Multimedia Content Distribution Governed by Ontology-Represented Contracts

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Workshop on Multimedia Ontologies and Artificial Intelligence Techniques (MOAIL-07)
JURIX-07
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Narrative Contracts and Electronic Licences

This International Video Distribution Agreement ("Agreement") is made ~~~~ between the following Licensor and Distributor:
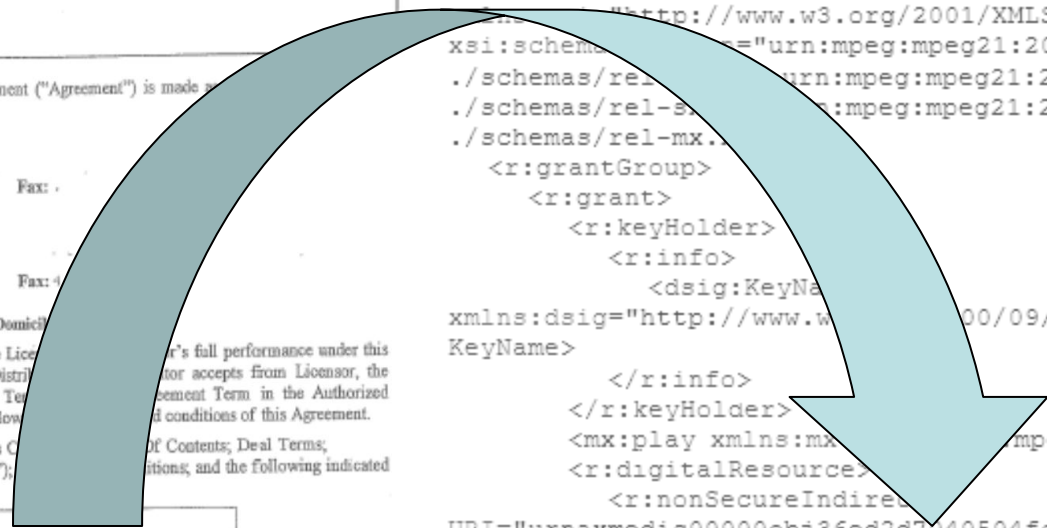
Licensor:
Address:
Tel: Fax:
E-Mail.

Distributor / Licensee:
Address:
Tel: +39   Fax:
E-Mail:
    Type of Entity: Domici~~

    Subject to timely payment of all monies due Lice~~~~~r's full performance under this Agreement, Licensor licenses exclusively to Distri~~~~~tor accepts from Licensor, the Licensed Rights in the Picture throughout the Te~~~~~~ement Term in the Authorized Languages subject to the Holdbacks identified below~~~~d conditions of this Agreement.

    This Agreement has the following parts: this C~~~~~ of Contents; Deal Terms; International Standard Terms ("Standard Terms");~~~~~itions; and the following indicated Attachment(s):

	Standard Attachments
no	International Access Letter
no	International Delivery Manifest
no	International Censorship Rider
no	Other:

    This Agreement has been drafted based on the ~~~~~ version V: 200~~~~~~~~~~~~~~~~ Licensor represents that, except where terms are to be included in such terms, no changes~~~~~~~~ pre-printed elements of the ~~~~~ Form unless conspicuously indicated in double underlining, strike-out or similar formatting to design~~~~~~~~~~~~~~~~~~together to form one contract, but in the event of a direct conflict, any terms inserted in the Deal Terms as part of completing the contract will prevail over pre-printed elements of the ~~~~~ Form.

    Licensor and Distributor have executed this Agreement as of the date written above to constitute a binding contract between them.

LICENSOR: DISTRIBUTOR / LICENSEE:

By: By:
                                  Its:

Narrative Contract (paper)
Pasive Contracts

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<r:license xmlns:r="urn:mpeg:mpeg21:2003:01-REL-R-NS"
~~~~~~~~"http://www.w3.org/2001/XMLSchema-instance"
xsi:schem~~~~~~~="urn:mpeg:mpeg21:2003:01-REL-R-NS
./schemas/re~~~~~~urn:mpeg:mpeg21:2003:01-REL-SX-NS
./schemas/rel-s~~~~~:mpeg:mpeg21:2003:01-REL-MX-NS
./schemas/rel-mx.~~~~
  <r:grantGroup>
    <r:grant>
      <r:keyHolder>
        <r:info>
          <dsig:KeyNa~~~
xmlns:dsig="http://www.w~~~~~~00/09/xmldsig#">DemoEndUser</dsig:
KeyName>
        </r:info>
      </r:keyHolder>
      <mx:play xmlns:mx~~~~~~mpeg21:2003:01-REL-MX-NS"/>
      <r:digitalResource>
        <r:nonSecureIndire~~
URI="urnaxmedis00000obj36ed2d7040504fcca05112a74322ee14"/>
      </r:digitalResource>
      <r:allConditions>
        <sx:territory xmlns:sx="urn:mpeg:mpeg21:2003:01-REL-SX-
NS">
          <sx:country xmlns:iso="urn:mpeg:mpeg21:2003:01-REL-
SX-NS:country">iso:C~~~~~~~~~
          </sx:location>
        </sx:location>
      </r:allConditions>
    </r:grant>
  </r:grantGroup>
  <r:issuer>
    <r:keyHolder>
      <r:info>
        <dsig:KeyName
xmlns:dsig="http://www.w3.org/2000/09/xmldsig#">DemoDistributor</d
sig:KeyName>
```

Electronic License (digital)
Active Contract

*Multimedia Content Distribution **Governed by** Ontology-Represented Contracts*

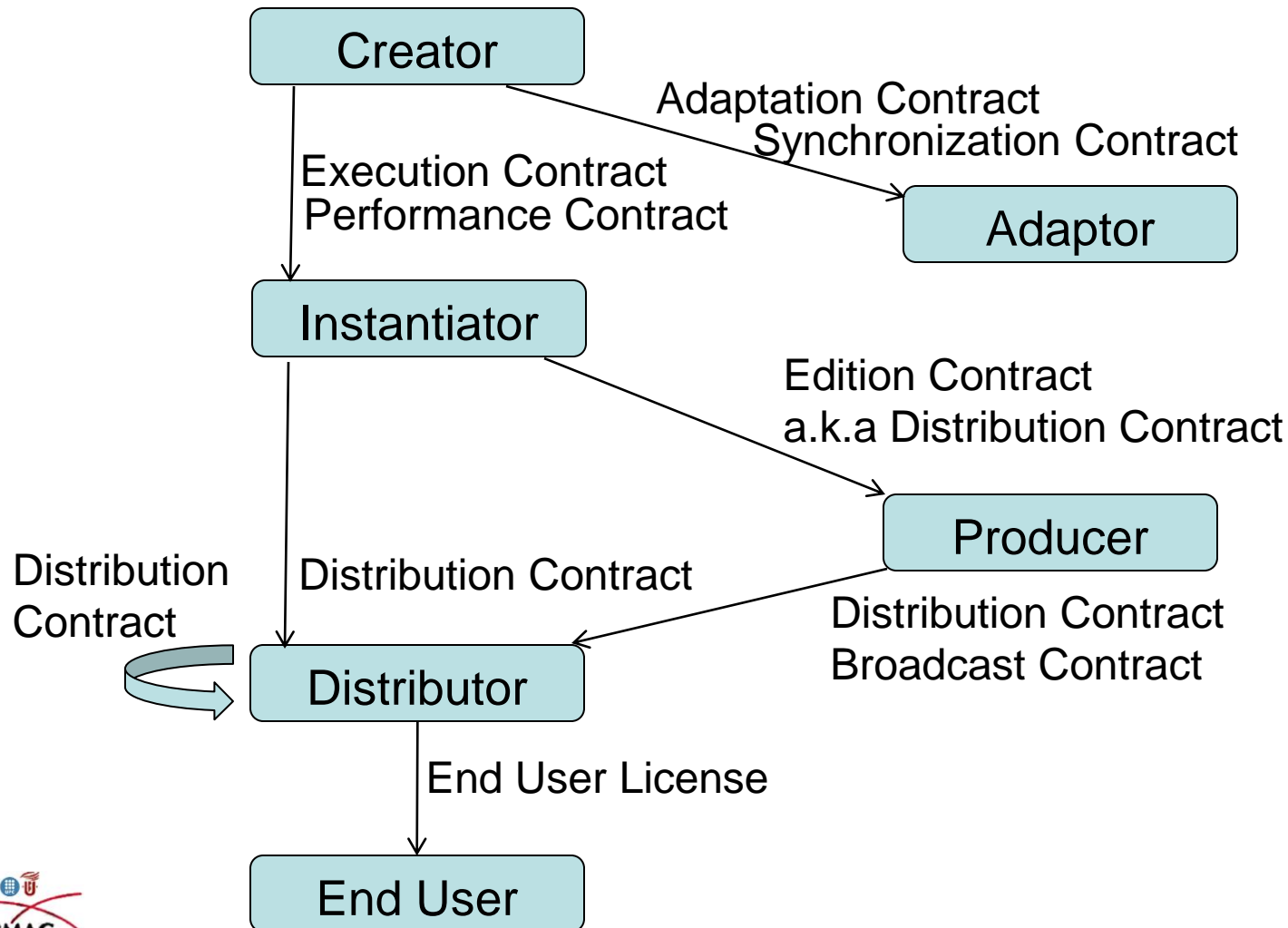# IP Agreements along the Value Chain

# Benefits of having electronic contracts

- Potentially faster contract negotiation
  - Two parties can negotiate contracts with external software
- Allows exporting contract management data
  - Obligations at certain times can be integrated with external applications: calendar, project management, payments etc.
- Allows better storage of precedent contracts
  - Lawyers use to re-cycle clauses from previous contracts, and it is better managed from electronic contract
- Expressivity is far poorer, but ambiguity dissapears
  - Clauses are classified and help understanding of contracts
- As an electronic *license*, the keystone of DRM
  - Governing authorisation systems like the Axmedis' one
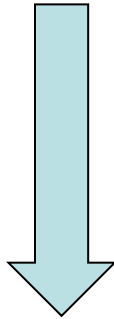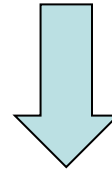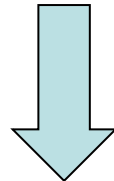
Evaluation of REL for contract expression

- Evaluated over 40 real contracts in the multimedia market,
  - For all the segments in the Value Chain
- REL = Rights Expression Languages
- MPEG-21 REL or OMA DRM licenses act effectively already as *electronic contracts* governing DRM systems, but…**Do REL License Suffice?:**
1. Does REL represent well the clauses?
2. Do REL rights match contract rights?
3. Do REL conditions match contract conditions?
4. Are REL licenses useful for every kind of party?

Contracts in the MPEG-21 terminology

	Contracts jargon	*MPEG-21 jargon*
Grant	Rights	Rights
	Term and Territory	Conditions (Term, Territory)
Fee	Payments	Conditions (Fee)
Parties	Licensor	Issuer
	Licensee	Principal
Object	Text reference	Resource (URN, ID)
Signature	Handwritten signature	Digital Signature
Metadata	Date	Date
	Title	Title
Rest of clauses	Jurisdiction, Termination, Breachment, Warranties, Disclaimers, Reporting, Confidentiality, etc.	Other Info

Enforceable / not enforceable

|	Contracts jargon	MPEG-21 jargon
Grant	Rights	Rights
	Term and Territory	Conditions (Term, Territory)
Fee	Payments	Conditions (Fee)
Parties	Licensor	Issuer
	Licensee	Principal
Object	Text reference	Resource (URN, DigitalItem)
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Metadata	Date	Date
	Title	Title
Rest of clauses	Jurisdiction, Termination, Breachment, Warranties, Disclaimers, Reporting, Confidentiality, etc.	Other Info

1. Does REL represent well contract clauses?

- Assertions: *claim.* Deontic logic: *permissible, impermissible, obligatory.*

	A (Licensor)	B (Licensee)
Claim	SOMETHING IS	
Permissible	**B MAY**	A MAY
Impermissible	A MUST NOT	B MUST NOT
Obligatory	A MUST	**B MUST**

- REL License
  - Metadata
  - Rights
  - Conditions

License → Grant, Issuer; Grant → Principal, Right, Resource, Condition
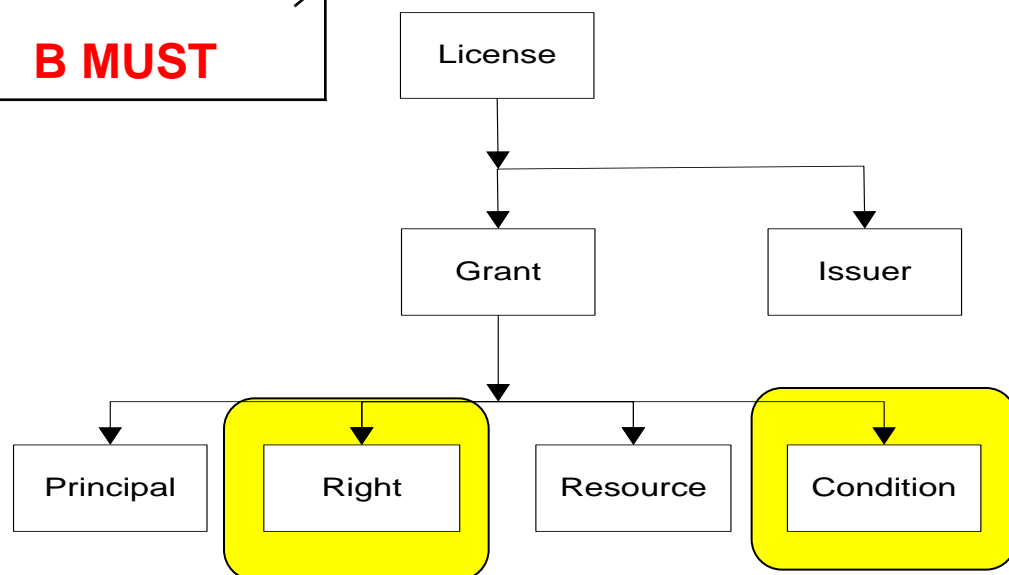
2. Does REL represent well rights?

MPEG-21 REL rights core, multimedia

issue	extract	reduce
revoke	embed	move
possessproperty	play	adapt
obtain	print	uninstall
modify	execute	delete
enlarge	install	

- Defined in a Rights Data Dictionary (MPEG-21 RDD)
- Ignored here: mx1,mx2 defined for the MAM and DAC profiles etc.

Most common rights appeared in contracts

Reproduce	Broadcast	Adapt	Lease
Download	Copy	Convert	License
Upload	Print	Transcode	Promote
MakeAvailable	Record	Remix	Stream
PubliclyPerform	Modify	Distribute	
Exhibit	Translate	Sell	
Transmit	Dub	Advertise	

3. Does REL represent well conditions?

- More difficult to represent than rights
- Many cannot be enforced
- MPEG-21 REL: 24 conditions, not defined in RDD

Most common conditions in REL	Conditions in contracts	
Term	Exclusivity	Term
Territory	Reporting	Territory
Number	Many fee types	Format
Fee	Auditing	Content type

4.Are REL licenses useful for every kind of party?

Value Chain Users

Creator
Adaptor
Instantiator
Producer
Distributor
EndUser

Implicit users in MPEG-21 and ODRL
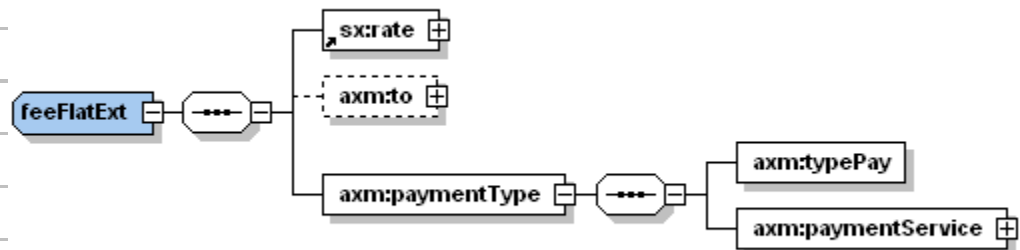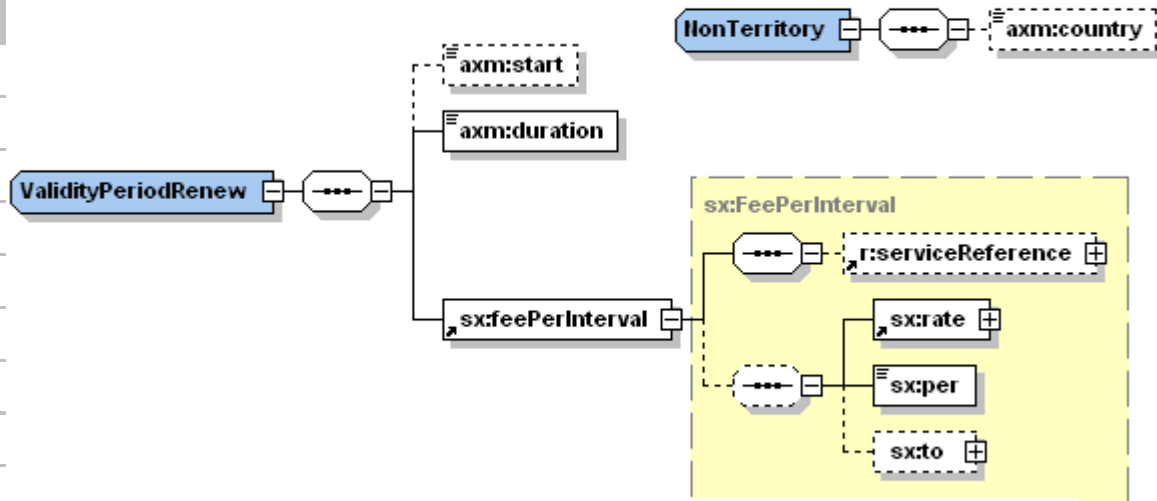
Usage	Reuse	Asset Management	Transfer
End-user			Distributor
Display	Modify	Move	Sell
Print	Excerpt	Duplicate	Lend
Play	Annotate	Delete	Give
Execute	Aggregate	Verify	Lease
		Backup/Restore	
		Install/Uninstall	

Right	Party	Right	Party
Issue	distributor	Extract	end-user
Revoke	distributor	embed	end-user
possessprop	end-user	play	end-user
Obtain	distributor	print	end-user
Modify	end-user	execute	end-user
Enlarge	end-user	install	end-user
Reduce	end-user	uninstall	end-user
Move	end-user	delete	end-user
Adapt	end-user		

DMAG
Distributed
Multimedia
Applications
GROUP

Extension of REL for contracts

Conclusion

- ## MPEG-21 REL has a proper structure to represent a contract but…
    - Lacks some vocabulary for expressing rights
    - Lacks some expressivity to represent conditions
    - Does not represent all kind of clauses
    - Does not support all kind of parties along the value chain

➔Ontology to express contracts semantically

Intellectual Property Value Chain Ontology

- Computer Ontology codified in OWL language
  - Ontology Web Language is the W3C for ontologies
  - Allows semantic representation of contracts
  - Imlicit Knowledge made explicit through sentences (*triples*)
  - Allows reasoning over the sentences
  - An XML standard universally understood
- Definition of the ontology
  - Enumeration of Classes
  - Enumeration of Properties of the classes
  - Enumeration of Relationships between the classes
- Individuals: the bridge to solve real problems

IP Value Chain Ontology

Root classes	Subclasses
IP Entities	Work, Adaptation, Manifestation, Instance, Copy, Product
Roles	Creator, Adaptor, Instantiator, Producer, Distributor, EndUser
Actions	TransformingActions (adapt, perform, etc.), ConsumeRights (play etc)

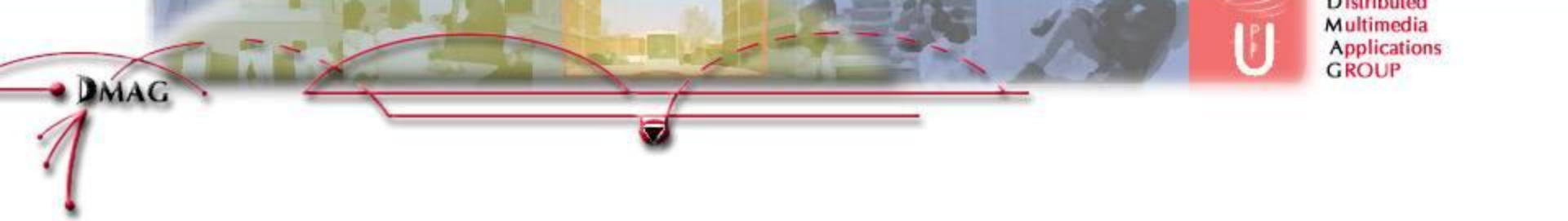| Relation	Domain	Range
ResultsIn	TransfomingAction	IPEntity
ComesFrom	IPEntity	IPEntity
RequiresAuthoris	Action	Role
CanExercise	Role	Action
CanApply	Action	IPEntity
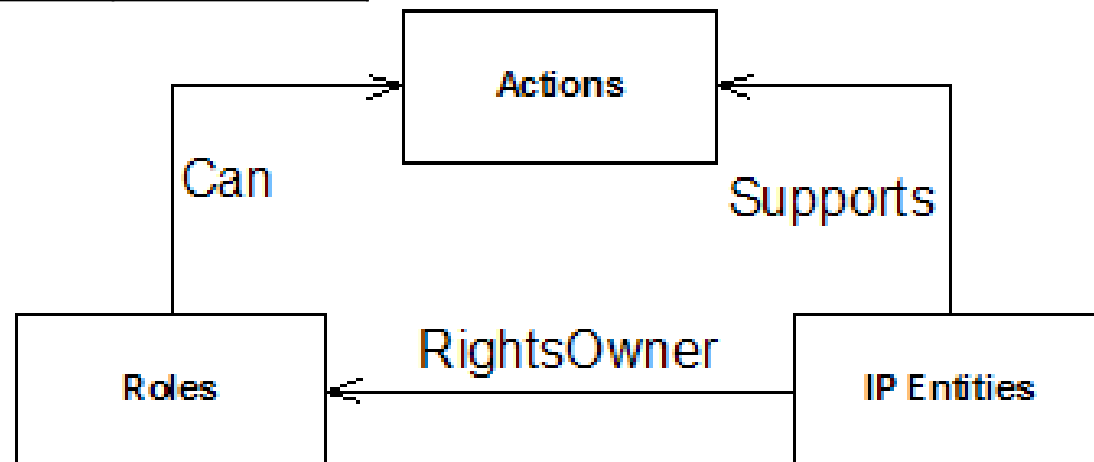
Clauses in the Ontology

- ## Represented with the traditional modal logic

  - ### NOT ∼, AND ∧, OR ∨

  - ### Logic is built-in in the Ontology

- ## Enriched with the deontic logic

  - ### Obliged □ and Permissible ◇

- ## Only one of the deontic operators is actually needed

  - ### Allowing 5 kinds of clauses (obligatory (OB), permissible (PE), impermissible (IM), gratuitous (GR), optional (OP))

- 1. PE (p)Alice may make a preview of Song
- 2. PE (q& r& s)Alice may (play the song, pay 1 euro and be in Holland)
- 3. t → OB (w) Bob must grant Song with a minimum of quality, in case he does

Rules definition to to trigger actions

- **5 kinds of Events to trigger actions**
- *Execution*. A party executes a right or an action.
- *Transfer*. A party transfer rights about a certain IP Entity to the other party
- *Reporting*. A party reports information
- *Payment*. A party executes a payment
- *Service*. A party executes the service described by a reference

Into practice…

- **MPEG-21 Licenses handling in DRM systems**
  - (Wide Experience)
- **MPEG-21 Extension for contract representation**
  - AXMEDIS European Project, cooperation with AFI
- **Intellectual Property Value Chain Ontology**
  - Digital Media Project (DMP)
- **Semantic representation of contracts**
  - Still ongoing…

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