OASIS LegalRuleML

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LegalRuleML TC

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Outline

- Introduction to LegalRuleML
  - Motivations, Goals, Principles
  - Design principles
  - LegalRuleML main blocks: meta, context, rules
    - Legal Statements and References
    - Temporal Events and Temporal Situations
    - Deontic
    - Penalty and Reparation
    - Defeasible
    - Alternatives
- Future work
Motivations

- Legal texts are the privileged sources for norms, guidelines and rules that often feed different concrete Web applications.
  - Legislative documents, Contracts, Judgements

- The ability to have proper and expressive conceptual, machine readable models of the various and multifaceted aspects of norms, guidelines, and general legal knowledge is a key factor for the development and deployment of successful applications.
The LegalRuleML TC, set up inside of OASIS at Jan 12, 2012 ([www.oasis-open.org](http://www.oasis-open.org)) with 25 members, aims to produce a rule language for the legal domain:

- Based on the legal textual norms
- Oriented to legal people
- Compact in the syntax annotation
- Neutral respect any logic
- Flexible and extensible
Requirements

- Support for modelling different types of rules:
  - Constitutive rules (e.g. definitions)
  - Prescriptive rules (e.g. obligation, permission, etc.)
- Implement isomorphism [Bench-Capon and Coenen, 1992]
- Model legal procedural rules
Design Principles (1/2)

Multiple Semantic Annotations:

- A legal rule may have multiple semantic annotations where each annotation can represent a different legal interpretation.
- Each such annotation can appear in a separate annotation block as internal or external metadata.

Tracking the LegalRuleML Creators:

- As part of the provenance information, a LegalRuleML document or any of its fragments can be associated with its creators.

Linking Rules and Provisions:

- LegalRuleML includes a mechanism, based on IRI, that allows N:M relationships among the rules and the textual provisions
  - avoiding redundancy in the IRI definition and errors in the associations
- LegalRuleML is independent respect any Legal Document XML standard, IRI naming convention
Design Principles (2/2)

Temporal Management:
- LegalRuleML must represent these temporal issues in unambiguous fashion

Formal Ontology Reference:
- LegalRuleML is independent from any legal ontology and logic framework.

LegalRuleML is based on RuleML:
- LegalRuleML reuses and extends concepts and syntax of RuleML.

Mapping:
- Investigate the mapping of LegalRuleML metadata to RDF triples for favouring Linked Data reuse.
Open Rules

Legal document in XML

Combine rules with other dataset
Interoperability and interchange
Retrieve rules and documents

Legal Ontology

Linked Open Data

Logic Rules
LegalRuleML main blocks

Metadata
- Legal Sources
- References
- Agents
- Authority
- Time Instants
- Temporal Characteristics
- Jurisdiction
- Role

Context association of metadata with rules

Context different author association of metadata with rules

Context different time and jurisdiction association of metadata with rules

Context association of alternative interpretations of the same text

<lrml:Rule key="rule1">
  <lrml:if> ...
  <lrml:then>...
</lrml:Rule>...

<lrml:Rule key="rule2">
  <lrml:if> ...
  <lrml:then>...
</lrml:Rule>...
<lrml:LegalRuleML>
  <lrml:References>
    <Reference> ... </Reference>
  </lrml:References>

  <lrml:Context key="ruleInfo1-v2">
    <lrml:Association>
      <lrml:appliesSource keyref="#sec2.1-list1-itm31-par1-v2"/>
      <lrml:toTarget keyref="#rulebase1-v2"/>
    </lrml:Association>
  </lrml:Context>

  <lrml:hasStatements key="rulebase-v2">
    <lrml:ConstitutiveStatement key="rule1a-v2">
      <ruleml:if> ... </ruleml:if>
      <ruleml:then> ... </ruleml:then>
    </lrml:ConstitutiveStatement>
  </lrml:hasStatements>
</lrml:LegalRuleML>
LegalRuleML main blocks

Metadata
- Legal Sources
- References
- Agents
- Authority
- Time Instants
- Temporal Characteristics
- Jurisdiction
- Role

Context
association of metadata with rules

```xml
<lrml:Rule key="rule1">
    <lrml:if> ...</lrml:if>
    <lrml:then>... </lrml:then>
</lrml:Rule>...
```
<lrml:LegalSources>  
  <lrml:LegalSource key="ref1"  
    sameAs="http://www.law.cornell.edu/uscode/text/17/504#psection-1"/>
</lrml:LegalSources>

<lrml:References>  
  <lrml:Reference refersTo="ref2"  
    refID="/us/USCode/eng@/main#title17-sec504-clsc-pnt1"  
    refIDSysName="AkomaNtoso2.0-2012-10"/>
</lrml:References>
Temporal Events and Temporal Situations

Event that define the validity of the rules

Type of event: In force Efficacy

In force Efficacy

Event that define the validity of the rules
LegalRuleML main blocks: rules

Metadata
- Legal Sources
- References
- Agents
- Authority
- Time Instants
- Temporal Characteristics
- Jurisdiction
- Role

Context association of metadata with rules

```xml
<lrml:Rule key="rule1">
  <lrml:if> ...</lrml:if>
  <lrml:then>... </lrml:then>
</lrml:Rule>...
```
National Consumer Credit Protection Act 2009:
Section 29
(Prohibition on engaging in credit activities without a licence)
(1) A person must not engage in a credit activity if the person does not hold a licence authorising the person to engage in the credit activity.

Civil penalty: 2,000 penalty units.
Omissis
Criminal penalty: 200 penalty units, or 2 years imprisonment, or both.
Deontic operators

**Obligation +**: a Deontic Specification for a state, an act, or a course of action to which a Bearer is legally bound, and if it is not achieved or performed results in a Violation.

**Prohibition +**: a Deontic Specification for a state, an act, or a course of action to which a Bearer is legally bound, and if it is achieved or performed results in a Violation.

**Permission +**: a Deontic Specification for a state, an act, or a course of action where the Bearer has no Obligation or Prohibition to the contrary.

**Right +**: a Deontic Specification that gives a Permission to a party (the Bearer) and implies there are Obligations or Prohibitions on other parties (the AuxiliaryParty) such that the Bearer can (eventually) exercise the Right.
Penalty and Reparation

**Penalty**

*PenaltyStatement* :

A Legal Statement of a sanction (e.g. a punishment or a correction).

**Reparation** :

An indication that a *PenaltyStatement* is linked with a *PrescriptiveStatement*, meaning that a sanction may apply when the *PrescriptiveStatement* entails a Deontic Specification, and there is a Violation of the Deontic Specification.

A penalty of 200 criminal unit is a *reparation* for violating the prohibition on engaging in a credit activity without a financial license.
## Defeasibility

<table>
<thead>
<tr>
<th>body always head</th>
<th>body -&gt; head</th>
<th>strict</th>
</tr>
</thead>
<tbody>
<tr>
<td>body sometimes head</td>
<td>body =&gt; head</td>
<td>defeasible</td>
</tr>
<tr>
<td>body not complement head</td>
<td>body ~&gt; head</td>
<td>defeater</td>
</tr>
</tbody>
</table>

R2 > R1

**R1:** A person must not engage in a credit activity.

**R2:** But if the person has a financial license they can engage in a credit activity.

```xml
<lrml:hasQualification>
  <lrml:Overrides over="#R2" under="#R1"/>
</lrml:hasQualification>
```
Example

National Consumer Credit Protection Act 2009: Section 29

(Prohibition on engaging in credit activities without a licence)

(1) A person must not engage in a credit activity if the person does not hold a licence authorising the person to engage in the credit activity.

Civil penalty: 2,000 penalty units.

Criminal penalty: 200 penalty units, or 2 years imprisonment, or both.
LegalRuleML modelling

- In a giving time t=2009, the author Guido, the authority “Consumer Credit Agency”, in the jurisdiction “Australia”, source text sec29
- ps1: Person(x) => [FORB]EngageCreditActivity(x)
- ps2: HasLicence(x) => [PERM]EngageCreditActivity(x)
- ps2 > ps1
- pen1: [OBL] PayCivilUnits(x,2000)
- pen2:
  - [OBL] PayPenalUnits(x,200),
  - [OBL] Imprisonment(x,2y),
  - [OBL] PayPenaltyUnitsPlusImprisonment(x,200,2y)
- rep1: [Violation]ps1, pen1
- rep2: [Violaltion]ps1, pen2
LegalRuleML main blocks

Metadata
- Legal Sources
- References
- Agents
- Authority
- Time Instants
- Temporal Characteristics
- Jurisdiction
- Role

Context

bridge between metadata and rules

<lrml:Rule key="rule1">
  <lrml:if> ...
  <lrml:then>...
  </lrml:then>
</lrml:Rule>...
Alternative interpretations of the same text

Criminal penalty: 200 penalty units, or 2 years imprisonment, or both.

**pen2a:**

\[
\text{SUBORDERLIST} \{ \\
\quad \text{[OBL] PayPenalUnits}(x,200), \\
\quad \text{[OBL] Imprisonment}(x,2y), \\
\quad \text{[OBL] PayPenaltyUnitsPlusImprisonment}(x,200,2y) \\
\}
\]

**pen2b:**

\[
\text{OR} \{ \\
\quad \text{[OBL] PayPenalUnits}(x,200) \\
\quad \text{[OBL] Imprisonment}(x,2y), \\
\quad \text{[OBL] PayPenaltyUnitsPlusImprisonment}(x,200,2y) \\
\}
\]

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Monica Guido
LegalRuleML modelling

- In a giving time $t=2009$, the author Guido, the authority “Consumer Credit Agency”, in the jurisdiction “Australia”, source text sec29
- $\text{ps1}: \text{Person}(x) \Rightarrow [\text{FORB}]\text{EngageCreditActivity}(x)$
- $\text{ps2}: \text{HasLicence}(x) \Rightarrow [\text{PERM}]\text{EngageCreditActivity}(x)$
- $\text{ps2} > \text{ps1}$
- $\text{pen1}: [\text{OBL}] \text{PayCivilUnits}(x,2000)$
- $\text{pen2a}$:
  - SUBORDERLIST {
    - $[\text{OBL}] \text{PayPenalUnits}(x,200)$,
    - $[\text{OBL}] \text{Imprisonment}(x,2y)$,
    - $[\text{OBL}] \text{PayPenaltyUnitsPlusImprisonment}(x,200,2y)$
  }
- $\text{pen2b}$:
  - OR {
    - $[\text{OBL}] \text{PayPenalUnits}(x,200)$
    - $[\text{OBL}] \text{Imprisonment}(x,2y)$,
    - $[\text{OBL}] \text{PayPenaltyUnitsPlusImprisonment}(x,200,2y)$
  }
- $\text{rep1}: [\text{Violation}]\text{ps1}, \text{pen1}$
- $\text{rep2a}: [\text{Violation}]\text{ps1}, \text{pen2a}$
- $\text{rep2b}: [\text{Violation}]\text{ps1}, \text{pen2b}$
Conclusion and Future plans

- LegalRuleML is an emerging XML standard for modelling legal rules oriented to the legal expert, that provides a compact and expressive syntax.
- RDF approach helps to foster the Open Rules in Linked Data and in Semantic Web.
- Future work:
  - integration with Reaction RuleML
  - meta-model for permitting export in RDF
  - extensibility mechanisms of the schema
  - case-law management
  - good documentation and pilot cases
Where to find material of the tutorial

- Schemas and Examples SVN: https://tools.oasis-open.org/version-control/browse/wsvn/legalruleml/trunk/examples/approved/?rev=117&sc=1#_trunk_examples_approved
- Documentation of the LegalRuleML TC: https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=legalruleml
Thank you for your attention!