Profiles of knowledge representation and reasoning for legal information retrieval and legal compliance checking

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E SISTEMI GIUDIZIARI

Scenario 1

OnLine Contract

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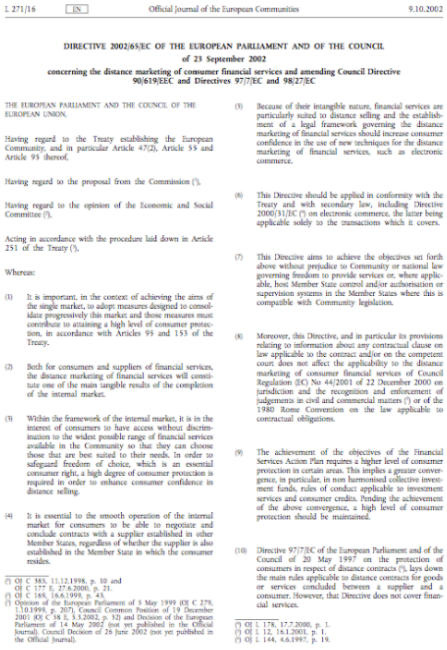
OnLine Contract

Consumer Protection Law



L 271/16 EN Official Journal of the European Communities 9.10.2002

DIRECTIVE 2002/65/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 23 September 2002
concerning the distance marketing of consumer financial services and amending Council Directive 90/619/EEC and Directives 97/7/EC and 98/27/EC

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 47(2), Article 55 and Article 95 thereof,

Having regard to the proposal from the Commission (1),

Having regard to the opinion of the Economic and Social Committee (2),

Acting in accordance with the procedure laid down in Article 251 of the Treaty (3),

Whereas:

(1) It is important, in the context of achieving the aims of the single market, to adopt measures designed to consolidate progressively this market and those measures must contribute to attaining a high level of consumer protection, in accordance with Articles 95 and 153 of the Treaty.

(2) Both for consumers and suppliers of financial services, the distance marketing of financial services will constitute one of the main tangible results of the completion of the internal market.

(3) Within the framework of the internal market, it is in the interest of consumers to have access without discrimination to the widest possible range of financial services available in the Community so that they can choose those that are best suited to their needs. In order to safeguard freedom of choice, which is an essential consumer right, a high degree of consumer protection is required in order to enhance consumer confidence in distance selling.

(4) It is essential to the smooth operation of the internal market for consumers to be able to negotiate and conclude contracts with a supplier established in other Member States, regardless of whether the supplier is also established in the Member State in which the consumer resides.

(5) Because of their intangible nature, financial services are particularly suited to distance selling and the establishment of a legal framework governing the distance marketing of financial services should increase consumer confidence in the use of new techniques for the distance marketing of financial services, such as electronic commerce.

(6) This Directive should be applied in conformity with the Treaty and with secondary law, including Directive 2000/31/EC (4) on electronic commerce, the latter being applicable solely to the transactions which it covers.

(7) This Directive aims to achieve the objectives set forth above without prejudice to Community or national law governing freedom to provide services or, where applicable, host Member State control and/or authorisation or supervision systems in the Member States where this is compatible with Community legislation.

(8) Moreover, this Directive, and in particular its provisions relating to information about any contractual clause on law applicable to the contract and/or on the competent court does not affect the applicability to the distance marketing of consumer financial services of Council Regulation (EC) No 44/2001 of 22 December 2000 on jurisdiction and the recognition and enforcement of judgements in civil and commercial matters (5) or of the 1980 Rome Convention on the law applicable to contractual obligations.

(9) The achievement of the objectives of the Financial Services Action Plan requires a higher level of consumer protection in certain areas. This implies a greater convergence, in particular, in non harmonised collective investment funds, rules of conduct applicable to investment services and consumer credits. Pending the achievement of the above convergence, a high level of consumer protection should be maintained.

(10) Directive 97/7/EC of the European Parliament and of the Council of 20 May 1997 on the protection of consumers in respect of distance contracts (6), lays down the main rules applicable to distance contracts for goods or services concluded between a supplier and a consumer. However, that Directive does not cover financial services.

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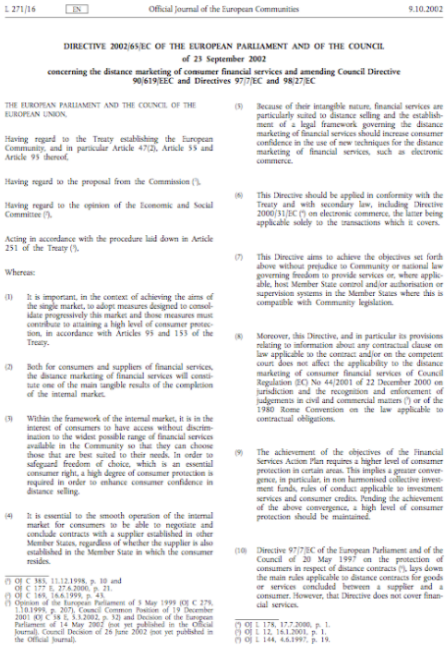

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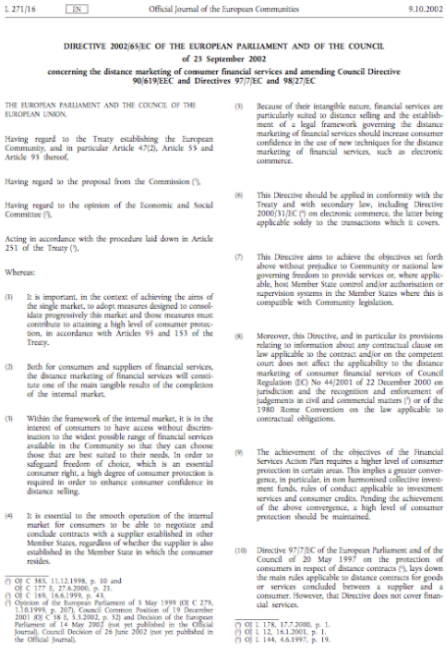

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Legal information retrieval system endowed with reasoning facilities

Scenario 2

Speed Limits

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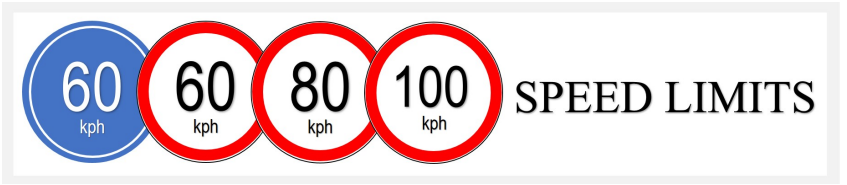
Speed Limits

Speed Limits Regulation



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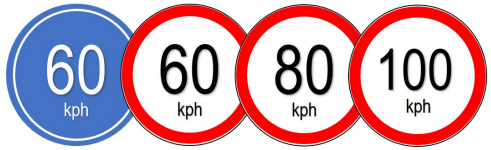

Interest in

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- Checking such compliance in presence of conflicting rules or rules changing over time (norm defeasibility)

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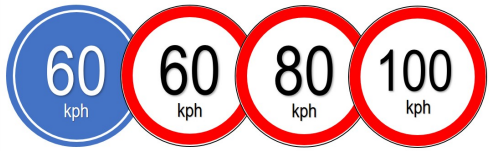

Interest in

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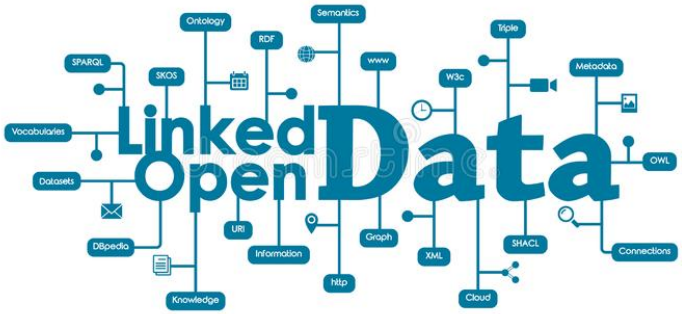
- Checking such compliance in presence of conflicting rules or rules changing over time (norm defeasibility)

Legal compliance checking system endowed with reasoning facilities

An Approach in the Semantic Web



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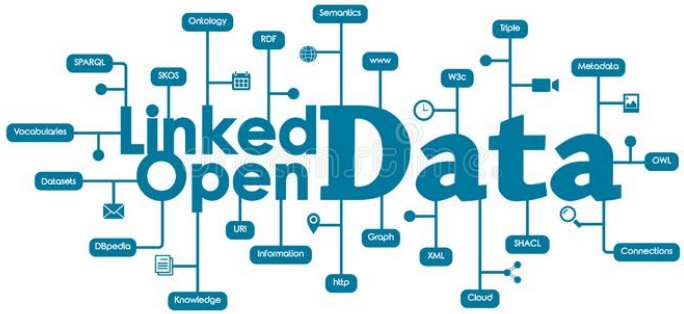
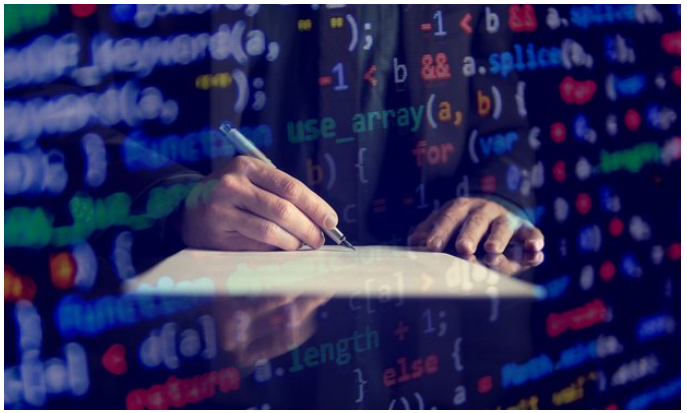
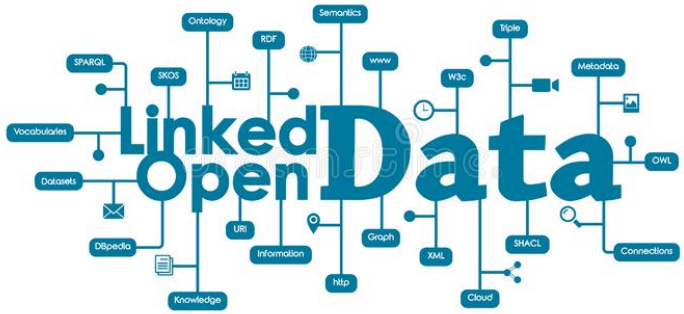
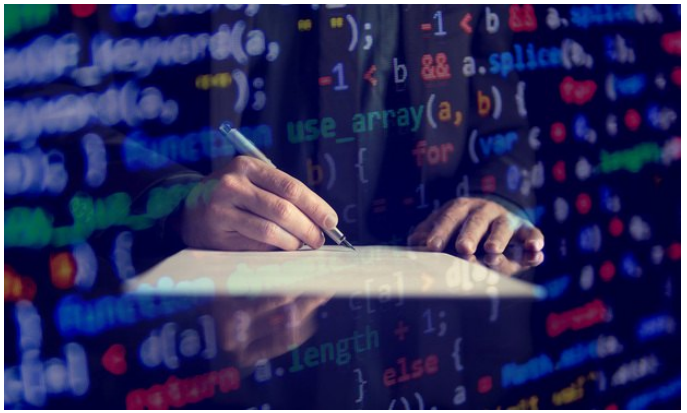




Law as Code

An Approach in the Semantic Web





Law as Code

Legal reasoning by OWL-DL and decidable reasoners

Legal Rules: Provisions and Norms

A Legal Rule can be seen in a twofold perspective:

Provision

A set of signs organized in words and sentences for creating a normative statement [Raz, 1980] [Biagioli, 2009]

Norm

The applicative meaning of such normative statement
[Guastini, 2010], [Marmor, 2014]

Excerpt from EU Directive 2002/65/EC

Art. 5

1. The supplier shall communicate to the consumer all the contractual terms and conditions and the information referred to in Article 3(1) and Article 4 [...]

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Provision: Textual legal object

- drafted
- searched and retrieved
- modified

Excerpt from EU Directive 2002/65/EC

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Provision: Textual legal object

- drafted
- searched and retrieved
- modified

Norm: Social legal object

- It's a rule applicable in a social context
- We can check if a "state of affairs" is compliant with such a norm

Provisions and Norms: properties

Relationships between Provisions and Norms [Pino, 2016]

- A Provision can include more Norms
- A Norm can be expressed by different Provisions

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Relationships with Time

- Provisions, as pure textual objects, are the product of lawmaking and are characterized by the in-force date
- Norms, as applicative interpretation of provisions, are characterised by the efficacy date (starting date in which a norm can be concretely applied).

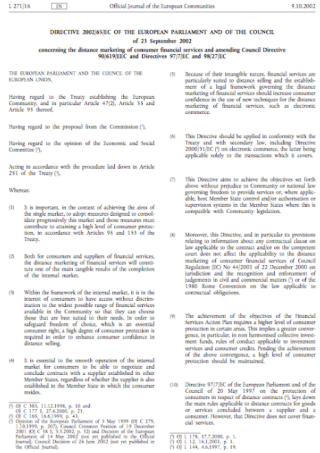
Provision (in-force)	**Norm (effective)**
YES	YES
YES	NO
NO	YES*
NO	NO

*retro-activity / ultra-activity

Provisions and Norms in Legal Reasoning

Reasoning with textual information ⇒ Provisions

- Advanced legal information retrieval
  (ex: Hohfeldian reasoning)
- Legal drafting



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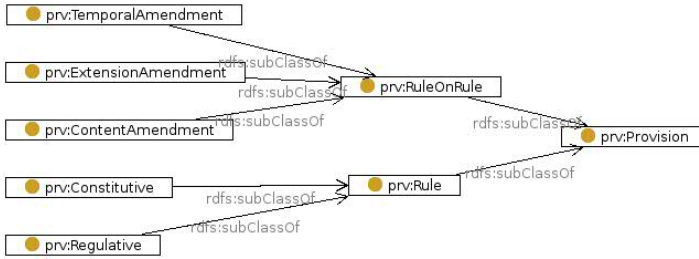
Reasoning with interpretation/application of legal rules ⇒ Norms

- Legal compliance checking

Modeling Provisions and Norms

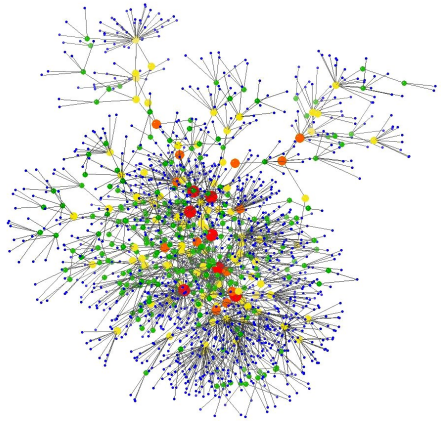
- Provisions

  can be classified and modeled by a provision taxonomy (Provision Model) for semantic annotation of legal texts



- Norms (deontic norms)

  can be modeled in terms of property restrictions in a domain ontology



Modeling Provisions

for Semantic Annotation and
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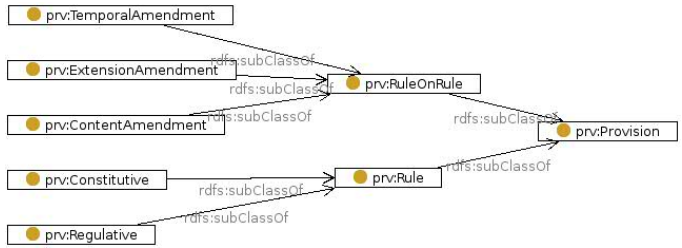

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3. At any time during the contractual relationship the consumer is entitled, at his request, to receive the contractual terms and conditions on paper. [...]

[...]
Art. 6
1. The Member States shall ensure that the consumer shall have a period of 14 calendar days to withdraw from the contract without penalty and without giving any reason [...]

[...]

Formal Profile: Set of paragraphs

Art. 5

1. The supplier shall communicate to the consumer all the contractual terms and conditions and the information referred to in Article 3(1) and Article 4 [...] — Paragraph

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Semantic Profile: Set of Provisions

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Duty (*Supplier*, *Consumer*)

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Procedure (*Supplier*, *Consumer*)

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Right (*Consumer*, *Supplier*)

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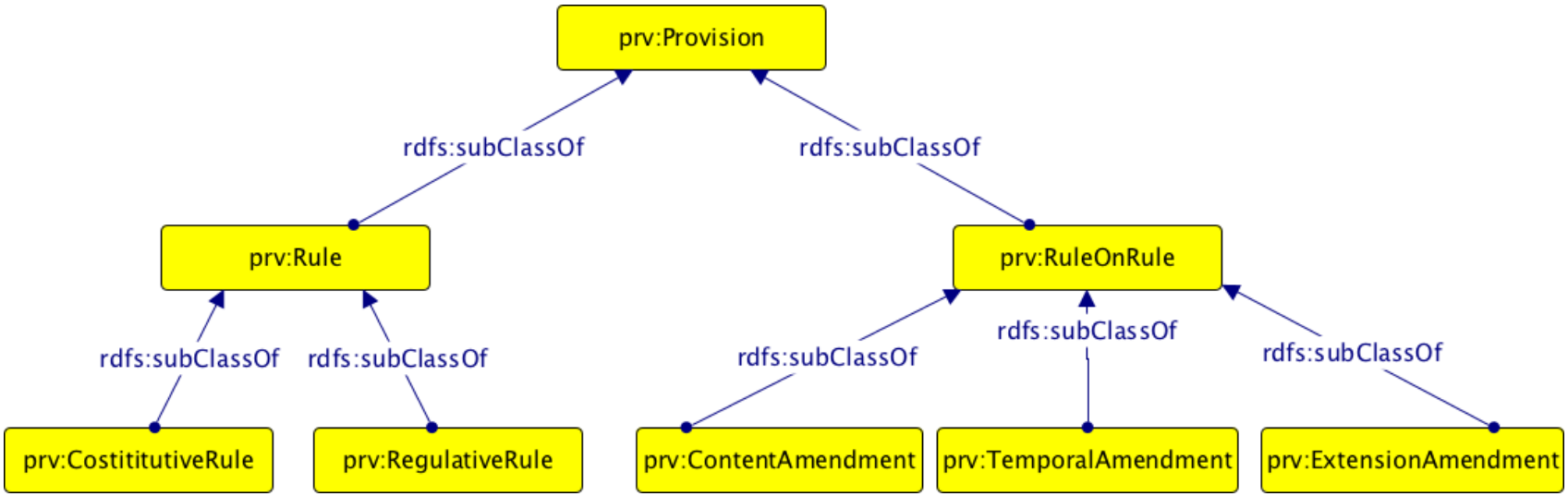
Provision Model



Provision Model contributes to Systematize the Law

A provision-centric view of legislative texts contributes to

1. Transparency
2. Semantic search facilities for legal rules
3. Consolidation (by amendments description)
4. Analysis of coherence and impact of new texts on the legal systems (contradictory norms, RIA, etc.)
5. Legal Drafting based on semantics

Provision Model contributes to Systematize the Law

A provision-centric view of legislative texts contributes to

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Semantic sub-profiles: Logic Profile

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Logical Relations (Hohfeldian relations)

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Right (*Consumer*, *Member States*)

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Technical Relations

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Duty (*Supplier*, *Communication*, *Contractual terms...*)

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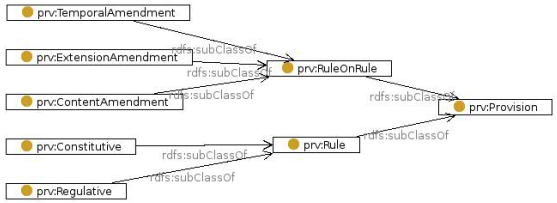
Procedure (*Supplier*, *Communication*, *Contractual terms...*)

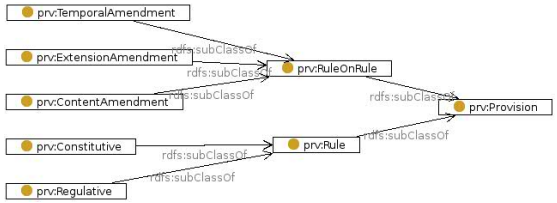
Approach

1. Representing Provision Types and Attributes (Provision Model)



Approach

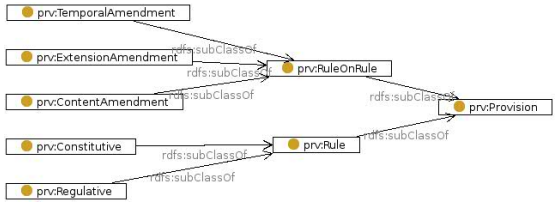
1. Representing Provision Types and Attributes (Provision Model)
2. Expressing axioms on Provisions Types and Attributes



(MTL1): $(A \to B) \to ((B \to C) \to (A \to C))$
(MTL2): $A \otimes B \to A$
(MTL3): $A \otimes B \to B \otimes A$
(MTL4a): $A \wedge B \to A$
(MTL4b): $A \wedge B \to B \wedge A$
(MTL4c): $A \otimes (A \to B) \to A \wedge B$
(MTL5a): $(A \to (B \to C)) \to (A \otimes B \to C)$
(MTL5b): $(A \otimes B \to C) \to (A \to (B \to C))$
(MTL6): $((A \to B) \to C) \to (((B \to A) \to C) \to C)$
(MTL7): $\bot \to A$

Approach

1. Representing Provision Types and Attributes (Provision Model)



2. Expressing axioms on Provisions Types and Attributes

$$
\begin{array}{ll}
\text{(MTL1):} & (A \to B) \to ((B \to C) \to (A \to C)) \\
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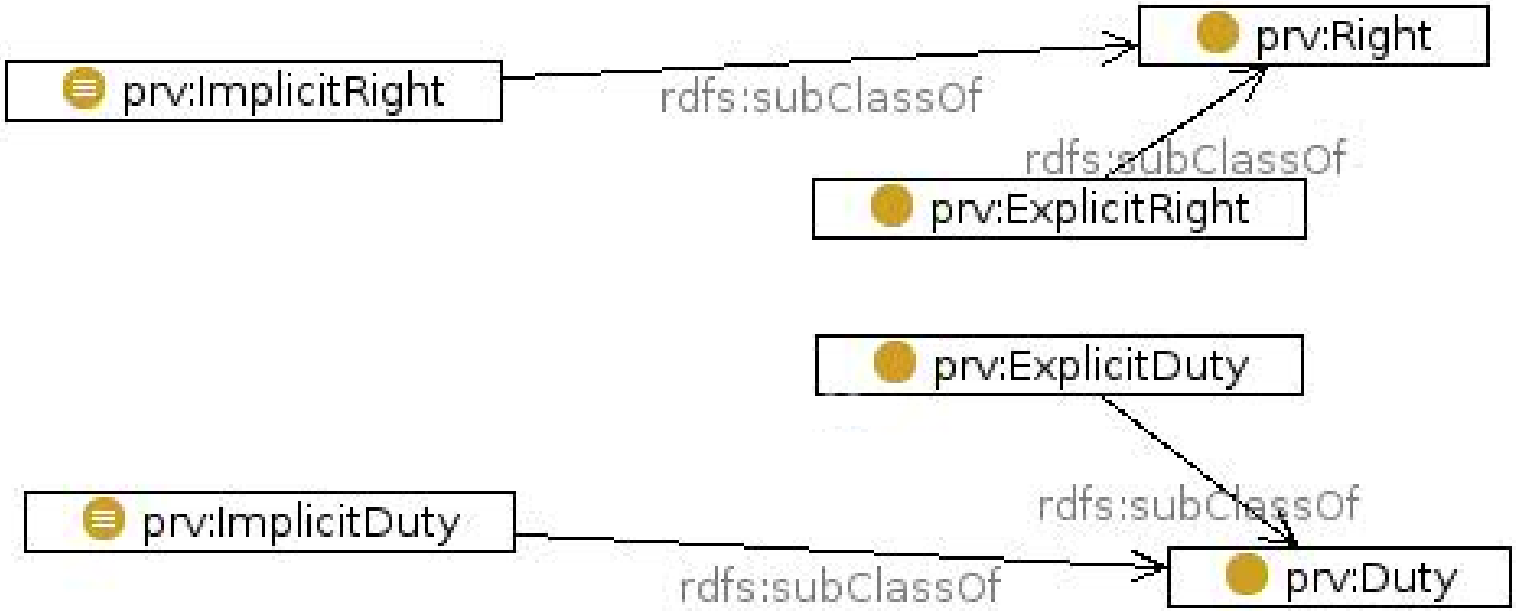
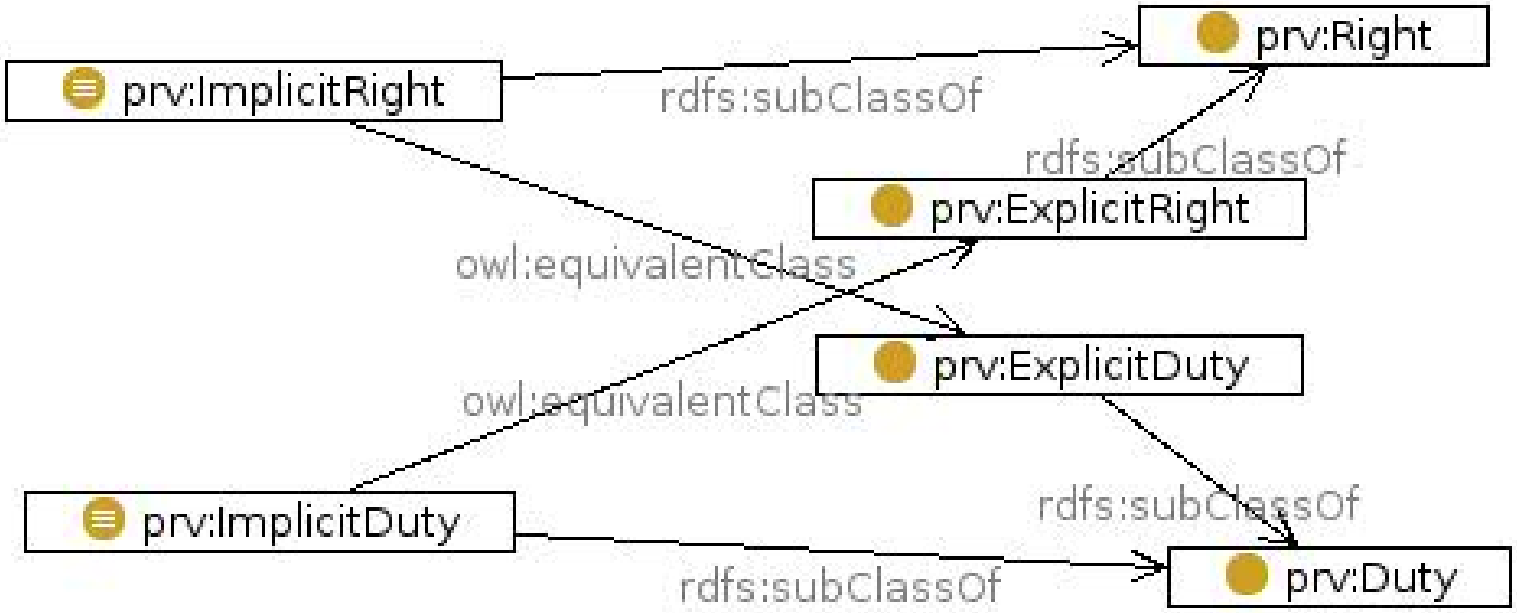
\text{(MTL7):} & \bot \to A
\end{array}
$$

3. Tools
   - RDF(S) and OWL-DL standards
   - Inferences by an OWL-DL reasoner
   - SPARQL as query language

Extension of the Provision Model: Provision Types



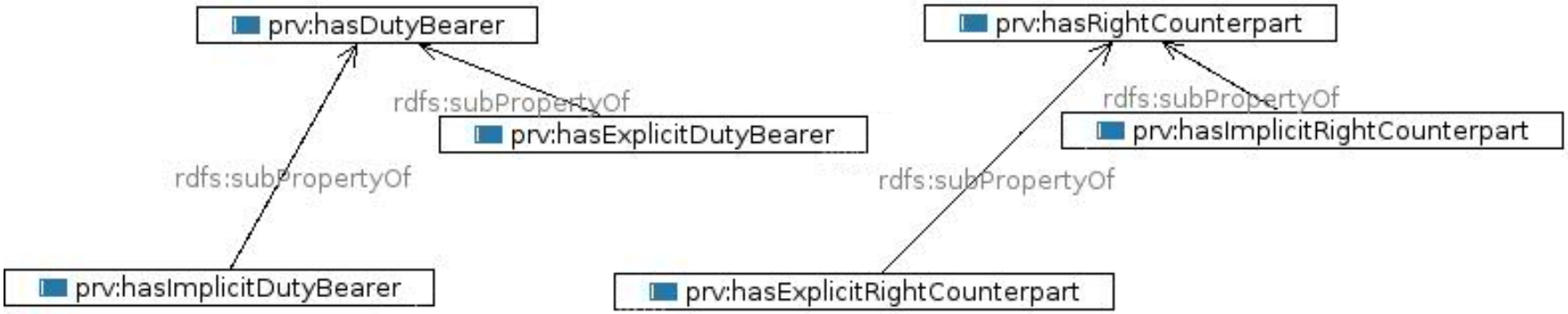
DL Axioms on correlative deontic concepts: Duty/Right



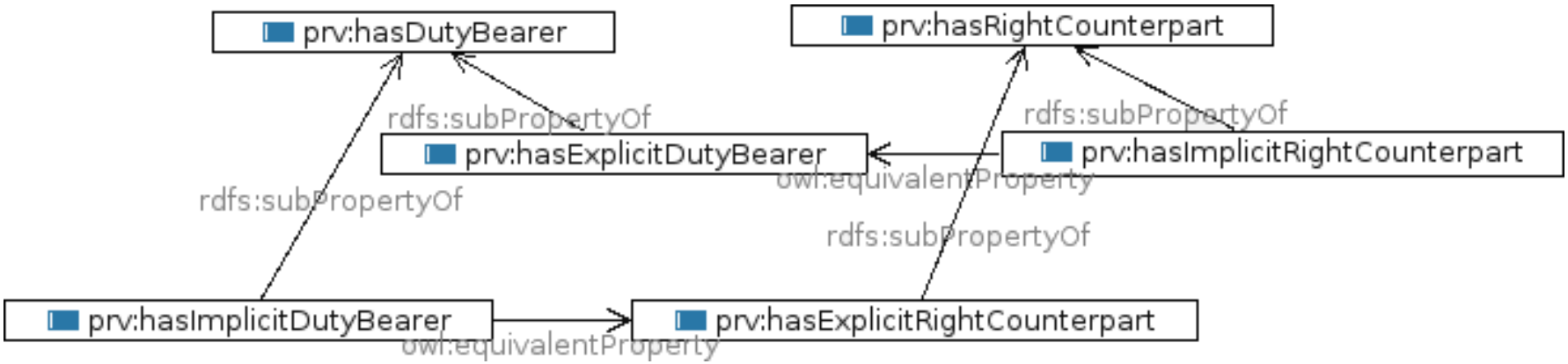
Axioms [Francesconi, 2014] [Francesconi, 2016]

ImplicitRight $\equiv$ ExplicitDuty
ImplicitDuty $\equiv$ ExplicitRight

Extension of the Provision Model: Provision Attributes



Axioms on Provision Attributes (OWL-DL)



Axioms [Francesconi, 2014] [Francesconi, 2016]

hasImplicitDutyBearer $\equiv$ hasExplicitRightCounterpart
hasImplicitRightCounterpart $\equiv$ hasExplicitDutyBearer

The same holds for hasRightBearer and hasDutyCounterpart in their explicit and implicit views.

The Inferred Model

- Inference facilities through an OWL reasoner

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- ex: Pellet – Java based OWL-DL reasoner

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- The result is a Provision Model where inferences are calculated from the asserted axioms

Querying the System

SPARQL queries using the Provision Model and property values

```
SELECT ?x WHERE { ?x prv:hasRightBearer ‘‘Consumer’’ }
```

Logical relations
1) Hohfeldian inference case-study: Querying the System

SELECT ?x WHERE { ?x prv:hasRightBearer "Consumer" }

Art. 5

1. The supplier shall communicate to the consumer all the contractual terms and conditions and the information referred to in Article 3(1) and Article 4 [...]	ExplicitDuty (*Supplier*, *Consumer*)
2. The supplier shall fulfil his obligation under paragraph 1 immediately after the conclusion of the contract, if the contract has been concluded at the consumer's request using a means of distance communication which does not enable providing the contractual terms [...]	Procedure (*Supplier*, *Consumer*)
3. At any time during the contractual relationship the consumer is entitled, at his request, to receive the contractual terms and conditions on paper. [...]	ExplicitRight (*Consumer*, *Supplier*)

[...]

Art. 6

1. The Member States shall ensure that the consumer shall have a period of 14 calendar days to withdraw from the contract without penalty and without giving any reason [...]	ExplicitDuty (*Mem. States*, *Consumer*)

[...]

Logical relations
2) Query result based on the *Asserted Model*

SELECT ?x WHERE { ?x prv:hasRightBearer "Consumer" }

Art. 5

[...]
Art. 6

[...]

Logical relations
2) Query result based on the *Asserted Model*

SELECT ?x WHERE { ?x prv:hasExplicitRightBearer "Consumer" }

Art. 5

3. At any time during the contractual relationship the consumer is entitled, at his request, to receive the contractual terms and conditions on paper. [...]

ExplicitRight (*Consumer*, *Supplier*)

[...]
Art. 6

[...]

Logical relations
3) Query result based on the *Inferred Model*

SELECT ?x WHERE { ?x prv:hasRightBearer "Consumer" }

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ExplicitDuty (*Supplier*, *Consumer*)

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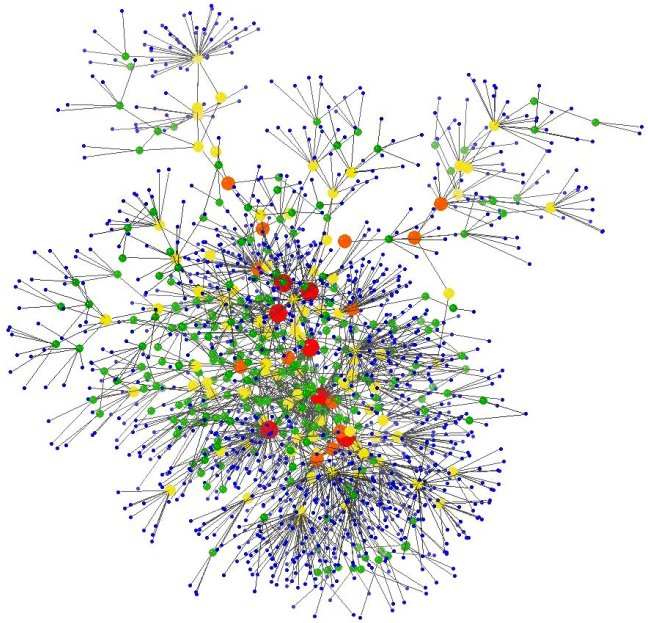
Modeling Norms

by Domain Ontologies
for Legal Compliance Checking



Representing Norms

- Provision is the textual expression of a legal rule
  $\Rightarrow$ textual object

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  $\Rightarrow$ conceptual object
  1. reality can be represented by domain ontologies
  2. deontic notions can be represented as constraints on the reality (ontology restrictions)
  3. legal compliance checking means identifying individuals compliant with such constraints

Legal Rules

R1 *The supplier shall communicate to the consumer all the contractual terms and conditions*

R2 *According to a [country] law one cannot drive over 90 km/h*

Both rules are speech acts, namely Provisions in specific regulations.

Considering the application of R1 and R2 on specific facts, we actually talk about Norms.

Norms Modeling: Obligation at R1

R1. *The supplier shall communicate to the consumer all the contractual terms and conditions*

Norms Modeling: Obligation at R1

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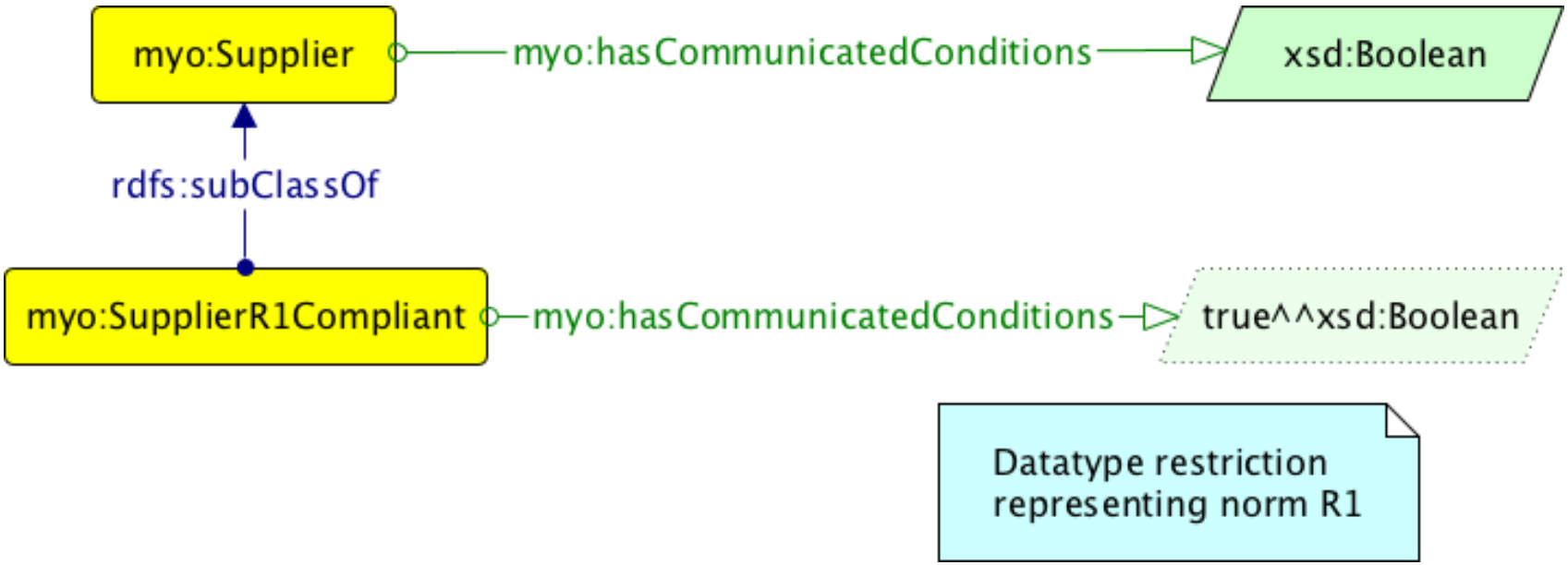
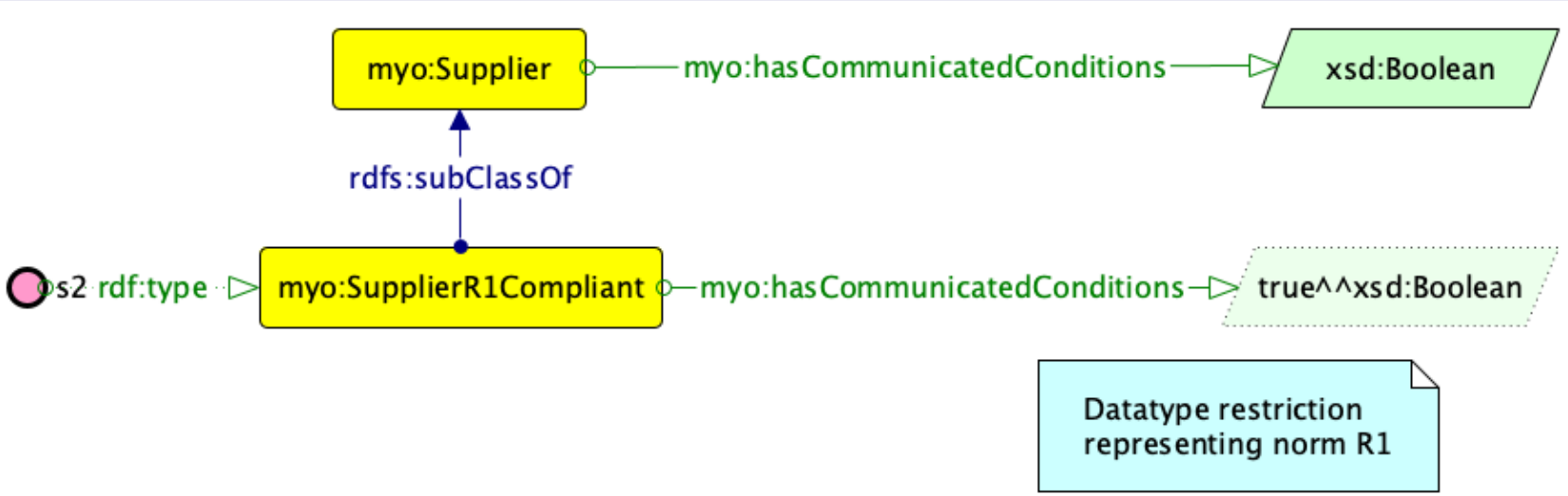


Compliance checking: Supplier R1 compliant

Selecting individuals compliant to Obligation at R1

```
SELECT ?x WHERE  {?x  rdf:type myo:SupplierR1Compliant}
```

Duty at R1 compliant individuals



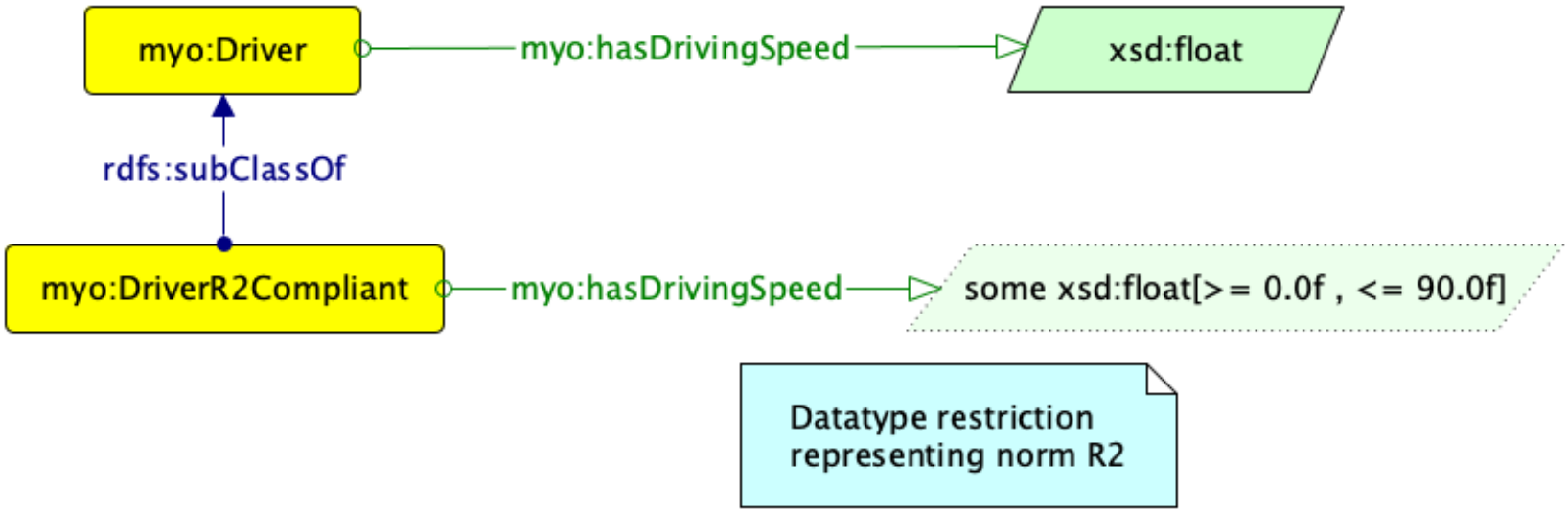

```
<myo:Supplier rdf:about="http://www.ittig.cnr.it/ontologies/def/MyOntology#s2">
```

Norms Modeling: Obligation R2 compliant

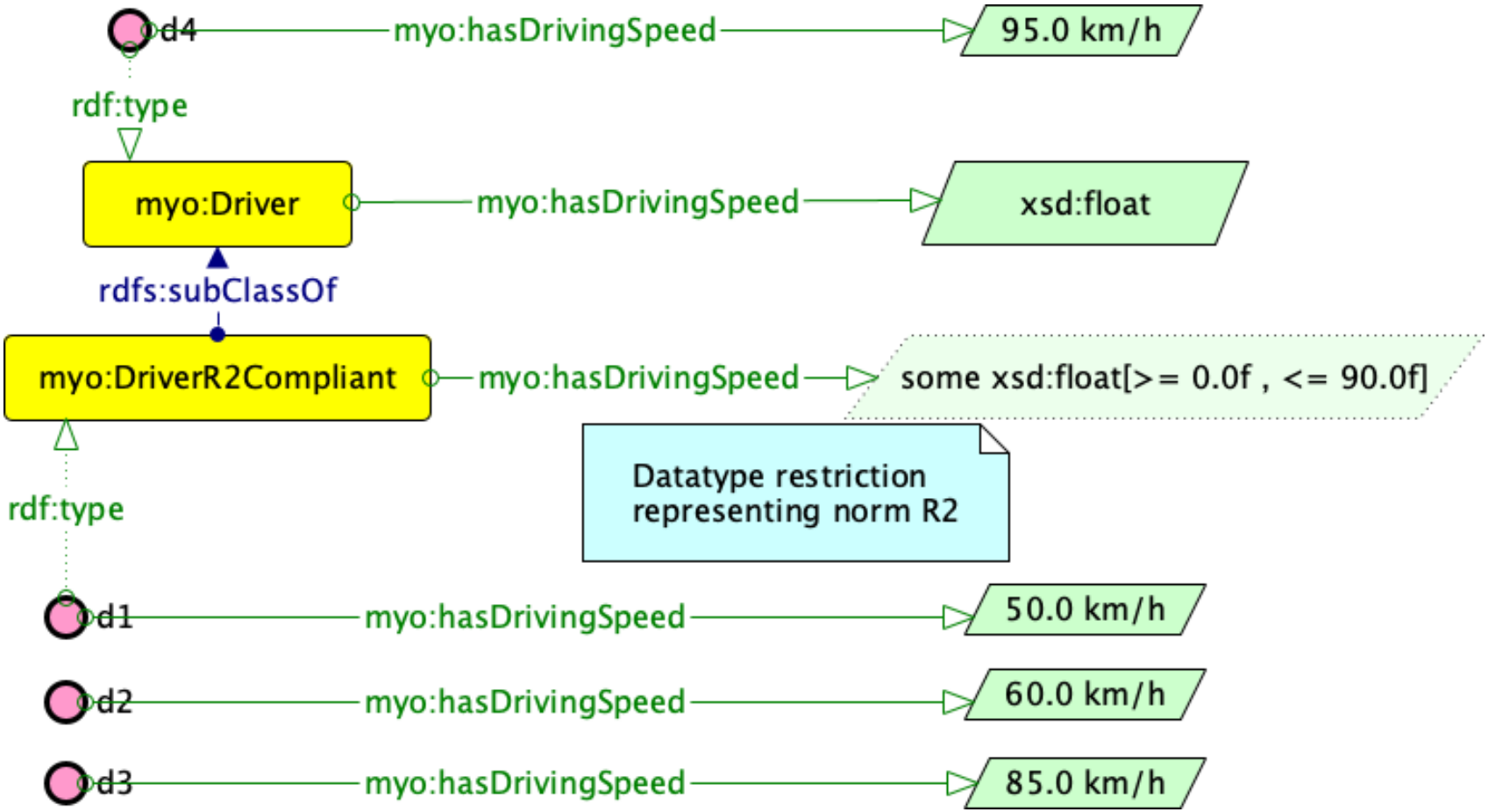
R2. *According to a [country] law one cannot drive over 90 km/h*

Norms Modeling: Obligation R2 compliant

R2. *According to a [country] law one cannot drive over 90 km/h*



Compliance checking: Drivers compliant with Obligation R2



Handling Norm Defeasibility

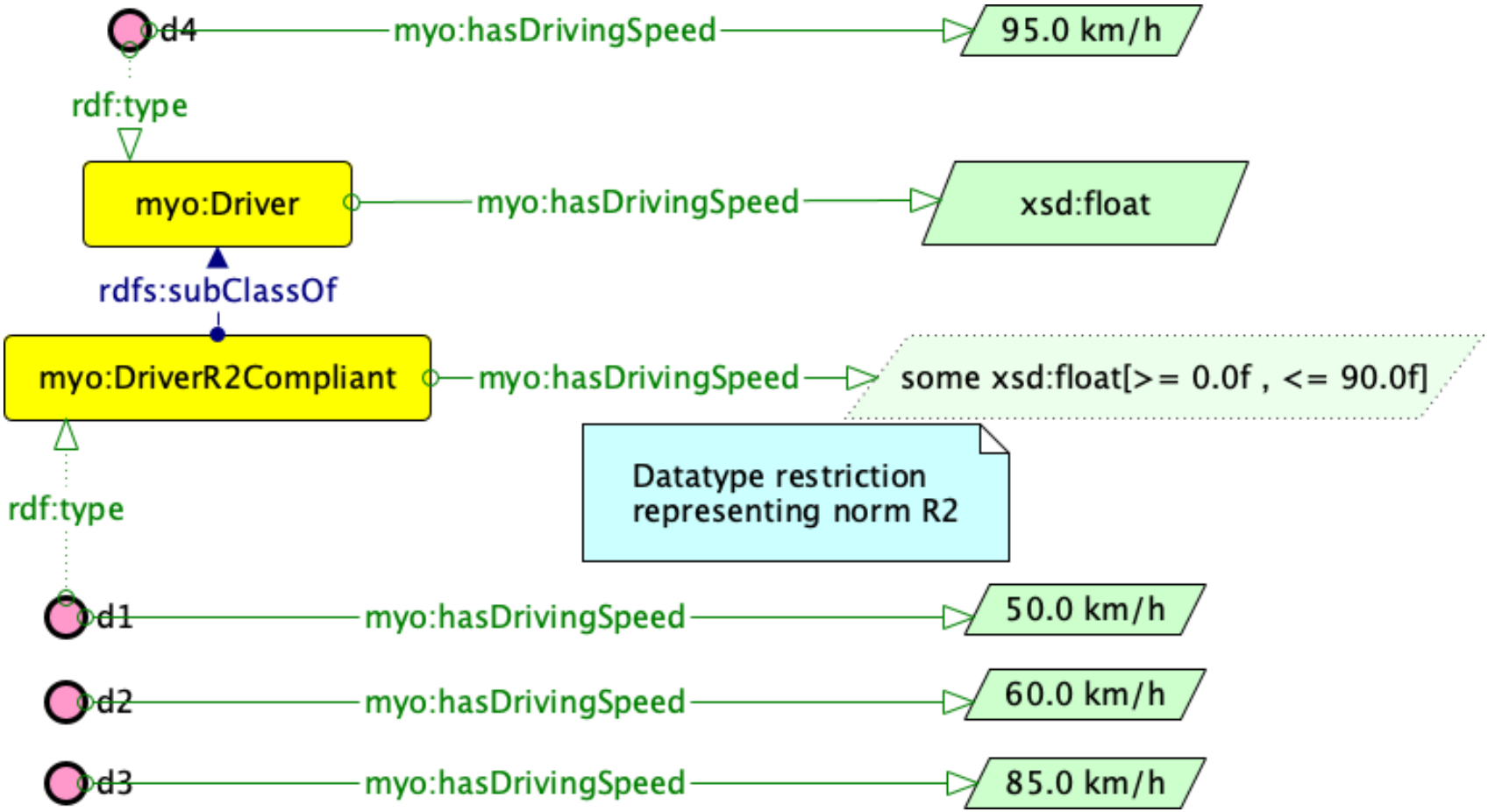
in Legal Compliance Checking

Defeasibility and Legal Reasoning

- Defeasibility is the property of an argumentation system for which a conclusion is open to revision in case evidence to the contrary is provided [Athan et al., 2015]

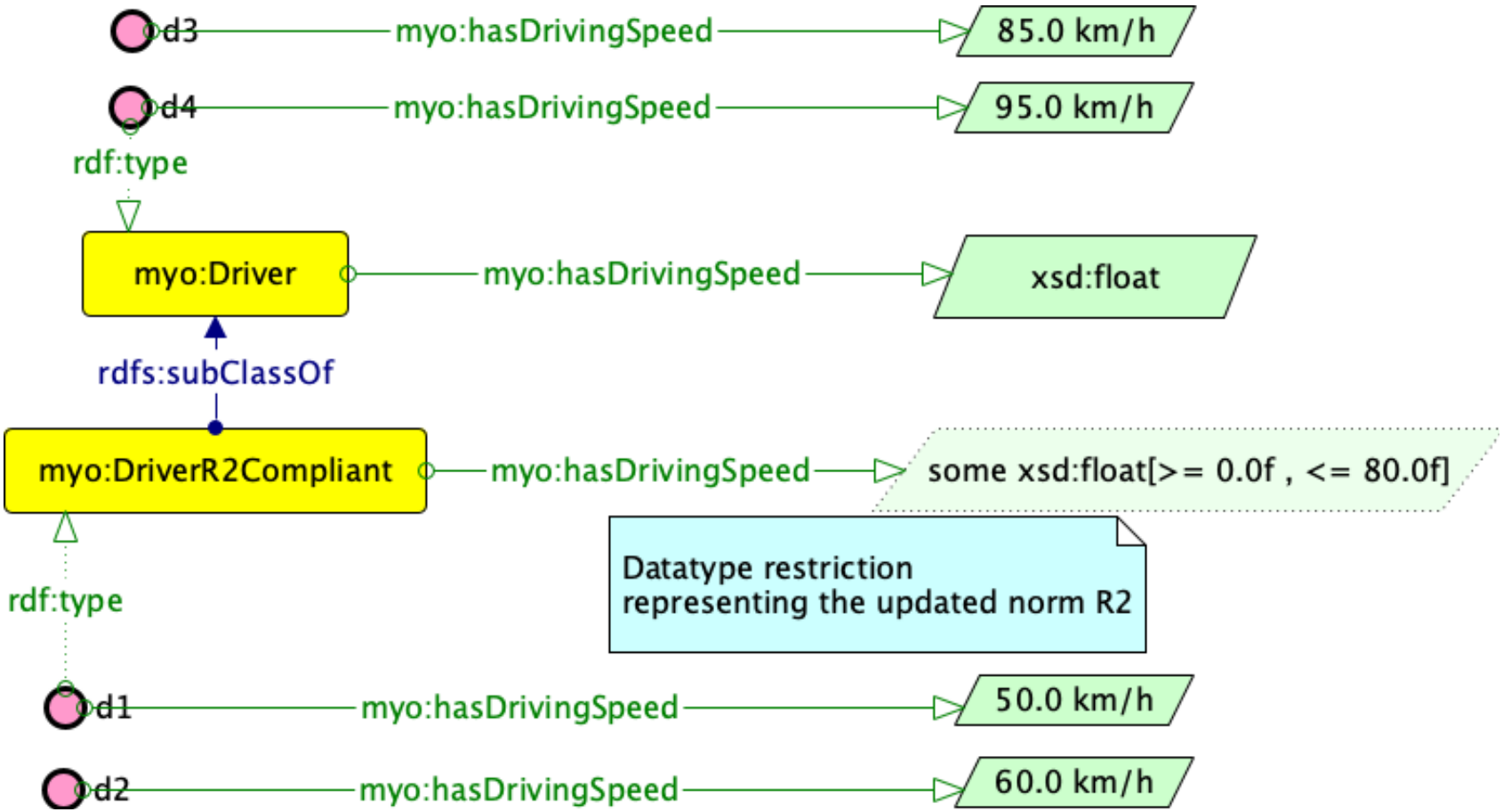
- In legal reasoning, norm conflicts or norm exceptions might breach a previous conclusion (non-monotonic reasoning)

Model for R2




```
SELECT ?x WHERE { ?x rdf:type myo:DriverR2Compliant }
```

Updated model for R2




```
SELECT ?x WHERE { ?x rdf:type myo:DriverR2Compliant }
```

Conclusions

- Framework for transforming the Law as Code (actionable rules) in the Semantic Web

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- Framework for transforming the Law as Code (actionable rules) in the Semantic Web
- Approach for decidable legal reasoning (OWL-DL)
- Based on the distinction between Provisions–Norms
- Approach able to handle defeasible reasoning

Thanks for your attention!

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