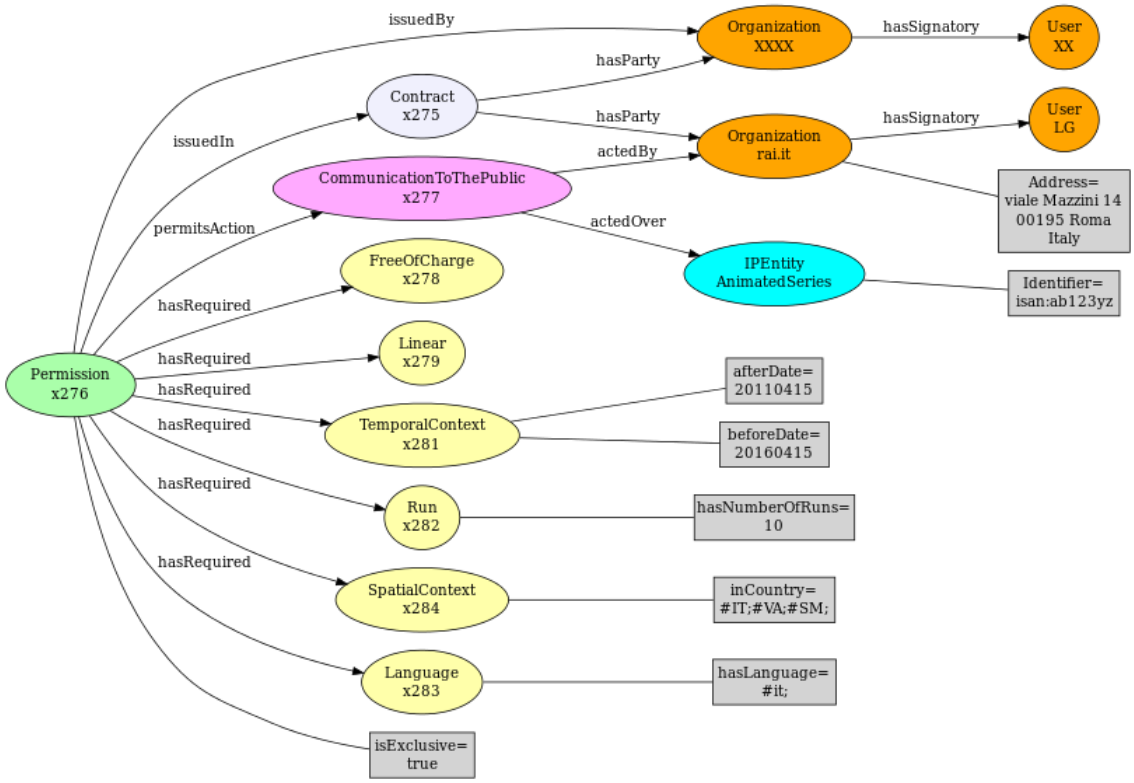

Figure 7: diagram representing an MCO contract sample

5.3 ODRL

5.3.1 Introduction

As indicated on the page (http://www.w3.org/community/odrl/) of the W3C ODRL Community Group, the Open Digital Rights Language (ODRL) Initiative is an international effort aimed at developing and promoting an open standard for policy expressions. ODRL provides flexible and interoperable mechanisms to support transparent and innovative use of digital content in publishing, distribution and consumption of digital media across all sectors and communities. The ODRL Policy model is broad enough to support traditional rights expressions for commercial transaction, open access expressions for publicly distributed content, and privacy expressions for social media.

The Open Mobile Alliance (http://openmobilealliance.org/) profiled ODRL1.1 for OMA DRM.

The current finalized version is ODRL 2.0, which is made of:

- a Core Model;
- a Common Vocabulary;
- an XML Encoding.

A profile of ODRL 2.0 has been developed to represent Creative Commons statements. ODRL2.0 proposes an abstract core model which can be represented as JSON, XML or RDF. While the three of them can convey the same information, the latter is based on an ODRL2.0 Ontology which might be used to make inferences not possible with the others. While this feature is not likely to be exploited in practical settings, it permits rights expressions to be written as Linked Data. The ability to expose rights information as Linked Data (following the design principles in http://www.w3.org/standards/semanticweb/data) makes the RDF serialization the right choice if the rights expressions are to be publicly available and connected to other entities.

The current draft work is on ODRL 2.1 (due for release by end 2014), which defines:

- a Core Model;
- a Common Vocabulary;
- an XML Encoding;
- a JSON Encoding;
- an Ontology; and
- a Creative Commons Profile.

The namespace URI for ODRL will be changed in ODRL 2.1 to comply with W3C rules and the Vocabulary namespace will be merged into it, which has been made to strengthen its RDF representation. Version 2.1 will also provide a refined Actions Vocabulary. No other substantial changes are planned at the time of publishing this report.

IPTC's RightsML is a profile of ODRL, presented in detail in § 5.3.3.

5.3.2 Core Model and common vocabulary

Figure 8 shows the complete version 2.0 ODRL Core Model. Policy is the central entity that holds an ODRL policy together. In its encoded form, e.g. in an XML document, it makes the policy addressable from the outside world via its `uid` attribute. Policy can refer to `Permissions` and `Prohibitions`.

A `Permission` allows a particular `Action` to be executed on a related `Asset`, e.g. "*play the audio file abc.mp3*". A `Constraint` such as "*at most 10 times*" might be added to specify the `Permission` more precisely. The `Party` that grants this `Permission` is linked to it with the `Role` "*assigner*", the `Party` that is granted the `Permission` is linked to it with the `Role` "*assignee*", e.g. "*assigner VirtualMusicShop grants the Permission to assignee Alice*". Additionally, a `Permission` MAY be linked to `Duty` entities.

Similar to `Permission`, a `Duty` states that a certain `Action` MAY be executed by the `Party` with the `Role` "*assignee*" for the `Permission` to be valid, e.g. "*Alice must pay 5 EUR in order to get the Permission to play abc.mp3*".

The `Prohibition` entity is used in the same way as `Permission`, with the two differences that it does not refer to `Duty` and (obviously) that it forbids the `Action`, e.g. "*Alice is forbidden to use abc.mp3 commercially*".

For more information see http://www.w3.org/community/odrl/two/model/

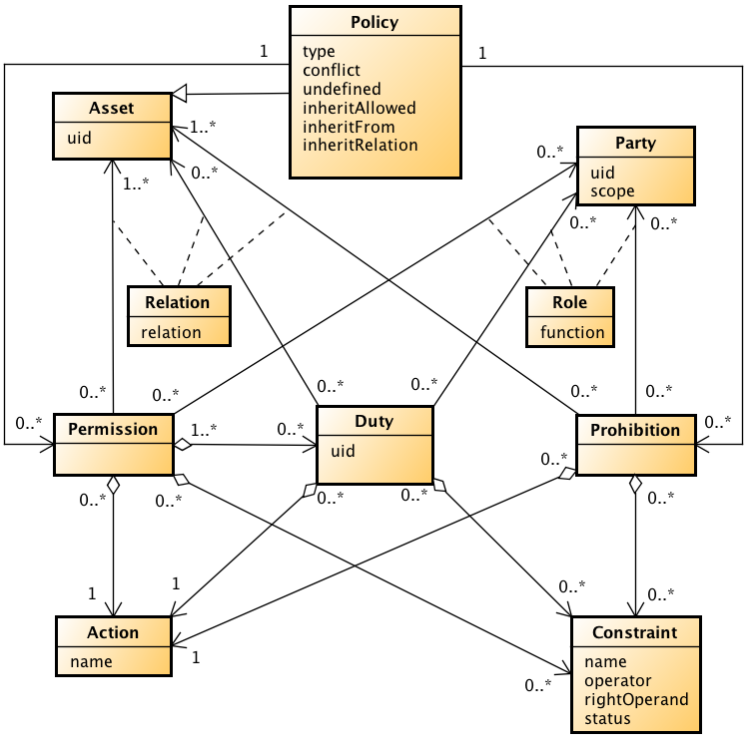

Figure 8: Diagram of ODRL Core Model

The example already given for CEL and MCO, in §§ 5.2.6 and 5.2.7 respectively, can be partially mapped in ODRL v2.0 as well, as shown in Box 3 using the XML encoding of ODRL. Some characteristics, such as the signatories (and possibly their signatures) and the exclusivity flag, are not mapped. The attribute values with cyan background in Box 3 are actually URNs of MCO/IPRE, because they are not present in the current version of ODRL Vocabulary (http://www.w3.org/community/odrl/two/vocab/).

```
<o:policy type="http://w3.org/ns/odrl/vocab#agreement" uid="x275"
xsi:schemaLocation="http://w3.org/ns/odrl/2/ odrl2.0.xsd"
xmlns:o="http://w3.org/ns/odrl/2/" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance">
    <o:permission id="x276">
        <o:asset id="AnimatedSeries" uid="isan:ab123yz"
             relation="http://w3.org/ns/odrl/vocab#target"></o:asset>
        <o:action name="urn:mpeg:mpeg21:mco:ipre:2012#CommunicationToThePublic"
id="x277"/>
        <o:constraint name="http://w3.org/ns/odrl/vocab#count"
                  operator="http://w3.org/ns/odrl/vocab#lteq" rightOperand="10"/>
        <o:constraint name="http://w3.org/ns/odrl/vocab#language"
                  operator="http://w3.org/ns/odrl/vocab#eq" rightOperand="it"/>
        <o:constraint name="http://w3.org/ns/odrl/vocab#spatial"
                  operator="http://w3.org/ns/odrl/vocab#isAnyOf" rightOperand="IT
SM VA"/>
        <o:constraint name="urn:mpeg:mpeg21:mco:ipre:2012#DeliveryModality"
                  operator="http://w3.org/ns/odrl/vocab#isAnyOf"
                  rightOperand="urn:mpeg:mpeg21:mco:ipre:2012#Linear"/>
        <o:constraint name="urn:mpeg:mpeg21:mco:ipre:2012#AccessPolicy"
                  operator="http://w3.org/ns/odrl/vocab#isAnyOf"
                  rightOperand="urn:mpeg:mpeg21:mco:ipre:2012#FreeOfCharge"/>
        <o:constraint name="http://w3.org/ns/odrl/vocab#dateTime"
                  operator="http://w3.org/ns/odrl/vocab#gt" rightOperand="2011-04-
15"/>
```

```
        <o:constraint name="http://w3.org/ns/odrl/vocab#dateTime"
                    operator="http://w3.org/ns/odrl/vocab#lteq" rightOperand="2016-
04-15"/>
        <o:party uid="www.rai.it"
function="http://w3.org/ns/odrl/vocab#assignee"></o:party>
        <o:party uid="XXXX"
function="http://w3.org/ns/odrl/vocab#assigner"></o:party>
    </o:permission>
</o:policy>
```

Box 3: example of ODRL 2.0 XML agreement

A similar exercise can be done with RDF version of ODRL (http://www.w3.org/ns/odrl/2/ODRL20.rdf) and the RDF/XML resulting serialization is given in Box 4 and its graph diagram is presented in Figure 9.

```
<rdf:RDF xmlns="urn:it.rai:odrl-rights-odrlsample#" xml:base="urn:it.rai:odrl-
rights-odrlsample"
     xmlns:odrl-rights-odrlsample="urn:it.rai:odrl-rights-odrlsample#"
xmlns:rdfs="http://www.w3.org/2000/01/rdf-
schema#"xmlns:owl="http://www.w3.org/2002/07/owl#"
xmlns:xsd="http://www.w3.org/2001/XMLSchema#"xmlns:rdf="http://www.w3.org/1999/02/
22-rdf-syntax-ns#" xmlns:odrl="http://www.w3.org/ns/odrl/2/">
    <owl:Ontology rdf:about="urn:it.rai:odrl-rights-odrlsample">
        <owl:imports rdf:resource="http://www.w3.org/ns/odrl/2/"/>
    </owl:Ontology>
    <owl:DatatypeProperty rdf:about="&odrl-rights-odrlsample;AccessPolicy">
        <rdfs:subPropertyOf rdf:resource="&odrl;rightOperand"/>
    </owl:DatatypeProperty>
    <owl:DatatypeProperty rdf:about="&odrl-rights-odrlsample;deliveryModality">
        <rdfs:subPropertyOf rdf:resource="&odrl;rightOperand"/>
    </owl:DatatypeProperty>
    <owl:DatatypeProperty rdf:about="&odrl-rights-odrlsample;spatial">
        <rdfs:subPropertyOf rdf:resource="&odrl;rightOperand"/>
    </owl:DatatypeProperty>
    <owl:Class rdf:about="&odrl-rights-odrlsample;CommunicationToThePublic">
        <rdfs:subClassOf rdf:resource="&odrl;Action"/>
    </owl:Class>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;AnimatedSeries">
        <rdf:type rdf:resource="&odrl;Asset"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;XXXX">
        <rdf:type rdf:resource="&odrl;Party"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;rai.it">
        <rdf:type rdf:resource="&odrl;Party"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;x275">
        <rdf:type rdf:resource="&odrl;Agreement"/>
        <odrl:permission rdf:resource="&odrl-rights-odrlsample;x276"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;x276">
        <rdf:type rdf:resource="&odrl;Permission"/>
        <odrl:target rdf:resource="&odrl-rights-odrlsample;AnimatedSeries"/>
        <odrl:assigner rdf:resource="&odrl-rights-odrlsample;XXXX"/>
        <odrl:assignee rdf:resource="&odrl-rights-odrlsample;rai.it"/>
        <odrl:action rdf:resource="&odrl-rights-odrlsample;x277"/>
```

```
        <odrl:constraint rdf:resource="&odrl-rights-odrlsample;x278"/>
        <odrl:constraint rdf:resource="&odrl-rights-odrlsample;x279"/>
        <odrl:constraint rdf:resource="&odrl-rights-odrlsample;x281"/>
        <odrl:constraint rdf:resource="&odrl-rights-odrlsample;x281bis"/>
        <odrl:constraint rdf:resource="&odrl-rights-odrlsample;x282"/>
        <odrl:constraint rdf:resource="&odrl-rights-odrlsample;x283"/>
        <odrl:constraint rdf:resource="&odrl-rights-odrlsample;x284"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;x277">
        <rdf:type rdf:resource="&odrl-rights-
odrlsample;CommunicationToThePublic"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;x278">
        <rdf:type rdf:resource="&odrl;Constraint"/>
        <AccessPolicy
rdf:datatype="&xsd;anyURI">urn:mpeg:mpeg21:mco:ipre:2012#FreeOfCharge</AccessPolic
y>
        <odrl:operator rdf:resource="&odrl;isAnyOf"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;x279">
        <rdf:type rdf:resource="&odrl;Constraint"/>
        <deliveryModality
rdf:datatype="&xsd;anyURI">urn:mpeg:mpeg21:mco:ipre:2012#Linear</deliveryModality>
        <odrl:operator rdf:resource="&odrl;isAnyOf"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;x281">
        <rdf:type rdf:resource="&odrl;Constraint"/>
        <odrl:dateTime rdf:datatype="&xsd;dateTime">2011-04-15</odrl:dateTime>
        <odrl:operator rdf:resource="&odrl;gt"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;x281bis">
        <rdf:type rdf:resource="&odrl;Constraint"/>
        <odrl:dateTime rdf:datatype="&xsd;dateTime">2016-04-15</odrl:dateTime>
        <odrl:operator rdf:resource="&odrl;lteq"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;x282">
        <rdf:type rdf:resource="&odrl;Constraint"/>
        <odrl:count rdf:datatype="&xsd;nonNegativeInteger">10</odrl:count>
        <odrl:operator rdf:resource="&odrl;lteq"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;x283">
        <rdf:type rdf:resource="&odrl;Constraint"/>
        <odrl:language rdf:datatype="&xsd;language">it</odrl:language>
        <odrl:operator rdf:resource="&odrl;eq"/>
    </owl:NamedIndividual>
    <owl:NamedIndividual rdf:about="&odrl-rights-odrlsample;x284">
        <rdf:type rdf:resource="&odrl;Constraint"/>
        <spatial rdf:datatype="&xsd;string">IT VA SM</spatial>
        <odrl:operator rdf:resource="&odrl;isAnyOf"/>
    </owl:NamedIndividual>
</rdf:RDF>
```

Box 4: example of ODRL 2.0 RDF Agreement

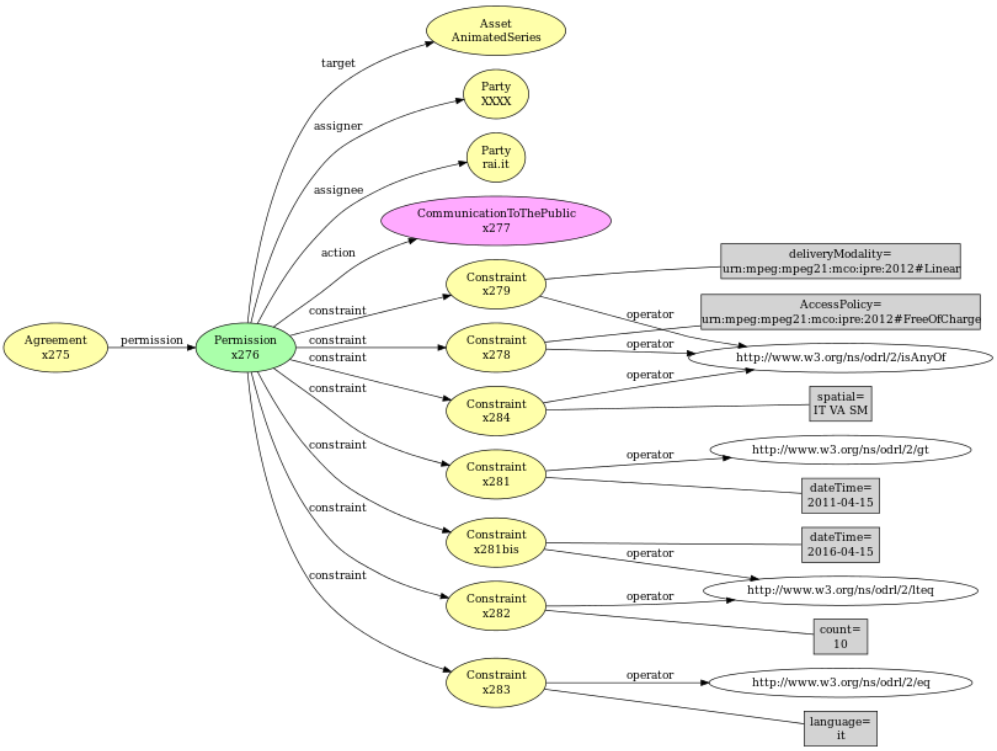

Figure 9: diagram representing the example of ODRL v2.0 RDF Agreement

5.3.3 IPTC's RightsML profile

RightsML is a profile of the Open Digital Rights Language (ODRL) Version 2.0 (to be further aligned when ODRL2.1 is released), specified by the IPTC, for application in the communication of usage policies, primarily in association with the licensed distribution and use of news content by news gathering agencies, news publishers, news licensing organisations, business intermediaries and business consumers in the online news market-place.

The RightsML use case is based upon the requirement, in the specific context of news syndication, to be able to associate a usage policy with an item of content for which usage rights are assigned by a licensing rights holder to a licensee. The assumption is that the licensee may not necessarily be the final consumer of the item in question, but is a licensed business entity that may wish to make any of a variety of permitted commercial uses of a content item, including using the item in the delivery of their own products or services to their own customers. The usage policy may therefore need to cover both the use that is made of the item by the immediate licensee to whom rights are being granted and the duty of the licensee to communicate specific usage policy terms to their own customers, associated with delivery of any content items or derivatives to their customers.

The requirement is to enable communication of the usage rights and constraints that are specific to a particular item. These might be delivered with the item – whether embedded in the item, or embedded in the communication payload that includes the item – or communicated separately.

The RightsML profile reuses specific elements of the ODRL 2.0 (and soon v2.1) vocabulary (policy types, actions, constraints, asset/groups of assets and relations, parties and roles), which semantics is occasionally refined to meet IPTC needs.

It is not an IPTC requirement that license contracts have to be expressed by ODRL in full. It is acknowledged that there are license contracts currently in use, which can be complex and would not efficiently be expressed using a Rights Expression Language. However, there is a need to express item-specific permissions or more often prohibitions by a Rights Expression Language. This is within the scope of primary use of ODRL/RightsML.

IPTC propose users to start with simple and widely used cases. This is facilitated by Simple Case examples and templates, including geographic and temporal constraints (http://dev.iptc.org/Forum-3). For IPTC, RightsML is only one of the possible representation formats for the expression of such rights.

RightsML is currently in an experimental phase by IPTC, for testing its applicability by the IPTC members. This will end when ODRL2.1 and RightsML1.2 are released by the end of 2014, early 2015, respectively.

For more information see http://dev.iptc.org/RightsML and http://dev.iptc.org/rightsml-forum .

5.4 Copyright Ontology

5.4.1 Introduction

The Copyright Ontology is the main contribution of a Ph.D. Thesis [16] and is available at http://rhizomik.net/html/ontologies/copyrightonto/ , where a stable version and other development versions can be found. The hosting site is an initiative supporting research projects on knowledge in different fields and it's led by the GRIHO research group and supported by the MediaMixer European research project [26].

The Copyright Ontology is a formal model of the copyright domain and takes into account the regulation of the copyright law, for its core part.

The `creation` takes different forms along its value chain because of particular `events`, represented by `verbs` as in the example: "`to fix`" generates a "`recording`" from a "`performance`". The `event` is connected to the `right` that governs it, e.g. the "`Reproduction`" `Right` regulates the "`to fix`" event. These building blocks are at the core of copyright law and therefore are the basis for any contract or license dealing with `creations`. Thus the Copyright Ontology can be used to formally describe any rights expression language and facilitate thus their implementation and the interoperability among them.

For instance, as described in [17], the Copyright Ontology can drive digital operations decision support and help dealing in a scalable way with copyright management issues that require taking into account DDEX data [1], one of the main standards for automating the exchange of information along the digital supply chain, together with clauses coming directly from talent contracts that set exceptions to be taken into account, for instance that Green Day doesn't want their songs mixed with UGC showing violent images.

5.4.2 Approach

The Copyright Ontology modelling approach is event-oriented. As the verb in the natural language is used for representing the dynamic aspects of the world and constitutes the core of sentences, so this ontology was modelled by identifying the verbs corresponding to the processes, situations, and events in the copyright domain. In order to build complex expressions, always taking inspiration from how natural language works, it is necessary to identify the other constituent entities, e.g. participants. These connections are characterized as verb fillers called case roles or thematic roles [19][20].

This approach has been extensively used in the Natural Language research domain and more

[1] Digital Data Exchange (DDEX), http://www.ddex.net

recently also in ontology and metadata vocabulary engineering, as in the schema.org[2] vocabulary.

5.4.3 Conceptualization

This section details the Copyright Ontology conceptualization activity. This activity is guided by event-oriented pattern presented in the previous section, which was employed in the Copyright Ontology engineering process.

The conceptualization process of the copyright domain was divided into two phases, the first of which concentrates on the static aspects of the domain, further divided into two different sub-models.

The Creation sub-model, shown in Figure 10, defines the different forms a `creation` can take, which are classified following the three main points of view as proposed by many upper ontologies, e.g. the Suggested Upper Merged Ontology [21]:

- **Abstract**: Work.
- **Object**: Manifestation, Fixation and Instance.
- **Process**: Performance and Communication.

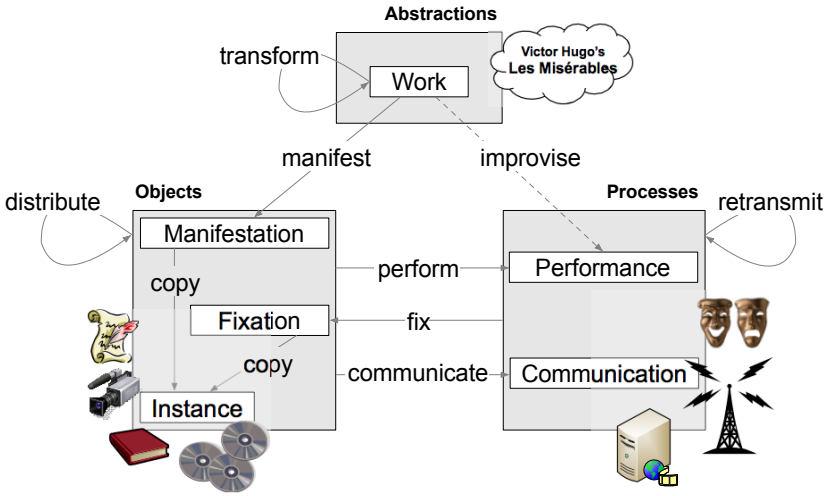

Figure 10: The creation model of the Copyright Ontology

The rights sub-model, which completes the static part model, follows the recommendations of the World Intellectual Property Organization (WIPO, http://www.wipo.int) in order to define the rights hierarchy, as shown in Figure 11. The economic rights, which are related to productive and commercial aspects of copyright, are most relevant.

[2] http://schema.org/Action

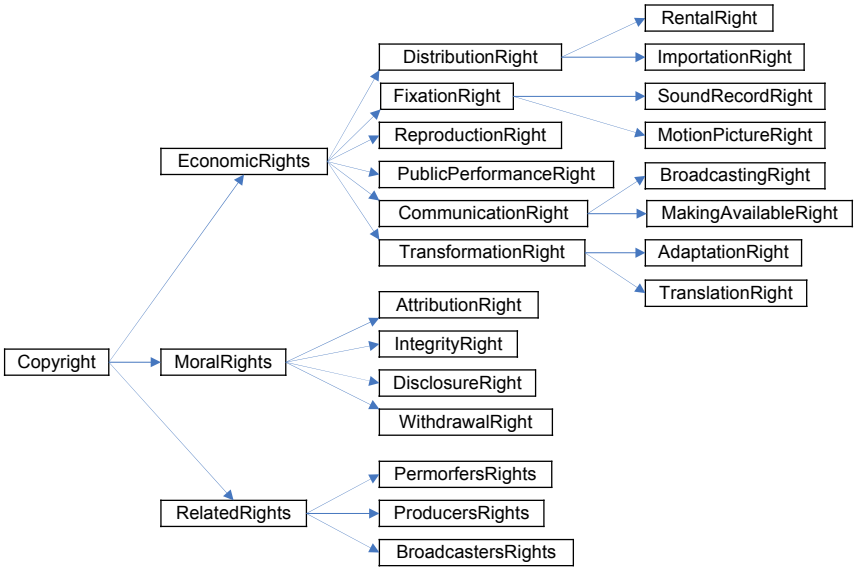

Figure 11: Rights Model in the Copyright Ontology

The Action Model covers the dynamic part of the domain. `Actions` can be performed on the concepts defined in the creation sub-model and are regulated by the rights defined in the rights sub-model. The actions related to the economic rights are:

- **Reproduction Right**: *reproduce*, commonly speaking *copy*.
- **Distribution Right**: *distribute*. More specifically *sell*, *rent* and *lend*.
- **Public Performance Right**: *perform*; it is regulated by copyright when it is a public performance and not a private one.
- **Fixation Right**: *fix*, or *record*.
- **Communication Right**: *communicate* when the subject is an object or *retransmit* when communicating a performance or previous communication, e.g. a re-broadcast. Other related actions, which depend on the intended audience, are *broadcast* or *make available*.
- **Transformation Right**: *derive*. Some specializations are *Adapt* or *Translate*.

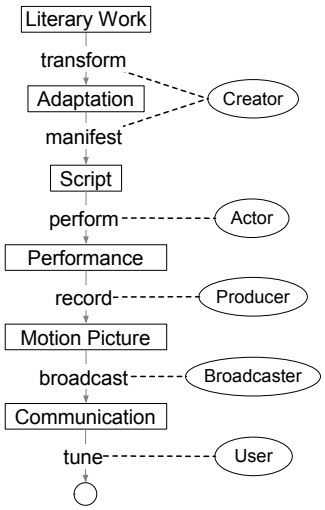

Figure 12: Value chain for a literary work, adapted into a script for a film that is then broadcast

With the previous pieces, it is possible to model a value chain, like the one shown in Figure 12 for a particular media asset, connecting the different creations involved and their evolution through the relevant performed actions, which at the same time are connected to the rights governing them.

For a detailed explanation of the Copyright Ontology as a media value chains modelling tool, and comparisons of it to other ways of modeling them like FRBR [3], there are more details in [22].

[3] Functional Requirements for Bibliographic Records, http://www.ifla.org/publications/functional-requirements-for-bibliographic-records.

Regarding the *Copy* action, we consider that copies have been traditionally the basic medium for *Work* commercialization. They are produced from a *Manifestation*, from a *Fixation* of a *Performance* or from another *Instance*. Therefore, these are the *theme* of the *Copy* verb as shown in Table 2. Another example of *case* role characterization for the *Copy* action is *result*, which has an *Instance* as expected value as this item employed for the physical commercialization of works, e.g. a DVD.

Based on the previous building blocks, the central part of Figure 13 shows an example model for expression build using the proposed pattern as it is applied to the *Copy* action.

These kind of action patterns are also used to model licenses. Therefore, two additional verb concepts are identified and detailed using case roles: *Agree* and *Disagree*, as building blocks of a license. Figure 13 also shows a license for the *Copy* action. As it is shown, the *condition* case role is used in order to introduce a compensation for the agent that grants the copy action, a 3€ transfer from the granted agent.

Table 2: Copy case roles

Case role	Range	Cardinality
agent	Person (Natural or Legal)	1..N
theme	Manifestation OR Fixation OR Instance	1
result	Instance	1
pointInTime	e.g. ISO8601	1
location	e.g. ISO3166, URL,	1

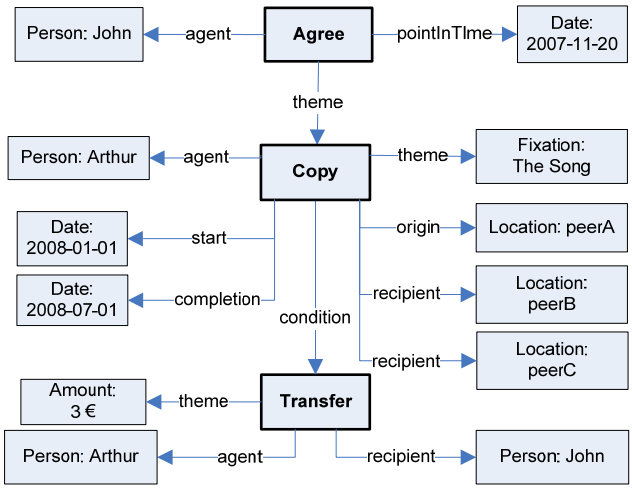

Figure 3: Model for an agreement on a copy action pattern plus a condition

The agreement *theme* corresponds to an implicit permission, i.e. the theme of an agreement is permitted. The *condition* relation corresponds to an obligation, i.e. in order to fulfil the theme action it is necessary to satisfy the pattern defined by the condition property object. Finally, it is also possible to model prohibitions using the *Disagree* verb concept and placing the prohibited action in the corresponding *theme*.

5.4.4 Implementation

A part from the Copyright Ontology conceptualisation presented in the previous section, there is an implementation based on the Web Ontology Language (OWL). This implementation can be used to develop semantics-powered Copyright Management systems based on ontology reasoning [22]. Reasoners can be then used to provide:

- **Consistency checking**: detect if a set of licenses is consistent and thus it is authorising a set of actions that is not empty.
- **License checking**: based on the subsumption service provided by the reasoners it is possible to detect how licenses interact, for instance detecting licenses that completely include other licenses making them not necessary. It is also possible to perform license search based on

example licenses, so it is possible to detect if there is a license that would provide the functionality of a fictitious one.

- **Usage checking**: based on the reasoned instance classification service to detect if a particular action, for instance copying a media fragment, is authorized by a set of licenses. This feature is based on the ability of reasoners to check if the action satisfies all the restrictions set by a license. For more details about this feature see [18].

The Copyright Ontology has been applied with DDEX data, used as the way to communicate the rights associated to assets along the value chain. However, DDEX data just model deals, which capture the kind of actions that can be performed with a particular asset or fragment in a given time and place, without capturing the existing copyright agreements that might make those particular actions legal or not.

Consequently, if there is a dispute because an asset or fragment is detected under a conflicting use, it is difficult to determine if there is legal support to claim compensation. Many different DDEX deals might be involved and even the agreements related with the involved assets might have to be manually checked. This is not feasible if the amount of disputes to deal with grows. Table 3 presents a DDEX example on the left.

Table 3: DDEX data example (left) and (right) the corresponding model based on the Copyright Ontology with a reference to a media fragment

```
<Deal>
    <DealTerms>
        <CommercialModelType>PayAsYouGoModel
            </CommercialModelType>
        <Usage>
            <UseType>OnDemandStream</UseType>
            <DistributionChannelType>Internet
                </DistributionChannelType>
        </Usage>
        <TerritoryCode>ES</TerritoryCode>
        <TerritoryCode>US</TerritoryCode>
        <ValidityPeriod>
            <StartDate>2013-01-01</StartDate>
        </ValidityPeriod>
    </DealTerms>
</Deal>
```

```
<http://media.com/deals/3> owl:Class, msp:Deal;
    co:start "2013-01-01" ;
    co:aim ddex:PayAsYouGoModel ;
    owl:intersectionOf (
        ddex:OnDemandStream
        [ a owl:Restriction ;
            owl:onProperty co:theme ;
            owl:hasValue
                <http://my.tv/video.ogv#t=60,100> ]
        [ a owl:Restriction ;
            owl:onProperty co:medium ;
            owl:someValuesFrom ddex:Internet ]
        [ a owl:Restriction ;
            owl:onProperty co:location ;
            owl:someValuesFrom
            [ a  owl:Class ;
                owl:oneOf (territory:ES territory:US)
]
        ])
```

Parts of DDEX has been mapped to the Copyright Ontology, so DDEX data can be converted into Semantic Web data based on this ontology. This way, many different deals can be combined and taken into account to decide a dispute. Moreover, they can be also combined with other sources of information, like existing agreements once they are also formalized using tools like MediaMixer Rights Builder User Interface described in [17].

Once combined, it is possible to use reasoners to easily implement the process of checking if the dispute being considered is supported by any of the existing deals or agreements. To do that, deals are modelled as OWL classes based on the intersection or union of restrictions on the deal action and its case roles, as shown on the right of Table 3. These expressions define the set of actions that are authorized by a deal. For instance the reasoner can be used to check if an intended use is inside the set defined by the OWL class (and consequently it can be interpreted as supported by the deals and agreements under consideration) or if it is matched by a disagree (not allowed even if possibly matching some agreement).

6. Users

6.1 ABC Australia

6.1.1 Introduction

The ABC's metadata working group promotes information management principles as a means of making both programs and content accessible, shareable and reusable both within the organisation and by audience, consumers, businesses, industry and other stakeholders. Underpinning effective content management is the management of its intellectual property rights, and since 2011 one of the priorities of the group has been research and investigation into rights standards. Since 2011 some of the ABC work in this area has included:

- Comparative review of rights standards using semantic methodologies;
- Preliminary evaluation of *RightsDraw*, PrestoPRIME's proof of concept prototype of a rights management system.

6.1.2 Comparative review of XML based standards

In 2011 the ABC's scan of rights standards highlighted the following ones, all with formal documentation in the form of an XML Schema:

- MPEG-21 Part 5 Rights Expression Language and the associated MPEG-21 Part 6 Rights Data Dictionary [MPEG-21 REL & RDD];
- ODRL v1.1 and the associated ODRL Data Dictionary [ODRL 1.1];
- ODRL v2.0 and the associated ODRL Data Dictionary [ODRL 2.0] (ODRL version 2.0 was issued during the course of the review process);
- METSRights.

Of additional interest to us was the Copyright Ontology (see § 5.4), that is not a standard and not XML Schema based.

The working group used two methods for comparing these candidate standards: a semantic metadata mapping procedure based on the draft ISO semantic metadata mapping procedure (ISO/IEC WD 20943-5) and a semantic web ontology use case evaluation process.

6.1.3 ISO semantic metadata mapping procedure

Using the semantic metadata mapping procedure we were able to identify common object classes (based on XML Schema Complex Types) and properties (based on XML Schema Elements and Attributes) and use these as the basis of our comparative review. The procedure used the simplest metadata schema, METSRights as the aggregating standard. Complex Types and XML Elements and XML Attributes from the other candidate standards were mapped to METSRights where any mapping relation (broad match, narrow match etc.) could be declared. Identification of mapping relations were primarily based on the lexical definitions, but also considered both elements and attributes as well as an elements range of permissible values. Table 4 shows the grouping of common objects, while Table 5 shows an example of the mapping of elements and attributes using METSRights Context object as the mapping base.

Table 4: Mapping of common objects

METS Rights XML Complex Types	**ODRL 1.1 Core** XML Complex Types	**ODRL 2.0 Core** XML Complex Types	**MPEG-21 REL** XML Complex Types
[item the subject of the METSRights statement]	Asset	Asset	Resource
RightsDeclare	Rights OfferAgree	Policy	License
Context	Permission	Permission	Grant
Permissions	Permission	Action	Right Act
Constraints	Requirement Condition Constraint	Duty Constraint	Condition DcConstraint
RightsHolder	RightsHolder	Party	Issuer
UserName	Party	Party	Principal
RightsHolderContact			
		Prohibit	

Table 5: Mapping of properties based on common object – mapping base METSRights Context

METS Rights XML Element|Attribute **Context**	**ODRL 1.1 Core** XML Element|Attribute	**ODRL 2.0 Core** XML Element|Attribute **Permission**	**MPEG-21 REL** XML Element|Attribute **Grant**
contextId			
permissions		action [mappingRelation]	right [mappingRelation]
username		party [broadMatch]	principal [mappingRelation]
constraints		duty [broadMatch] constraint [broadMatch]	condition [mappingRelation]
rightsHoldersIds		party [broadMatch]	
contextClass [Permissable values METS Context]			
otherContextType			
		Asset	resource
			delegationControl
			encryptedGrant
			forAll

While the mapping procedure ultimately proved a crude approach to the problem it generated the following high-level insights into the differences between the candidate XML based standards:

- **Machine actionable rights**. The METSRights statement is not designed to be machine actionable. In contrast, MPEG-21 REL is designed to produce a fully actionable license. ODRL 1.1 and ODRL 2.0 are partly machine actionable expressions as further work is needed to define context specific values for this to occur, for example nomination of a suitable Asset model and identification scheme.
- **Asset centric models versus rights centric models**. In METSRights rights information is structured as factors of a physical or digital item. In contrast, in ODRL 1.1 Asset is a factor of the OfferAgree class, while in ODRL 2.0 and MPEG-21 REL Asset or Resource is a factor of the Permission or Grant class.
- **Constraints**. Constraints are complements to, rather than modifiers of the Permission object

class in METSRights. In contrast, constraints are modifiers of the Principal object in MPEG-21 REL, of the OfferAgree object in ODRL 1.1 and most flexibly, of each of the Permission, Prohibition and Duty objects in ODRL 2.0. See comparison given in Figure 14.

Conclusion

Based on the semantic mapping procedure, ODRL 2.0 was identified as the standard of interest being rights centric; machine actionable with the extensibility to incorporate ABC asset models and broadcaster and ABC specific rights vocabularies; and offering the greatest flexibility for structuring permissions, requirements and constraints.

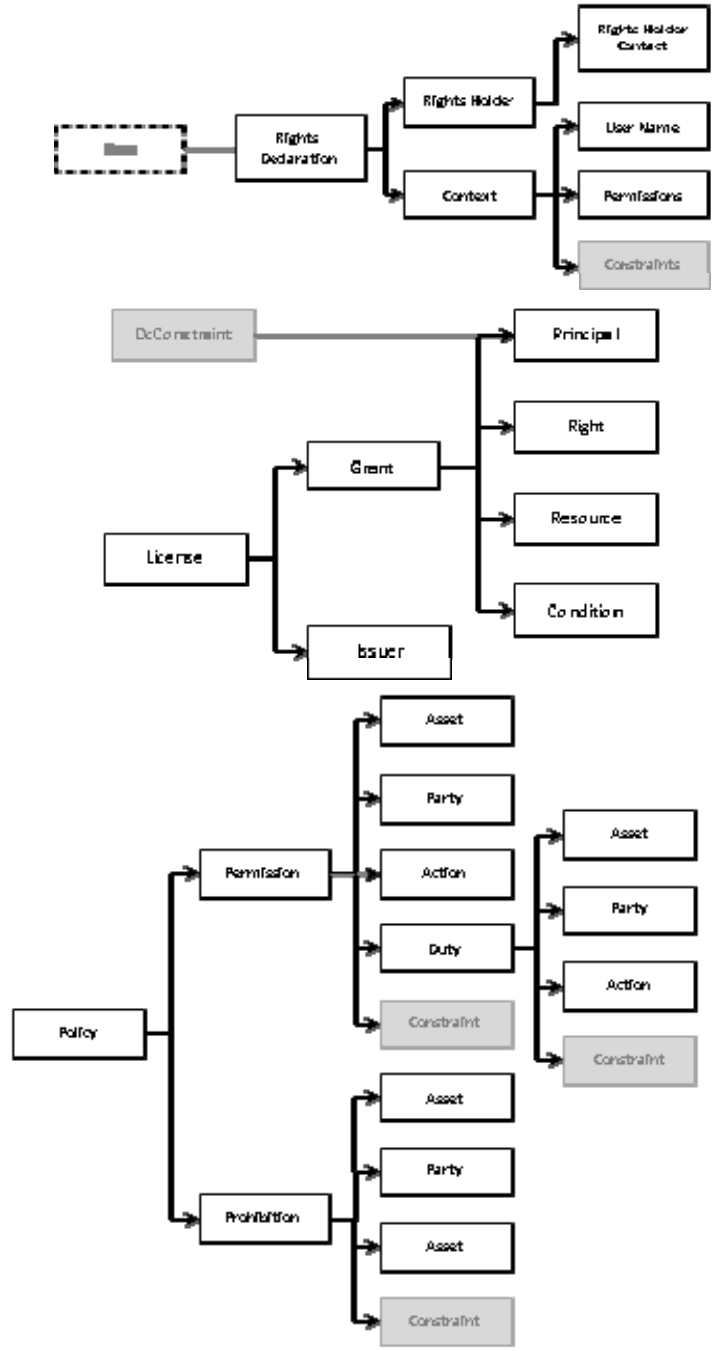

Figure 14: Comparison of constraints in MetsRighs (top), MPEG-21 REL (middle) DRL2.0 (bottom)

6.1.4 Semantic web technologies use case evaluation process

In line with work done previously, the ABC aimed to model its use cases using semantic technologies.

At the time of this evaluation the Copyright Ontology (5.4) was available as an OWL ontology, while OWL ontologies for MPEG-21 REL, ODRL 1.1, and ODRL 2.0 were developed using a subset of the XSD2OWL rules outlined in the ReDeFer project (http://rhizomik.net/html/redefer/). This task proved a considerable hurdle, as the simple rule based translation of the XML schema to OWL made it difficult to normalise the semantics across the standards, and significant manual intervention was required in order to produce comparable ontologies for evaluation.

The next step was to map the use cases to the ontologies. The focus of the analysis was on the so called 'back end rights' and the three main use cases were drafted covering a network of online publication activities for television and radio programs, music, events and news.

Television Use Case

My Place Series 2 is a children's television programme made up of 13 x 24 min episodes, produced by Matchbox Pictures P/L. Copyright in the series is shared between Screen Australia, Screen NSW, Screen Tasmania and Matchbox Pictures. The ABC has entered into a license and distribution agreement with the producer enabling it to exercise certain rights in the programme.

- In September 2010, Commercial began planning for its use of the online rights. To accompany the premier of the series, they would like to distribute *My Place Series 2* via iTunes making it available for consumers to buy and download.
- In April 2011, following delivery of the first episodes, ABC3 decided they would like to use the behind the scenes, rehearsal footage, and cast interviews to promote the first run of *My Place Series 2* on the website.
- The first episode of the series, *My Place, 1878: Henry*, premiered on 26 June 2011 on ABC 3. Television plan to stream each episode of the series on iView following the premiere broadcast on ABC3 and ABC1. In association with the broadcast, ABC3 would also like to make a low res WMV file of the episode available for audiences to download from the ABC3 website.
- Having been on air for a couple of weeks, Content Licensing are approached by the Historic Houses Trust who would like to license clips from *My Place Series 2* for use in a mobile app they are developing to accompany a new exhibition on the history of Australian childhood that will be launched in 2013.
- Innovation are working with Education Services Australia to establish an ABC Education Portal to be launched in January 2013. They would like to know if they can link to all *My Place Series 2* episodes as they are published on iView as well as the *My Place* programme website.
- Finally, in July 2012 the 6th run of *My Place Series 2* was broadcast on ABC1, and streamed on iView for 7 days following broadcast. Due to a sudden change in the schedule, ABC3 would like to broadcast the 7th run of *My Place Series 2*, commencing mid-November 2012 and stream each episode on iView.

Box 5: ABC Television Use Case

The Television Use Case is given in Box 5. Figures 15, 16, and 17 show schematic overviews of the 'request' instances, and 'agreement' instances for the first part of the Television Use Case modelled with ODRL2, MPEG-21 REL, and Copyright Ontology respectively.

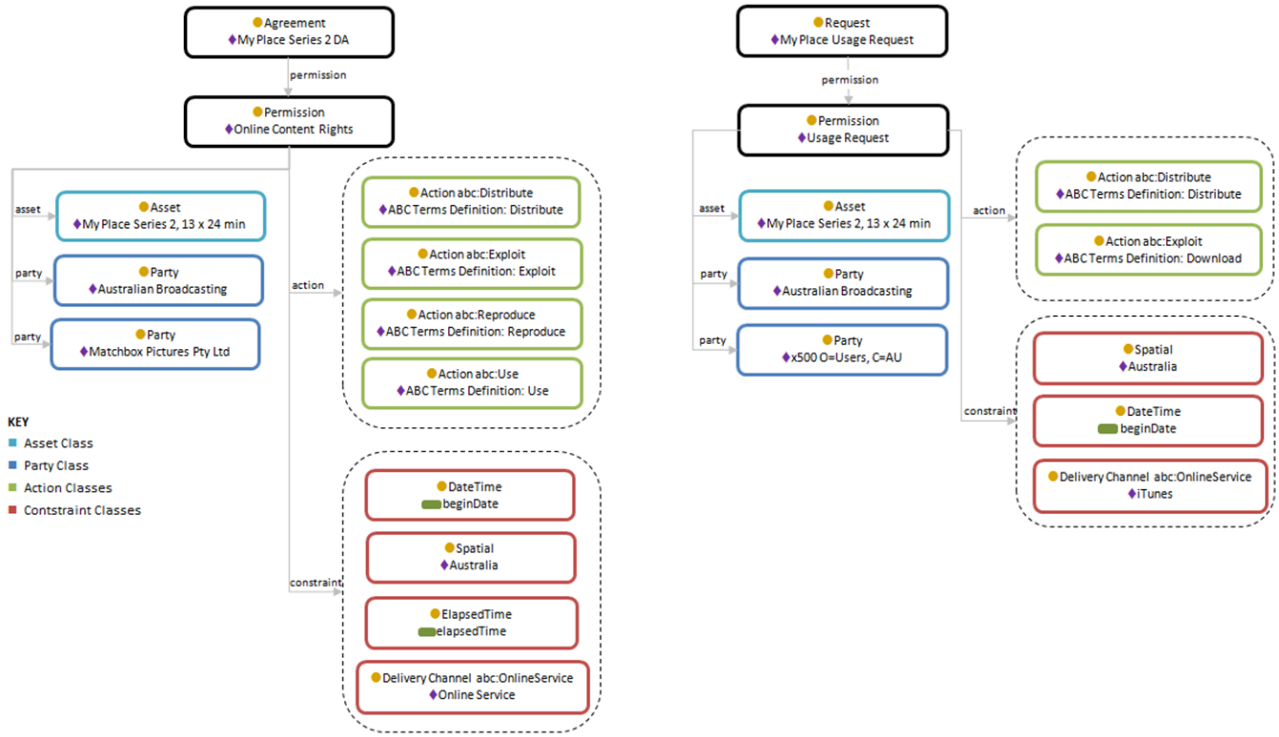

Figure 15: diagrams representing ODRL2 Agreement (left) & Usage Request (right) for "My Place"

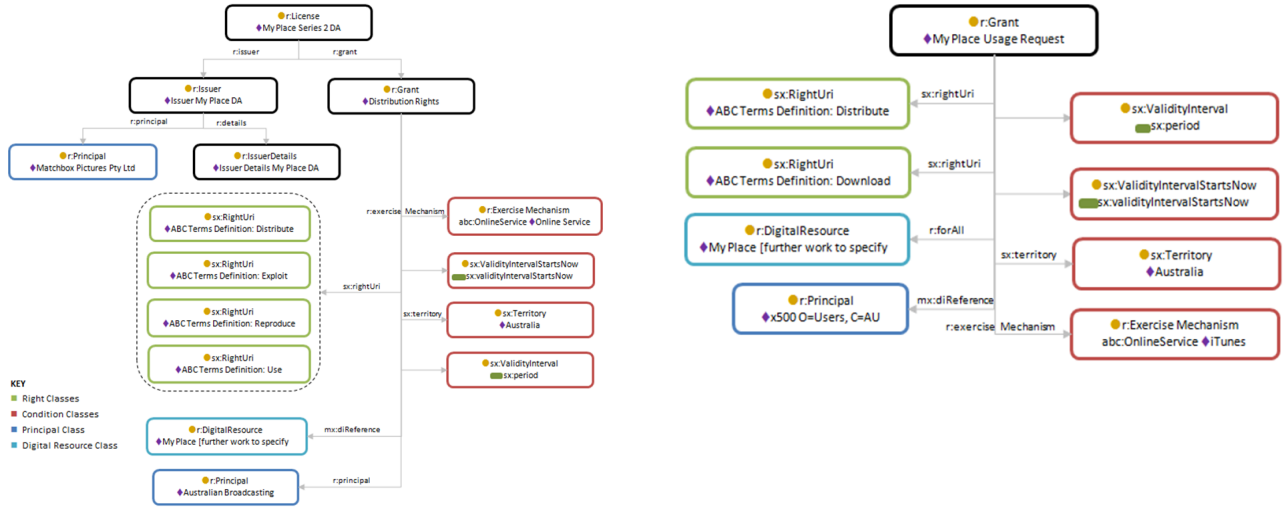

Figure 16: diagrams representing MPEG-21 REL Agreement (left) & Usage Request (right) for "My Place"

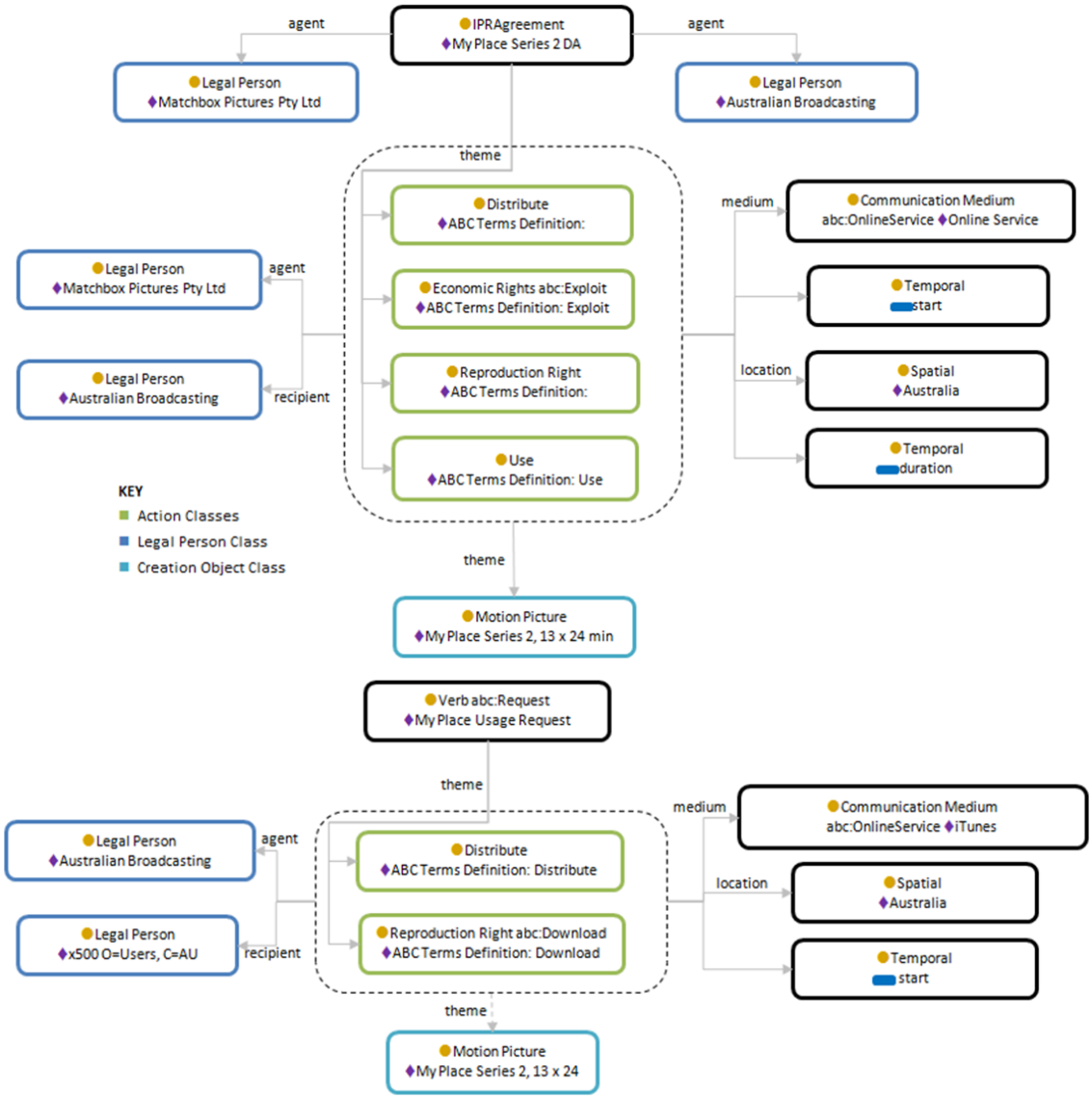

Figure 17: diagrams representing Copyright Ontology Agreement (top) & Usage Request (bottom) for "My Place"

The final step in the process was to produce the comparative evaluation of the ontologies. Having not found a suitable methodology for undertaking this process, a modified version of the ontology deficiency criteria [23] was applied. From the perspective of the use cases and ontologies, the evaluated criteria included:

- **Completeness**. Can each use case clause or term be mapped to the ontology?
- **Redundancy**. Is each use case clause or term mapped to exactly one or multiple ontology classes or properties?
- **Excess**. Can each ontology class or property be mapped to a use case term or entity?
- **Overload**. Is each class or property mapped to exactly one or multiple use case terms or entities?

An overview of the evaluation results for the My Place use case is shown in Table 6.

Table 6: Ontology evaluation for ABC "My Place" use case

	Representation Mapping		Interpretation Mapping
Partial	**Incompleteness**		**Excess**
	Agree term or clause → **ODRL 1.1** 7 terms or clauses had no mappings	Request term or clause → **ODRL 1.1** 1 term had no mapping	**ODRL 1.1** 12 classes|subclasses had no mappings
	Agree term or clause → **ODRL 2.0** 8 terms or clauses had no mappings	Request term or clause → **ODRL 2.0** 1 term had no mapping	**ODRL 2.0** 2 classes|subclasses had no mappings
	Agreement term or clause → **MPEG-21 REL & RDD** 9 terms or clauses had no mappings	Request term or clause → **MPEG-21 REL & RDD** 2 terms had no mapping	**MPEG-21 REL & RDD** 25 classes|subclasses had no mappings
	Agreement term or clause → **Copyright Ontology** 11 terms or clauses had no mappings	Request term or clause → **Copyright Ontology** 2 terms had no mappings	**Copyright Ontology** 46 classes|subclasses had multiple mappings
Ambiguous	**Redundancy**		**Overload**
	ODRL 1.1 → Agreement term or clause 1 term or clause had an ambiguous mapping	**ODRL 1.1** → Request term or clause 2 terms had ambiguous mappings	**ODRL 1.1** 6 classes|subclasses had multiple mappings
	ODRL 2.0 → Agreement term or clause	**ODRL 2.0** → Request term or clause 1 term had an ambiguous mapping	**ODRL 2.0** 5 classes|subclasses had multiple mappings
	MPEG-21 REL & RDD → Agreement term or clause 1 term or clause had an ambiguous mapping	**MPEG-21 REL & RDD** → Request term or clause 1 term had an ambiguous mapping	**MPEG-21 REL & RDD** 6 classes|subclasses had multiple mappings
	Copyright Ontology → Agreement term or clause	**Copyright Ontology** → Request term or clause 2 terms had ambiguous mappings	**Copyright Ontology** 1 classes|subclasses had multiple mappings

Conclusion

Based on the use case evaluation of the ontologies and applying the ontology deficiency criteria the preferred standard was ODRL 2.0.

However the evaluation process raised a number of issues in relation to the candidate standards which required further consideration:

- **Subordinate Rights Classes**. The superordinate 'rights' classes for example, Action, Condition, Duty, Constraint etc. worked well in each model for structuring the request and agreement instances. In contrast, the subordinate 'rights' classes extracted from the data dictionaries and vocabularies and used to provide the actual semantics for the rights, for example, the term and definition for 'distribute', compromised the evaluation process. For example, applying the Action, Duty, and Constraint type classes across the XML standards was necessarily based on the values specified in the ODRL and MPEG vocabularies yet these values would need to be heavily customised and extended for any implementation to accommodate the rights terminology used by the ABC.
- **Exclusions – Asset and Party**. Specification of both classes was excluded from the ODRL standards, and so to compare like with like the Asset and Party equivalencies in the other standards were necessarily excluded from the evaluation. While this suits the ABC's requirements in one sense as it provides the freedom for the rights model to plug in any 'asset' model in use by the ABC, the benefits of the Copyright Ontology's focus on Creation Objects and the Creation Process as the point of origin for copyright and therefore the whole chain of economic rights, was lost in the evaluation.
- **Patterns, containers, and inheritance**. These elements enabling complex rights chains to be structured, were not captured in the semantic mapping of the XML standards. While outside the scope of the rights model per se, their efficacy in any implementation made their absence from the ontology evaluation process a consideration.

As a result the working group made a recommendation that further work be undertaken to document and analyse additional ABC use cases using ODRL 2.0 (covering broadcast related rights,

legacy rights database mappings, news agreements etc.); draft terms for a local extension of the ODRL Common Vocabulary; and identify an appropriate Party and Asset model(s) – including the possibility of the copyright based Copyright Ontology creation model – for integration with a possible ODRL 2.0 implementation for our web content management system.

6.1.5 Preliminary evaluation of MPEG-21 MCO and *RightsDraw*

Since July 2013 the working group of ABC has been evaluating MPEG-21 Part 21 Media Contract Ontology [1] [MPEG-21 MCO] as well as RAI/PrestoPRIME's proof of concept rights management solution *RightsDraw*, [10] and [11].

Preliminary evaluation of MPEG-21 MCO compares favourably with ODRL 2.0 as a rights centric model, with the flexibility to handle both permissions and prohibitions, through the capacity to structure complex specifications actions, requirements and constraints. In contrast to the highly granular and non-broadcast industry specific set of terms in the ODRL Common Vocabulary, preliminary mapping of MPEG-21 MCO's Action and Fact vocabularies provide a near complete mapping to the ABC's standard license terms and definitions (see Table 7 and [5][6]), as well as the works, materials and rights covered by the Australian Copyright Act.

However while MPEG-21 MCO draws on the experience and requirements of a broadcaster user base, since 2012 development of IPTC's ODRL 2.0 profile RightsML, see § 5.3.3, has aimed to capture and represent the rights requirements of the news industry and thus addresses a significant and complex part of the ABC's business in gathering, producing and distributing news both via television and radio broadcast and online publication.

Table 7: Mapping of ABC standard license terms to MCO Action and Fact vocabularies

ABC terms	ABC Definition	MCO Action and Conditions (Facts)
Mobile Programme Rights	Means the right to, and the right to authorise third parties to, reproduce, use, distribute and exploit the Programme, whether in audio or audio-visual form, in whole or in part, either alone or with other content, by means of any mobile telephone service, delivered by any technology now known or discovered in the future, whether presented interactively or On Demand or on a scheduled basis or otherwise, whether free of charge or for payment of a fee or subscription, or for sale or hire or otherwise, and includes where users are permitted to download, make and store electronic reproductions of the Programme on a permanent basis, exercised by means of any mobile telephone service (including but without limitation, download to own rights and download to rent rights).	**Action** mco-ipre:ExploitIPRights **Facts** mco-ipre:MobileTelecommunication Technology
Online Programme Rights	Means the right to, and the right to authorise third parties to, reproduce, use, distribute and exploit the Programme, whether in audio or audio-visual form, in whole or in part, either alone or with other content, by means of any Online Service, delivered by any technology now known or discovered in the future, whether presented interactively or On Demand or on a scheduled basis or otherwise, whether free of charge or for payment of a fee or subscription, or for sale or hire or otherwise, and includes where users are permitted to download, make and store electronic reproductions of the Programme on a permanent basis, exercised by means of any Online Service (including but without limitation, download to own rights and download to rent rights).	**Action** mco-ipre:ExploitIPRights **Facts** mco-ipre:Internet

… cont.

Pay Per Use	Means the right to exploit the Programme by any licensed means where the Programme is delivered for payment of a fee solely relating to, and for the permitted use of, the Programme.	**Action** mco-ipre:ExploitIPRights **Facts** mco-ipre:Pay
Rental Rights	Means the right to exploit the Programme for hire or rent by any licensed means where users are permitted to receive a reproduction and/or communication of the Programme and/or to download, make and store electronic reproductions of the Programme on a temporary basis for private use only.	**Action** mco-ipre:Distribute **Facts** mco-ipre:Pay mco-ipre:Limited
Pay Television Rights	Means the right to communicate the Programme to the public in a linear form by any television service, delivered by any technology now known or discovered in the future, delivered for payment of a fee or subscription, including any television service provided on a scheduled, On Demand, pay per view or any other basis.	**Action** mco-ipre:CommunicationToThePublic **Facts** mco-ipre:Pay mco-ipre:Restricted mco-ipre:BroadcastTechnology mco-ipre:TelevisionDevice
Free-to-Air Television Rights	Means the right to communicate the Programme to the public by any form of free television broadcast by any technology now known or discovered in the future including delivery by means of terrestrial transmitter, satellite, cable, fibre optic or microwave distribution.	**Action** mco-ipre:CommunicationToThePublic **Facts** mco-ipre:FreeOfCharge mco-ipre:BroadcastTechnology ipre:TelevisionDevice
Clip Licensing Rights	Means the right to, and the right to authorise third parties to, license the copying and incorporation of parts of the Programme of any length in other audio and audio-visual productions, and to license the exploitation of those other productions in any way now known or discovered in the future.	**Action** mco-ipre:MakeExcerpts
Free Website Content Rights	Means the right to communicate the Website Content to the public in audio or visual or audiovisual form, whether linear or interactive, by any ABC Free Online Service delivered free of charge whereby a user is permitted to download, make and store an electronic reproduction of the Website Content or part thereof, where such reproductions may be stored for the user's own private, personal and domestic use only, and the right to authorise third parties to communicate the Website Content in connection with such ABC Free Online Service, including on a scheduled or On Demand basis.	**Action** mco-ipre:CommunicationToThePublic **Facts** mco-ipre:FreeOfCharge mco-ipre:Internet *'Service condition required'*
Download To Own	Means the right to exploit the Programme for sale by any licensed means where users are permitted to download, make and store electronic reproductions of the Programme on a permanent basis for private use only.	**Action** mco-ipre:Distribute **Facts** mco-ipre:Pay mco-ipre:Download
Free Download Rights	Means the right to communicate the Programme to the public by any ABC Free Online Service delivered free of charge whereby a user is permitted to download, make and store an electronic reproduction of the Programme or part thereof, where such reproductions may be stored for the user's own private, personal and domestic use only, and the right to authorise third parties to communicate the Programme in connection with such ABC Free Online Service, including on a scheduled or On Demand basis.	**Action** mco-ipre:CommunicationToThePublic **Facts** mco-ipre:FreeOfCharge mco-ipre:Internet mco-ipre:Download *'Service condition required'*

… cont.

Free Streaming Rights	Means the right to communicate the Programme (including by means involving reproduction or caching of data files in the course of such communication only and without a permanent copy being made) to the public in a linear form by any ABC Free Online Service delivered free of charge and the right to authorise third parties to communicate the Programme in connection with such ABC Free Online Service, including scheduled, On Demand, and any other system of delivery of an Online Service.	**Action** mco-ipre:CommunicationToThePublic **Facts** mco-ipre:FreeOfCharge mco-ipre:Internet mco-ipre:Webcasting OR mco-ipre:OnDemandStreaming *'Service condition required'*
Free-to-Air Television Run	Means an exercise of the Free-to-air Television Rights by way of: (a) an analogue run available on ABC1 and a simultaneous digital run available on any or all ABC digital channels; or (b) a digital run available on an ABC digital channel; or (c) a digital run available on an ABC digital channel and a simultaneous digital run available on any or all other ABC digital channels; (d) a simultaneous stream of any run by way of the Free Simulcast Streaming Rights, and where a run covers an area that has wholly or partly different local time, the run may be delayed in an area to account for different local time but completion of runs is at the ABC's discretion.	**Action** mco-ipre:CommunicationToThePublic **Facts** mco-ipre:FreeOfCharge mco-ipre:BroadcastTechnology mco-ipre:Run *'Service or channel condition required'* AND **Action** mco-ipre:CommunicationToThePublic **Facts** mco-ipre:FreeOfCharge mco-ipre:Run mco-ipre:Webcasting
Website Creation Rights	Means the right to create a Website relating to the Programme for publication on an Online Service delivered by any technology now known or discovered in the future, whether delivered free of charge or for payment of a fee or subscription.	**Action** mvco:CreateWork mvco:MakeManifestation mvco:Produce mco-ipre:CommunicationToThePublic
Free Simulcast Streaming Rights	Means the right to exercise Free Streaming Rights in the Programme simultaneously (subject to any delay caused by technical constraints) with the exercise of the Free to Air Television Rights in the Programme.	**Action** mco-ipre:CommunicationToThePublic **Facts** mco-ipre:FreeOfCharge mco-ipre:Webcasting mco-ipre:Internet mco-core:ActionStarted (related to free-tv) *'Service or channel condition required'*

Initial evaluation of the structuring of the ABC's *My Place* use case, our standard license agreement terms, rights terminology in use across a number of ABC databases, as well as the terms and conditions in collective rights agreements, for example the agreement with the Australasian Mechanical Copyright Owners Society Limited for the use of music in ABC radio and television broadcasts, in *RightsDraw* has been positive. Figures 18, 19, and 20 show the results of modelling using MCO and *RightsDraw* of the *My Place* license agreement terms as follows:

Agreement Summary. Matchbox Pictures Pty Limited grants the Australian Broadcasting Corporation the following rights in the Production in the Territory during the Term:

a. twelve exclusive Free-to-Air Television Runs per year of the ABC Licence Period. The ABC will use best endeavours to broadcast a minimum of 4 Runs per year of the ABC Licence Period on ABC 1

b. Exclusive Free Download Rights (only on ABC Online which must be Geoblocked), and transmitted at Low Resolution only, for 14 days only such 14 day period to commence on a date to be determined by the ABC either prior to or on the date of the First Run of the first episode

c. Exclusive Free Streaming Rights (only on ABC Online, which must be Geoblocked), for 14 days

only in each year of the ABC Licence Period such 14 day period to commence on a date to be determined by the ABC

Some details have not been modelled to keep the graphs simpler. The condition constraining for "low resolution" is not currently defined in MCO (see Outlook and proposed actions in § 9).

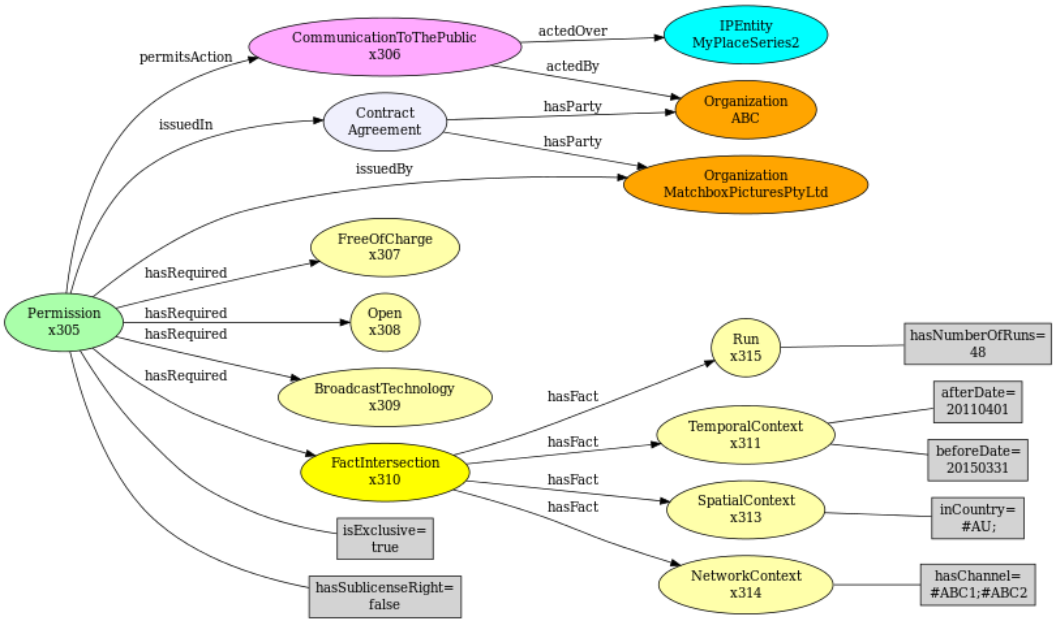

Figure 18: diagram representing Permission for the overall 48 free tv runs of "*My Place*"

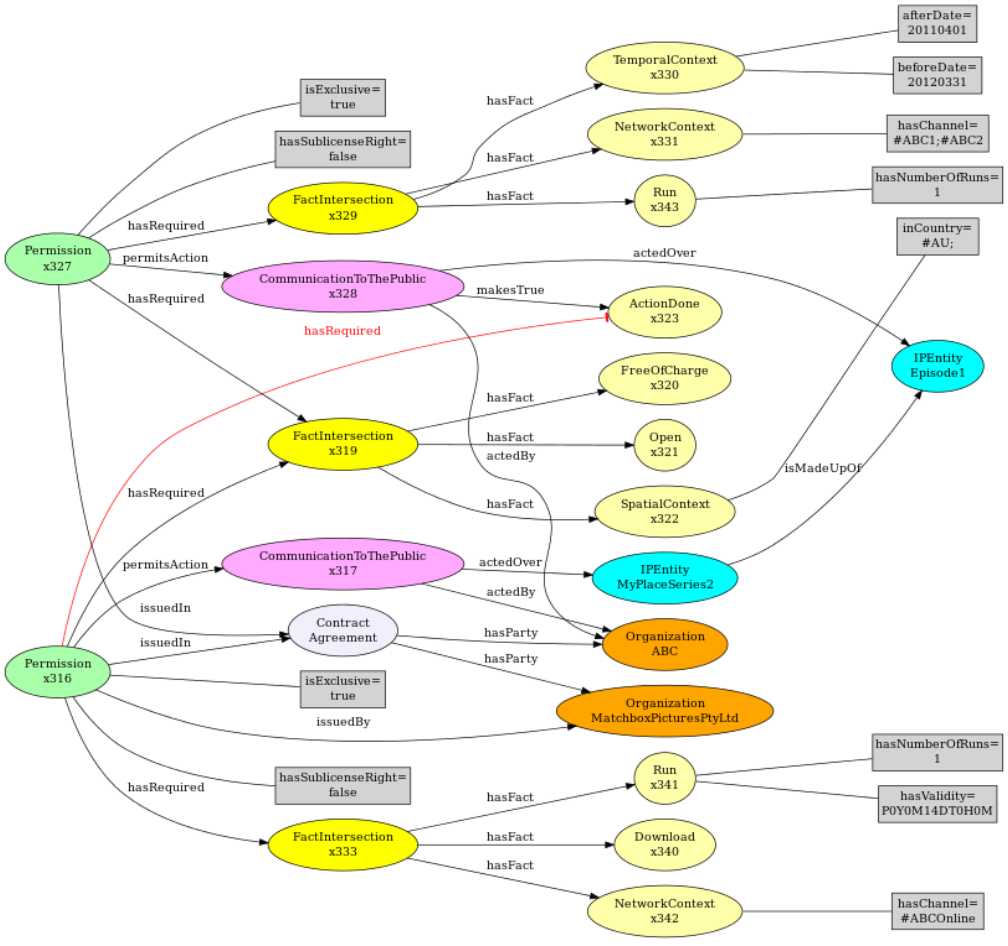

Figure 19 – diagram representing free download rights for "*My Place*" in 14 day period prior to the first run of the first episode, whose permission is also presented.

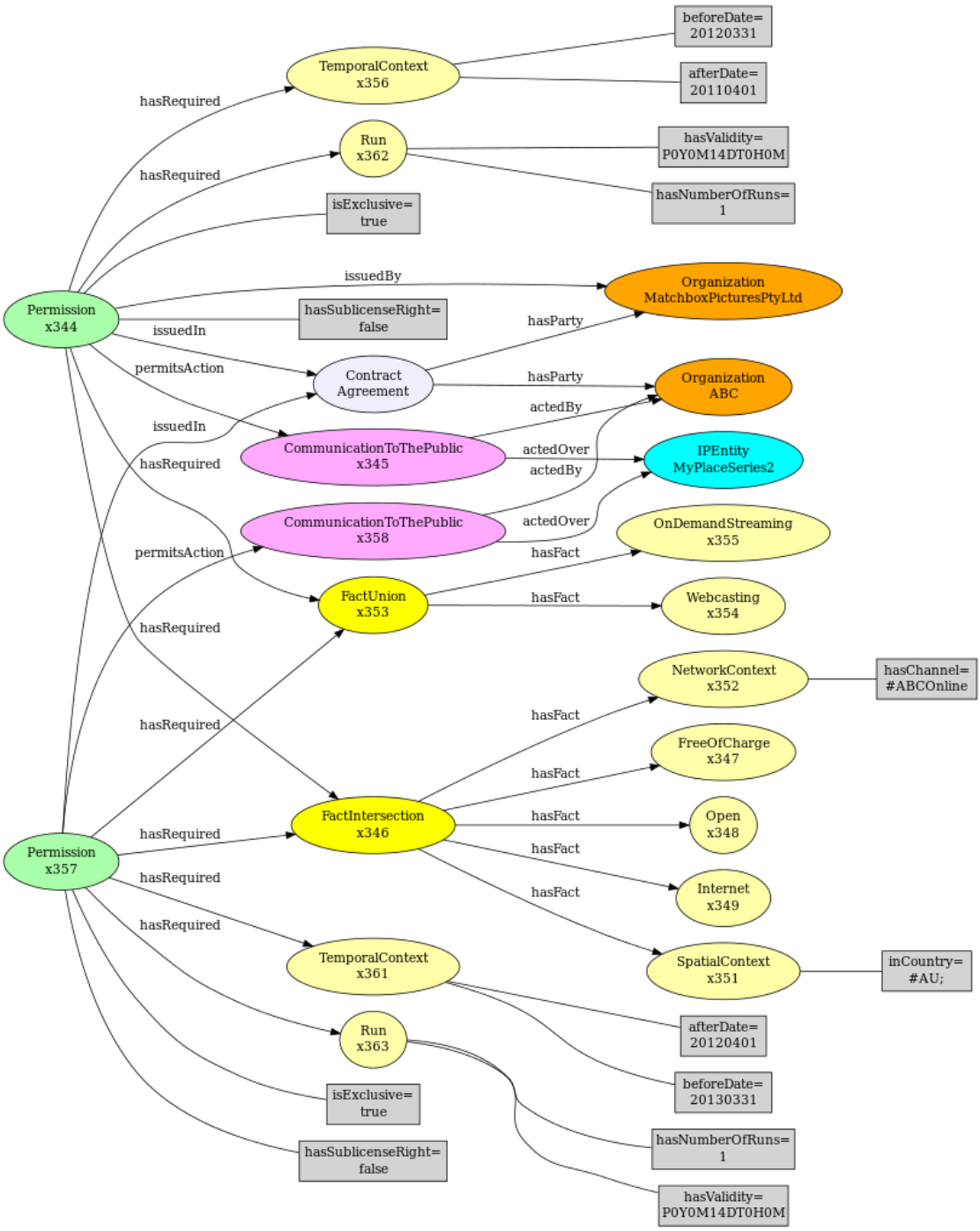

Figure 20 - diagram representing the permissions for free streaming rights of "*My Place*", for a 14 day period in each year (only two permissions for two years are presented).

6.2 Deutche Welle

Deutche Welle (DW) set up a Rights Management project for dealing with the following case.

DW receive content items from news agencies which grant them some rights and re-use the content for producing stories which are intended for distribution over various possible channels world-wide.

DW have a general agreement with their content providers (the news agencies) covering the received content. However different permissions or constraints which diverge from the general agreement can exist on individual content items.

So DW set up an automated rights clearance process based on the single produced story and aiming

at evaluating the rights for each possible exploitation channel. The results of such checks are of type “traffic light”, having also a possible “yellow light” when human evaluation is considered necessary.

Basically the process evaluates only the general agreements and not individual exceptions, although it is capable of detecting when the exceptions exist.

DW is considering formats for representing rights information, possibly including ODRL as a rights expression language, in order to verify if they are helpful to improve and complete the implementation of their rights clearance process.

The basic cases are:

case	note
Initial production of the story	new rights information
source material which includes third-party material whose rights differ from that of the rest of the item	actually provider used third party material and the rights can be fragmented already on the source item
subsequent re-use in form of a simple repeat on the same distribution channel (e.g. broadcast TV)	number of runs
subsequent re-use by distribution in a different format via another channel e.g. as a podcast	to understand if this use is depending on the first one (cannot happen without the first use)
subsequent re-use where the content in whole or part is spliced into another story altogether	possible constraint on transformation or editorial context
Language, geographical, or temporal restrictions	territory can be related to satellite prints

DW has a set of dynamic management cases where rights change over time:

case	note
re-purchase or extension of rights for an existing story	purchasing additional rights
revision of material in a story where rights change	working on content in order to have it matching the rights (removing parts for which rights are no longer sufficient for the target exploitation)
logging of rights usage	this is relevant to sub-sequent re-use,if there are conditions on the number of runs;
in addition to possible obligations related to such logging.	
comparative costing of using various material	this is relevant if the rights information is completed by economical information (pricing);
not to be confused with conditions on access policy for the final users (free-of-charge vs. pay).	
statistics of material used which would be subject to costs	this is relevant if the rights information is completed by economical information (pricing);
statistics on which sources are used most	this is not related to rights
statistics on which sources have most restrictions	
distribution controlled automatically according to availability of rights	this is just completely automated rights clearance

Other more abstract interests are:

case	note
comparison of a set of real rights with some ideal pattern	could say if a real set in more or less restrictive than a reference one
comparison of two different sets of real rights to determine if there has been a change	could say if the newer set is more/less/equally restrictive that the older one
creating “Templates” for filtering, replication, and comparison	analysis about identification and definition of most useful reference patterns for rights comparison

6.3 NRK

NRK identified the needs about rights presented in this section.

Generally NRK need to hold information on both rights holder and granted. Name and address information, as supported in EBUCore [31] are considered suitable.

Rights must take into account the target territory, time period, number of broadcast, medium and device.

Besides they NRK state the need for having a placeholder for special info, only valid for one contract.

6.3.1 Radio and TV needs for rights

Table 8: Needs on specification of constraints related to linear rights

Constraints on linear rights	
Territory	native, Nordic, Europe, the World (meaning without any exceptions)
Time period	restricted (indefinite number of repeats over a specific time period) or unrestricted
Number of broadcast	restricted or unrestricted

Table 9: Needs on specification of constraints related to non linear rights

Constraints on non linear rights	
Devices	no restrictions
Territory	geoblocking or no geoblocking
Time period	restricted or unrestricted - when series, the non-linear rights must run after the last episode is broadcast, for the whole series
Technology	streaming, download, off-line

6.3.2 Cross publishing

TV-sound can be transmitted on radio.

On demand periods refer to both TV and radio, starts running after each primary transmission. When we achieve new, restricted time periods, these must run after each linear broadcast.

There is also a need for rights to publish directly to non-linear devices (Internet, mobile, etc) without first publishing on TV or radio. The non-linear rights above will apply here.

Typical contracts are generally complex and extensive - usually from 3 to 10-15 or more pages. They will often contain different provisions, but will generally cover the rights above.

6.4 RAI

6.4.1 Introduction

In the last years RAI have been strongly engaged in activities related to audiovisual rights, in particular in the frameworks of: PrestoPRIME project [24], MPEG-21 standardisation [28][29], and currently in Presto4U project [25]. The scope of such activities ranged real contract terminology, rights modelling, standard format for representing rights, software tools and solutions supporting rights management.

In PrestoPRIME RAI was leading a task on rights modelling, with following public outcomes:

- Glossary of rights [30] – The intent of which was to provide the definition of a broad list of term, commonly used in the negotiation of rights on audiovisual content.
- Common Rights Ontology [4] [9] – After an evaluation work on rights standards and technologies, this deliverable defined a rights ontology as an extension of MPEG-21 Media Value Chain Ontology. This work was contributed back to MPEG-21 for standardization and was reflected in both Contract Expression Language (CEL) and Media Contract Ontology (MCO). From the comparison between REL and MVCO, the latter was eventually selected as the starting point. While REL licenses are mainly intended to be authorised, MVCO permissions serve well as contract representation. REL was found less flexible, such as for expressing bans and obligations, against MVCO greater expressivity. OWL was also considered more interesting than XML for the instances being expressed in the same language than the model and the implications of this fact in logical processing and reasoning.
- Proof of Concept Rights Management System [10] - For testing the ontology we first developed a tool for creating rights documents, presenting them graphically and making some rights comparison operations. This was named "*RightsDraw*". This tool was then revised to become a proof of concept rights management system. It is made of a set of services for handling the information on audiovisual rights in various stages of their life-cycle. In particular it provides components for creation, presentation, and editing of rights documents, for making indexes of rights and rights comparison, for formulating queries and for presenting the query results to its users, for managing import and export operations involving the users and or other services. *RightsDraw* [11] has been maintained all along MCO standardization process and it is released under Affero GPL v3.0 and can be found at http://www.crit.rai.it/EN/attivita/opensource/ or https://github.com/prestoprime/rightsdraw2.

In the MPEG-21 framework RAI firstly contributed by proposing to extend MVCO with the PrestoPRIME rights ontology, but this effort resulted in contributing to both CEL [3] and MCO [1]specifications, in particular regarding the complex constraint mechanisms, defined in the Core parts, and to the IPRE extensions. Specifically to MCO, RAI contributed also to the MPEG-21 Reference Software and to the MCO Corrigendum of 2014.

6.4.2 Use cases

The questions addressed were:

- How rights information on an AV work should be prepared for submission to a preservation system, or for updating the same rights information set as a consequence of some new rights negotiation.
- Representation of rights information taking into account all the required relationships between rights and the timeline of the AV entity.
- How to support rights clearance in case of AV entities created with the re-use of pre-existing

[4] The Ontology was carried out by RAI, Eurix and the DMAG of Universitat Politecnica de Catalunya (UPC)

materials and how to support, from the rights perspective, the re-use of Archive material for delivery to content creators.

- How the information on rights can be supported in search & retrieval activities.
- How the rights information originated by various organisations can be shared or compared.

The following cases represent significant examples.

Case 1

A RAI producer/director is working at a documentary on "Chinese Emperors" to be produced as a Home Video. He would like to use an excerpt of the TV movie "Marco Polo" (ed. 1988, director: Giuliano Montaldo, actor: Ken Marshall - Marco Polo). He locates this TV movie in the RAI Archive but before using it he has to know if the Archive holds the proper Video Rights. The rights-management-system provides him with the current rights situation. If the result is positive for his purposes, he asks for the delivery of material; else he may identify the rights holder for the purchase of a license to use or even decide not to use this material and seek for something alike.

Case 2

A producer needs some clips of an European city to produce a internet quiz (On the web site of the Archive) "Name This Town!". In the Archive there are many shots of European cities but only for a few of them the Archive holds the rights for exploitation via the internet. So he sets content information and rights information as parameters of the query in order to get only those clips which refer to the given city, and for which the archive holds the rights that he needs.

Case 3

A **professional user** (e.g. video producer) wants to make a documentary on "1968".

He makes some research and finds a lot of archive materials: photos, books and audiovisual material. He has interest in three audiovisual documents about "The Prague Spring", "The night of the Barricades" (12-13 May, Paris) and "The Battle of Valle Giulia" (1 march, Rome).

These materials are located in two different archives (Archive#1 and Archive#2). The user contacts the archives and asks for the material and the related rights to make a documentary. He informs the archives (sales and commercial rights department) that he wants to deliver this documentary via "TV broadcast" and "Internet".

If the meaning of the rights definitions were common to all the parties, it would be possible for the User to get materials from various sources with compatible licensing terms; otherwise the continuation of the scenario would be the following:

- Asking for "TV broadcast"-rights, in his understanding the User wants the rights for the analogue or digital transmission by terrestrial, cable and satellite including transmission of signals by closed circuit and video on demand. The "Internet" includes for him Internet streaming and the download from web to mobile device (e.g. podcast).
- For the Sales and Commercial Rights Department of Archive#1 the definition of **TV broadcast is:**

analogue or digital transmission, broadcast or exhibition of visual images intended for reception by conventional domestic or home television excluding video on demand. They include in "TV broadcast" only linear transmission.

Internet is a particular kind of a Multimedia on-line rights and it includes streaming and download service.

- For the Sales and Commercial Rights Department of Archive#2 the definition of TV broadcast

and Multimedia is:

TV broadcast means the analogue or digital transmission, broadcast or exhibition of visual images intended for reception by conventional domestic or home television. The transmission can be by terrestrial, cable and satellite including transmission of signals by closed circuit and video on demand. **Internet** right includes only streaming service but **does not include download** on PC or any other device.

On the basis of those different definitions the two commercial archive departments answer to the user that they will sell him the material together with the rights for "TV broadcast" and "Internet". User and archives sign a contract agreement and the user produces the documentary.

When the user offers the documentary on VOD services, the Archive#1 (holder of the rights on a part of contents) forbids the use of their archive material on VOD. (The user must require separate licensing arrangements for offering VOD. He needs to acquire the right of making available to the public-

When the user offers the documentary on Internet Download services, the Archive#2 (holder of the rights on a part of contents) forbids the use of their archive material via this way.

The user infringement is due to the fact that the two archives and the user don't have a **shared definition of exploitation rights** for the basis of their negotiation.

Case 4

From the analysis of a narrative contract RAI is granted, with exclusivity, to act free broadcasting of some AV-Work ("the Programmes"), for a maximum of 16 "runs", during the license period (dates given), in the Italian language version in Italy, Vatican City, Republic of San Marino, Malta, and the Principality of Monaco, by a number of specified means, corresponding to general broadcast technology.

Moreover it is specified that "each run in any week shall consist of no more than 5 transmissions within a 7 day period, commencing upon first transmission".

Eventually the contract add that "it is hereby understood that RAI is entitled to VOD and online multimedia rights solely for the broadcasting of the programmes starting 48 hours from the first broadcast and for the following 7 days, for the purpose of providing its so-called TV Catch-Up service".

Here we have two peculiarities:

- the definition of "run" is flexible, allowing a number of repletion within a time window;
- the rights to provide the Catch-Up TV service are actually depending on the use of the main "free-tv" rights.

Case 5

RAI is partner of a co-production with other partners. Such "consortium" owns all the exploitation rights on the result of the production, but the consortium itself is neither intended for acting such exploitation nor for trading the rights . However, at the beginning, those rights are not divided among the partners with the results that RAI can state about owning a percentage of the rights.

Without having the 100% of use rights no exploitation is possible. RAI will be obliged to negotiate rights with its partners in order to get 100% of use of some rights, for instance for free-TV in Italy. From the negotiation the partners might anyway retain a percentage on the income from the exploitation.

Case 6

The fiction "Il commissario Montalbano" is made up of 24 TV movies, resulting from 7 different co-productions for each of which there is a distinct co-production agreement. Eventually RAI owns some rights, which are almost related to the territory. Not exhaustively:

- In Italy (including San Marino and Vatican City) 100% of almost all rights with the exception of Videograms, that are shared 50% with another partner;
- the 50% of almost all rights for the German speaking countries (which includes Switzerland, but it's unclear if it is additionally limited to the German language);
- no rights for French speaking countries;
- limited to the last 8 movies, the main performer got the agreement on a constraint which forbids the use of excerpts, in which he appears.

Case 7

RAI commissioned to a third party the production of a "Programme" related to cultural heritage, history, news about cultural events, shows, and exhibitions. RAI owns all exploitation rights on the resulting production, however a number of criticalities apply:

- the use of works of arts protected by SIAE (Italian collecting society..);
- the use of archive material for which RAI has only some rights (e.g. Free-TV) but not all rights;
- the rights to act fixation (recording) within museums are granted only for the specific production; for any other use RAI will have to negotiate new rights with the related museums or institutions.

6.4.3 Approaches with MCO

RAI used *RightsDraw* for understanding and verifying most of MCO characteristics. However *RightsDraw* was not conceived for being a software product for adoption at a business organisational level, thus it is recommended to avoid any confusion between MCO and *RightsDraw* in considering the possible respective limitations.

The main goal of RAI in contributing to MCO development, was to have the capability of expressing most of the rights conditions and situations that are found in currently used contracts, in a machine-readable form, i.e. without any need for a human user to read and interpret any narrative textual clause.

Therefore the RAI assessment of MCO included the verification of:

- the "contract centric" perspective of MCO – that is to use MCO for creating new digital contract on audiovisual content, and the possibility to "translate" pre-existing narrative contracts into MCO.
- the "content centric" perspective of MCO – that is the capability to resume the whole set of Permissions (or other deontic expressions) which apply to a content item, or even a fragment of it.
- the support of MCO to "check-with/rights clearance" use cases –
- the support of MCO to "sales/purchases" use cases – that is the dynamic aspect of rights on holdings.

The result of the assessment showed that MCO supports all of the considered scenarios, but the actual operational aspects are going to be decided by the availability of tools capable of providing reliable results with the expected performances.

The cases described in § 6.4.2 can be addressed by MCO as shortly described in the following:

Case 1 – The current rights situation of a given asset can be represented with MCO either with the collection of knowledge of all the agreements related to it ("contract centric") or with the updated summarized result of all the "deontic expressions" ("content centric"). The "check-with" operation required by this case is simpler with the latter approach (partially implemented in *RightsDraw*) although only the former retains the original expression of the deontics.

MCO itself cannot ensure a total support in identifying the rights-holders for new negotiations, as nothing guarantees that the issuers of previous permissions hold the desired rights. However, together with the information about the authors (owner of the moral rights), they provide a starting point for successful investigation. See also [14] and [15].

Case 2 – This is addressed by "check-with" operation made on large collections of assets, possibly of different archives. In practice performances of a large scale "check-with" operation can be critical and optimization (for instance by means of indexes) of its implementation is required. Such queries are logical join between a query on rights (the check-with) and a query on content.

Case 3 – The identified problem can be addressed by a wide adoption of standards, including definitions of rights and constraints, in order to have an unambiguous expression of the rights. It's common practice talk about a re-current rights situation with a "short-term", as a label or title (e.g. "the free-tv rights"), but similar terms can have different intended meanings, in the various context. It is possible to define rights patterns using MCO and make comparisons among them, in order to verify if one is the restriction of the other or if they have nothing to do. An example is given in Figure 21, that provides a comparison between two differently defined "free-tv" rights. The one on the left is less restrictive because there is just the restriction for the delivery modality to be linear and various technology can be used (note the OR logical operator). That on the right is quite more restrictive, excluding streaming by internet, requiring the use of broadcast technology and even the fruition on television devices.

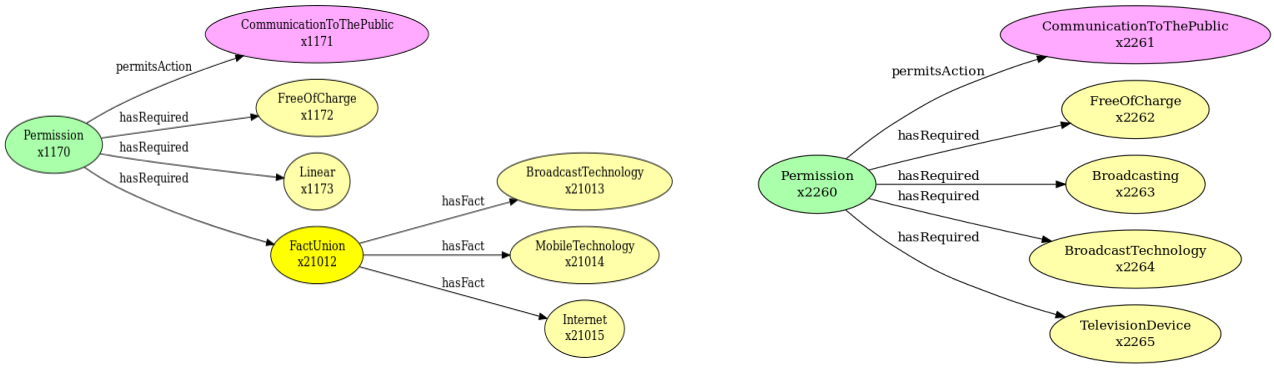

Figure 21: diagrams representing two different definitions of "free-tv" rights

Case 4 – MCO addresses flexible definition of constraints on "runs" by means of suitable data properties. In the simplest case there is just the number of runs. Otherwise it's possible to also specify a time validity for the single run, implying possible unbounded repetitions within a time window. Eventually it's also possible to limit the number of repetitions, as shown in the example of Figure 22.

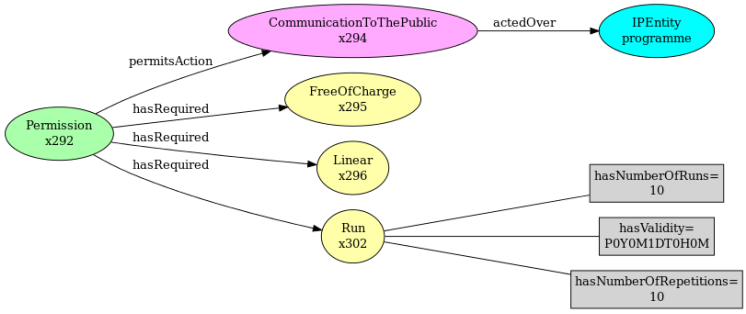

Figure 22: example of use for "runs" condition

The sub-case of "Catch-up TV service" is addressed in MCO by requiring the completion (or the start) of the action permitted by the main rights. The condition is called "ActionDone" (or "ActionStarted". Also in this case it's possible, if needed, to specify the validity time window. An example is given in Figure 23, where Permission x292 is the main one, while x293 is that of the Catch-up TV service.

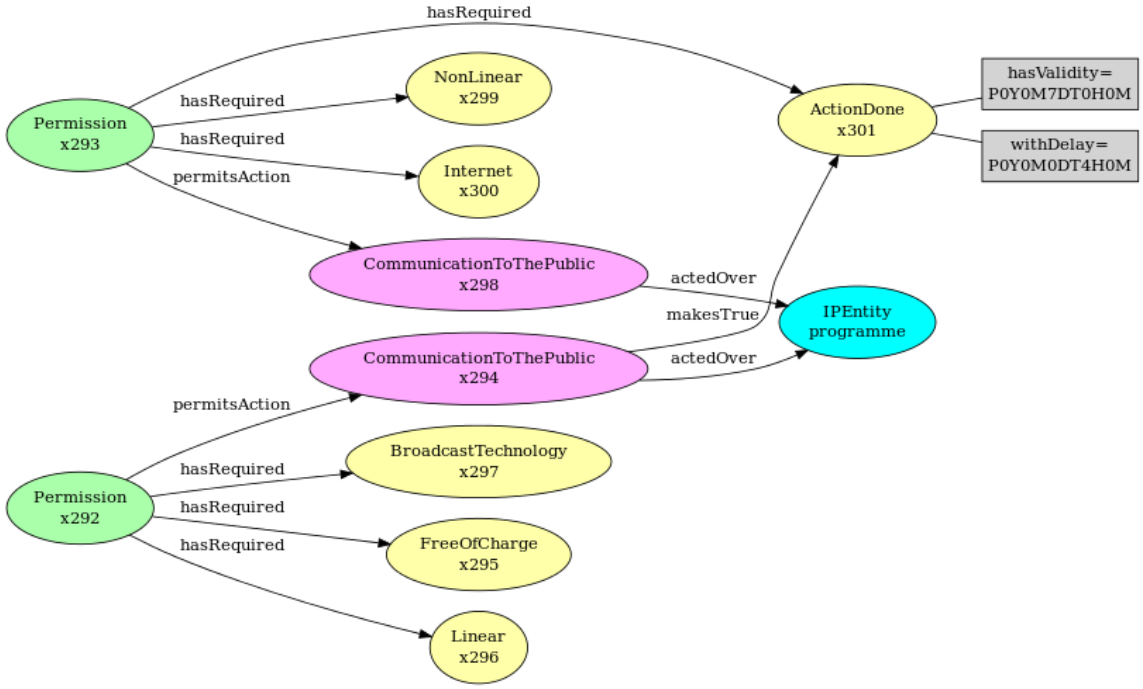

Figure 23: diagram representing implementation of Catch-up TV rights

Case 5 – MCO supports, in case of need, the indication of use and income percentages, as data property of Permissions, as well as boolean flags for indicating exclusivity and sublicensing. Default values are 100% for percentages, 'true' for sublicense and 'false' for exclusivity.

Case 6 – MCO supports this case. However, in defining the deontics, it should be clarified the distinction between conditions on territory and conditions on languages, which is not always the case for narrative contracts. As an example, instead of constraining to "German speaking part of Switzerland", it would be better to constrain to Switzerland as country and German as language (implying permission to broadcast in the German language in Lausanne).

Regarding prohibition to make/use excerpts related with a specific performer, this can be expressed with MCO (by defining restricted Permission or by defining specific Prohibition), however it requires the identification of the affected media fragments. It should be investigated if it is possible to express conceptually such identification.

Case 7 – MCO supports this case, for example with the condition on IP-Entity Context. What it's critical in such productions is to track properly the rights situation for each media fragment that can come either from archive or from a new recording, which can be restricted or not.

People working with rights in RAI, especially on rights clearance activities, were used to an organizational terminology, which reflected the terms used in the most recurrent narrative contract texts. An analysis of those terms, with the aim of providing common definitions, carried to the rights glossary published as [30].

Table 10 provides the most representative cases, mapped to MCO actions and Facts. Other cases, less common, can be obtained as variants of the presented ones. The envisaged use for rights tool interfaces, also implemented in *RightsDraw*, is to have those **reference rights patterns** as basis for the definition of the permissions, which have to be completed, if necessary, with conditions on territory, license periods, language, runs, and other that require the specification of data

properties. Similarly the approach can be adopted for "search" and "check-with" activities, in which the reference rights patterns are offered to the user for defining her queries.

The definition of such **reference rights patterns** is flexible, as any organization can have their own table, that can be changed or enriched in any time, because eventually the rights are expressed by means of the MCO definitions.

Table 10: RAI reference rights patterns mapped to MCO Action and Fact vocabularies

RAI terms	MCO Action and Conditions (Facts)	
All rights	**Action:** mco-ipre:ExploitIPRights	
All CTTP rights	**Action:** mco-ipre:CommunicationToThePublic	
DVBH rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:MobileTechnology mco-ipre:Broadcasting mco-ipre:MobileBroadcastDevice
	Note: "Broadcasting" is a linear delivery modality.	
All TV rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:BroadcastTechnology mco-ipre:TelevisionDevice
Satellite rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:Broadcasting mco-ipre:Satellite mco-ipre:TelevisionDevice
	Note: "Satellite" is the only allowed means. "Broadcasting" is a linear delivery modality.	
Internet rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:NonLinear mco-ipre:Internet OR mco-ipre:MobileTechnology
	Note: the delivery modality must be "NonLinear" The means are constrained to be either "Internet" or any mobile technology.	
Downloading rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:OnDemandDownload mco-ipre:Internet
	Note: the delivery modality must be "OnDemandDownload" that is a "NonLinear" modality. More restricted than "Internet rights"	
Streaming rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:OnDemandStreaming mco-ipre:Internet
	Note: The delivery modality must be "OnDemandStreaming" that is a "NonLinear" modality. More restricted than "Internet rights"	
VOD rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:OnDemandBasis mco-ipre:Internet
	Note: the delivery modality must be "OnDemandBasis" that is a "NonLinear" modality, implying a response to a user request. In theory slightly more restricted than "Internet rights".	
Free TV rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:FreeOfCharge mco-ipre:Linear mco-ipre:BroadcastTechnology OR mco-ipre:MobileTechnology OR mco-ipre:Internet
	Note: the access policy must be "FreeOfCharge" and the delivery modality must be "Linear". Means are constrained to any among "Broadcast Technology", "MobileTechnoloy", and "Internet".	
Free TV rights legacy	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:FreeOfCharge mco-ipre:Broadcasting mco-ipre:BroadcastTechnology
	Note: "Broadcasting" is a linear delivery modality. More restrictive than "Free TV rights".	
Free TV rights cable	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:FreeOfCharge mco-ipre:Linear mco-ipre:Cable
	Note: More restrictive than "Free TV rights" with respect to means.	
Free TV rights satellite	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:FreeOfCharge mco-ipre:Linear mco-ipre:Satellite
	Note: More restrictive than "Free TV rights" with respect to means.	

… cont.

Free TV rights terrestrial	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:FreeOfCharge mco-ipre:Linear mco-ipre:Terrestrial
	Note: More restrictive than "Free TV rights" with respect to means.	
VOD free rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:FreeOfCharge mco-ipre:OnDemandBasis mco-ipre:Internet
	Note: "OnDemandBasis" is a non linear delivery modality	
Pay TV rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:Pay mco-ipre:Linear mco-ipre:BroadcastTechnology OR mco-ipre:MobileTechnology OR mco-ipre:Internet
	Note: The access policy must be "Pay" and the delivery modality must be "Linear". Means are constrained to any among "Broadcast Technology", "MobileTechnoloy", and "Internet". Two more restrictive variants of this specify "PayPerView" and "Subscription" respectively.	
IPTV rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:Pay mco-ipre:Broadcasting mco-ipre:Restricted co-ipre:IPNetwork mco-ipre:TelevisionSet
	Note: "Broadcasting" is a linear delivery modality. The service access policy must be "restricted" (i.e. based on approval by the service provider). Means are constrained to "IPNetwork" which is a "Broadcast Technology" based on IP private network (i.e. excluding internet). The final user device is also constrained.	
Pay TV rights cable	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:Pay mco-ipre:Linear mco-ipre:Cable
	Note: More restrictive than "Pay TV rights" with respect to means.	
Pay TV rights satellite	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:Pay mco-ipre:Linear mco-ipre:Satellite
	Note: More restrictive than "Pay TV rights" with respect to means.	
Pay TV rights terrestrial	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:Pay mco-ipre:Linear mco-ipre:Terrestrial
	Note: More restrictive than "Pay TV rights" with respect to means.	
VOD Pay rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:Pay mco-ipre:OnDemandBasis mco-ipre:Internet
	Note: "OnDemandBasis" is a non linear delivery modality	
Video Rental rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:Pay mco-ipre:Videogram mco-ipre:Limited
	Note: The means are constrained to "Videogram" (i.e. by means of a physical container). The final user must have limited time for fruition.	
Video Sell rights	**Action:** mco-ipre:CommunicationToThePublic	**Facts:** mco-ipre:Pay mco-ipre:Videogram mco-ipre:Unlimited
	Note: The means are constrained to "Videogram" (i.e. by means of a physical container). The final user must have unlimited time for fruition.	
Home video rights	**Action:** mco-ipre:Distribute	**Facts:** mco-ipre:Pay mco-ipre:Videogram
	Note: The means are constrained to "Videogram" (i.e. by means of a physical container). The final user must have limited time for fruition.	
Transform rights	**Action:** mco-ipre:Transform	

… cont.

Excerpts rights	**Action:** mco-ipre:MakeExcerpt	
	Note: More restrictive than Transform rights	
Theatrical rights	**Action:** mco-ipre:PublicPerformance	**Facts:** mco-ipre:Pay
Non theatrical rights	**Action:** mco-ipre:PublicPerformance	**Facts:** mco-ipre:Free

Some people, used to the narrative legal language of the original contracts, might argue that understanding such graphical representation requires some specific technical skill, not related to the legal environment. So how could the legal staff agree in the creation of born-MCO contracts, with digital signatures and binding? Actually the MCO definitions can be used also for deriving a synthetic narrative text from the MCO OWL contract document

7. Sample set

The capability to faithfully represent all real operative conditions and cases is crucial, for avoiding exceptions to the "machine-readable" approach. It is therefore important to assess the capability of formats against representative samples collected in all the relevant contexts. The samples must cover both the typical cases and the critical ones.

7.1 Contract samples

RAI used with a number of contract texts and excerpts, in English language, used as examples in CEL and MCO specifications and in other publications. (*to be added as annexes, hereis given a simple description of the more interesting features for each sample*)

7.1.1. Excerpts of narrative contract

A typical narrative contract heading is given in Box 6, where it is possible to see how the "parties" are introduced, stating their role in the agreement, with the respective signatories.

```
Proposal of Agreement Rai (Licensee) -  XXXX (Licensor)

                        Spett.le  XXXX

 PROPOSAL OF LICENSE AGREEMENT Acquisition of utilization and
 exploitation rights of n. 1 First Run Animated Series entitled
                           [...]

                                Between
XXXX is a company duly organized under the laws of
[...], le with its registered office located at [...], legally
represented by [...] (hereinafter referred as XXXX and/or  you
and/or Licensor)
                           on the one hand
                                  And
RAI - Radiotelevisione Italiana S.p.A a company duly organized
under the laws of Italy, with its registered office located at
Viale G. Mazzini n. 14 - Rome, Italy, legally
represented by its CEO [...] (hereinafter, Rai and/or Licensee)

hereinafter, collectively, the Parties.
  [...]
    That being stated, it is hereby formulated the following [...]
```

Box 6: excerpt of a typical narrative contract heading

A simple grant is defined in the excerpt given in Box 7. The object of the agreement is introduced, together with the definition of an exclusive permission for a specified territory, language and license period. Actually the permission is not completely specified here, as it is split in pieces with different further constraints in a subsequent sub-clause of the narrative text.

```
[..]

2)   OBJECT  OF  THE LICENSE AGREEMENT RIGHTS GRANTED TO RAI

2.1  (Acquisition of 100% exploitation rights both by free of
charge and upon any kind of payment communication to the public
and/or by making the Programme available to the public, both free
of charge and upon any kind of payments, at the time and place
chosen by the viewer, in Italy, Vatican City, Republic of San
Marino and Principality of Monaco)
Under this Agreement, RAI acquires from XXXX,
on an exclusive  basis and with the fullest and unconditional
authority to assign/grant/sublicense to any third parties, 100%
(one hundred per cent) of the following utilisation and economic
exploitation rights - and 100% (one hundred per cent) of the
relative net receipts related to the following First Run
Animated TV Series (hereinafter also the Animated Series
and/or the Programme and/or Series) in the Italian language
dubbed version, and to the pertaining filmed materials, in the
Italian language dubbed version thereto, for the entire term
specified below (the Licensed Period) in the territories of
Italy, Vatican City, Republic of San Marino and Principality of
Monaco, being however agreed that overspill does not constitute
a breach of the Agreement (hereinafter, jointly, the Territory) [...]
```

Box 7: excerpt of narrative contract defining a simple grant

The detailed constraints are itemised, in this example of narrative contract, in the text given in Box 8, as for each single sub-case there is a difference on the number of permitted runs.

```
i) by communication to the public through remote
diffusion/broadcast, whether or not a charge is being paid by
the viewer [i.e. any and all free of charge and upon any kind
of payment forms of circular diffusion/broadcast (point to
multipoint), including the so-called Free TV, Pay TV, Pay per
View, Near Video on Demand, Pay per channel, Pay per Day, etc.]
and/or
ii) by making the Programme available to the public both free of
charge and upon payment, at the time and place chosen by the
final viewer [i.e. any and all forms of point to point
communication, including Video on Demand, Subscription Video on
Demand, Pay on Demand, Demand Video etc.
in the Italian dubbed language (hereinafter also Authorized
Language), in any forms and manners, by any kind of encoding
devices conditioning the access to the Programme, on any platforms
and by any technical means and/or technologies and/or
communication protocols now existing and/or hereafter devised
(such as, without limitation: by communication to the public
and/or by making the Work available to the public via air -
including digital terrestrial - MMDS, any kind of satellites,
wires, cables and fibres of any kind and nature, etc.; both in
```

```
the analogue and in the digital formats), on any type of
channels (s.c. general content channels, thematic channels,
etc.), accessible/receivable/viewable by any type of
terminals/devices, including any and all the cable and/or
satellite and/or terrestrial re-transmissions and all On
Demand services free of charge and/or upon payment, provided
through any networks, including the telematic and informatics
ones, using any communication protocols and accessible by the
final viewer by any terminals/devices, in the Territory, except
however possible overspills due to the technical characteristics
of the transmission means used and anyhow subject to the
following third sub-paragraph.
The herein licensed rights shall also include the exclusive
right to place the Programmes at the public disposal with or
without any payments being due (i.e. excluding any utilizations
which might require the payment of a specific fee by the final
user, in order to view each Programme), by cable, air and/or
satellite, by means of digital technology and all transmission
networks, including the telematic ones, in such a way as any
final users can gain access to, from the place and at the time
individually selected.

The grant is made for n. 5 (five) years starting on [...],
until [...], (the so-called License Period);
Within the Territory and during the License Period, RAI shall
have the right:
- [...];

The following number of runs are hereby granted during the
License Period:
- with reference to the communication to the public by
unencrypted and free of charge television diffusion/broadcast
(point to multipoint communication) - the so-called Free TV
by any means and methods on general content channels, with the
sole exception of original transmissions by digital terrestrial
technology as better specified in the following sub paragraph :
10 (ten) runs;
- [...]
- with reference to the communication to the public by encrypted
and upon payment television diffusion/broadcast (point to
multipoint communication) - the so-called PAY TV, PAY PER VIEW,
NEAR VIDEO ON DEMAND etc. by any means and methods on
whatsoever type of channel (general content channels, thematic
channels): unlimited runs;
- [...]
- with reference to the right to make the Programme available to
the public at the time and place chosen by the final viewer
(point to point communication) and, therefore, to the afore said
both free of charge and upon any kind of payments on demand
exploitation, any limitation of runs cannot apply, due to the
technical characteristics of the service and, consequently, the
hereby licensed rights shall be granted for an unlimited number
of make-available acts.
```

Box 8: excerpt of narrative contract specifying details on the number of runs

A distinct sub-clause, given in Box 9, specifies the right to use separate excerpts, here with the constraint on the length (1 minute) or individual still.

```
3.3 (Right to use separate excerpts)
By the present Agreement, RAI is also granted the right
to use and exploit in the Territory and during the License
Period and during the License Period, even by the Internet or
similar networks (e.g. UMTS, etc.) with the fullest faculty to
use nonlinear formats, digital compression and temporary and/or
permanent playback systems in the transmission/broadcast/diffusion
/distribution on any distribution  channels, including online
and offline and even multimedia ones separate excerpts of each
episode composing the Programme, in the Authorized Language,
up to a maximum of one (1) minute in length, and/or individual
stills of the same Programme, by any means and in any forms and
manner, within both the promotional and institutional activities,
also of anthological nature and anyhow for non-profit purposes,
carried out on its own and/or by its associated, affiliated, subsidiary,
sublicensee  companies,  with the  exception  of  uses  for  the
purpose of advertising any products.
```

Box 9: excerpt of narrative contract permitting the use excerpts

The excerpt of Box 10 contains the definition of a permission for free-tv rights, with a particular constraint on “run”, permitting up to 5 repetitions within 7 days to be considered as a single run.

```
    THE SUBJECT MATTER OF THE AGREEMENT: RAI'S RIGHTS.
    UNDER THIS AGREEMENT, AND SUBJECT TO THE TERMS AND CONDITIONS
    HEREIN SPECIFIED, YOU SHALL LICENSE TO RAI, AND TO ITS RELATED
    AND/OR SUBSIDIARY COMPANIES, 100% OF THE EXCLUSIVE RIGHTS TO USE
    AND EXPLOIT THE PROGRAMMES, AND RELEVANT TECHNICAL MATERIALS
    INDICATED UNDER LETTER A) OF THE RECITALS, IN THE ITALIAN LANGUAGE
    VERSION, IN ITALY, VATICAN CITY, REPUBLIC OF SAN MARINO, MALTA,
    PRINCIPALITY OF MONACO, BY THE FOLLOWING MEANS:
    ALL FORMS OF FREE BROADCASTING AND/OR TRANSMISSION ADOPTING
    DIGITAL TECHNIQUE, BY USING ANY AVAILABLE BROADCASTING AND/OR
    TRANSMISSION MEANS/INFRASTRUCTURES (WHETHER OR NOT USING
    RADIO-FREQUENCIES FOR THE DISTRIBUTION OF TV SIGNALS AND
    INCLUDING, WITHOUT LIMITATION, DTH - DIRECT TO HOME SATELLITE
    SERVICES, DDT - DIGITAL TERRESTRIAL TELEVISION SERVICES, STANDARD
    CABLE, FIBRE OPTIC, DSL - DIGITAL SUBSCRIBER LINES, ETC.).
    THIS LICENCE OF RIGHTS SHALL APPLY FOR A PERIOD OF 2 (TWO) YEARS
    STARTING ON DECEMBER 6TH, 2010 AND ENDING ON DECEMBER 5TH, 2012
    AND FOR A MAXIMUM OF 16 (SIXTEEN) "RUNS" DURING THE LICENSE PERIOD
    (WHERE EACH "RUN" IN ANY WEEK SHALL CONSIST OF NO MORE THAN 5
    (FIVE) TRANSMISSIONS WITHIN A 7 (SEVEN) DAY PERIOD COMMENCING UPON
    FIRST TRANSMISSION).
```

Box 10: excerpt of a permission for free-tv with flexible runs

The same contract actually contains another exploitation possibility, defined by the text of Box 11, which is indeed related to the previous one. This mechanism is sometimes named in RAI as “CatchupTV”. It deals with a “Communication to the Public”, made by making available the audiovisual material on line for fruition on demand, but limited to a time period defined by the occurrence of the related broadcast event. The reasons for defining those conditions in real contracts are manifold. They include more complex economical considerations, such as the price or the availability of VOD rights within a certain territory/market.

```
IT IS HEREBY UNDERSTOOD THAT RAI IS ENTITLED TO VOD AND ONLINE
MULTIMEDIA RIGHTS SOLELY FOR THE BROADCASTING OF THE PROGRAMMES
STARTING 48 HOURS FROM THE FIRST BROADCAST AND FOR THE FOLLOWING 7
DAYS, FOR THE PURPOSE OF PROVIDING ITS SO-CALLED TV CATCH-UP
SERVICE..
```

Box 11: excerpt about the right for catch-up TV service

8. Comparative analysis

This section describes the result of comparative analysis on a selection of formats and technologies on which some assessments and/or experiences of use are available.

Some results of comparative analysis, done by ABC at different times, are described in §§ 6.1.2, 6.1.3, 6.1.4, and 6.1.5.

Another work of comparisons is presented in [13], considering both XML and RDF based formats for the expression of rights.

Table 11 summarizes analogies and differences among the latest standard initiatives, CEL and MCO within MPEG-21 and ODRL, in order to evaluate the current and possible level of interchangeability among them.

Table 11: comparison table between CEL, MCO, and ODRL2.0

Feature	CEL	MCO	ODRL 2.0
Support to types of deontic expression	**YES** Permission, Obligation, Prohibition	**YES** Permission, Obligation, Prohibition	**YES** Permission, Duty, Prohibition Duty is related to Permission
Support to complex conditions, logical constructs	**YES** Intersection, Union, Negation	**YES** Intersection, Union, Negation (also by means of negative assertions)	POOR with attribute 'operator' for Constraint a way of relating deontics with boolean operators is defined (informatively) as Extended Relations
Support to express inter-dependencies between deontics	**YES** pre-condition on action status	**YES** action related facts	**NO** except Duty related to Permission
Support to express exclusivity, sublicensing right for Permission	**YES** Boolean flags	**YES** Boolean flags	COMPLEX permission should be the target instead of asset; sublicensing can be expressed as a permission itself; exclusivity expressed as a Duty for the Assigner.
Support to express percentages for Permission Use or Income	**YES**	**YES**	**NO**
Has vocabulary for exploitation rights actions	**YES**	**YES**	**NO** but could be defined as Profile
Has vocabulary for expressing exploitation conditions	**YES**	**YES**	**PARTIAL** but could be defined as Profile
Support to express payment details	**NO** might use Obligation with appropriate vocabulary	**NO** might use Obligation with appropriate vocabulary	**YES/PARTIAL** as Duty

… cont.

Support to express obligation to usage reporting	**NO** might use Obligation with appropriate vocabulary	**NO** might use Obligation with appropriate vocabulary	**PARTIAL** acceptance of tracking instead of Duty to report;
Support to express obligations on sub-licensing terms (e.g. as for creative commons)	**NO** might use Obligation with appropriate vocabulary	**NO** might use Obligation with appropriate vocabulary	**YES**
Support to express priority among the rules and default behaviour (in case of contradictions)	**PARTIAL** relationships between Contracts (e.g. prevailsOn) Criterion of "the most restrictive" might be applied	**PARTIAL** relationships between Contracts (e.g. prevailsOn) Criterion of "the most restrictive" might be applied	**YES**

9. Outlook and proposed actions

The following recommendations and actions are proposed:

- To adopt and require machine readable standard formats for rights expression;
- To support the improvement of the interchange-ability, that is "capable to be used in the place of each other", of the latest and most promising standard initiatives; for instance;
  - promoting IPRE vocabulary for ODRL compatible with that of MCO;
- To propose and support amendment to standards for covering the identified gaps; for instance and related to IPRE domain:
  - Add conditions on Service or Channel used for the Communication to the Public;
  - Add conditions related to the Quality and/or the Format of the Material;
  - Add more itemised conditions to express rights for restricted contexts such as hotels and transportation means (ships, airplanes);
- To investigate on the model for representing the knowledge related to Works in the public domain and the Works supposed/considered/formally recognised as Orphan Works;
- To continue sharing experience on actual implementation of systems and services for handling rights expressed in standard forms.

10. Glossary

Term	Meaning
AMD	Amendment - A change to an already existing standard, in MPEG
Assignee	Someone to whom a right is granted. In ODRL. See also Licensee, Principal
Assigner	Someone granting a right to someone else. In ODRL See also Licensor, Issuer.
B2B	Business-to-Business
B2C	Business-to-Consumer
CEL	Contract Expression Language
DDEX	Digital Data Exchange (DDEX), http://www.ddex.net
DID	Digital Item Declaration
DIDL	Digital Item Declaration Language

DII	Digital Item Identification
EFG	European Film Gateway, EU Project, http://www.efgproject.eu
IPRE	Extension for exploitation of intellectual property rights. Present in CEL and MCO.
IPTC	International Press Telecommunications Council
IRI	Internationalized Resource Identifier. A URI allowing Unicode characters. In Ontologies
ISAN	International Standard Audiovisual Number
ISO	International Organization for Standardization
Issuer	Someone granting a right to someone else. In REL. See also Licensor, Assigner
JSON	JavaScript Object Notation
Licensee	Same as Principal or Assignee
Licensor	Same as Issuer or Assigner
MCO	Media Contract Ontology
METS	Metadata Exchange and Transmission Standard
MPEG	Moving Pictures Expert Group, same as ISO/IEC SC 29 WG 11
MVCO	Media Value Chain Ontology
ODRL	Open Digital Rights Language
OWL	Web Ontology Language
Principal	Someone to whom a right is granted. In REL. See also Licensee, Assignee
RDD	Rights Data Dictionary
RDF	Resource Description Framework
REL	Rights Expression Language
UGC	User Generated Content
URI	Uniform Resource Identifier
URN	Uniform Resource Name
W3C	World Wide Web Consortium, www.w3.org
WIPO	World Intellectual Property Organization
XML	eXtensible Markup Language

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