

# ODRL Policies

## (Re)using assets on the Web

Beatriz Esteves, PhD Researcher

Ontology Engineering Group, Universidad Politécnica de Madrid

[beatriz.gesteves@upm.es](mailto:beatriz.gesteves@upm.es) | [besteves4@eupolicy.social](https://eupolicy.social)



# Overview

- Policies
  - Definitions
  - Scenarios where policies are useful
- Machine-readable policies
  - Policy languages through the years
  - ODRL
    - Main concepts
    - Taxonomies
    - Examples
    - Using profiles
    - Tools

# Policy definitions

“a course or principle of action adopted or proposed by an organization or individual”

[Oxford Languages](#)

“a set of ideas or a plan of what to do in particular situations that has been agreed to officially by a group of people, a business organization, a government, or a political party”

[Cambridge Dictionary](#)

“a definite course or method of action selected from among alternatives and in light of given conditions to guide and determine present and future decisions”

[Merriam-Webster Dictionary](#)

# Policy definitions

“A group of one or more Rules”

[Open Digital Rights Language \(ODRL\)](#)

“A plan or course of action by an authority, intended to influence and determine decisions, actions, and other matters.”

[DCMI Metadata Terms](#)

“A guidance document outlining any of: procedures, plans, principles, decisions, intent, or protocols.”

[Data Privacy Vocabulary](#)

In which scenarios do you think it is useful to have policies?

In which scenarios do  
you think it is useful  
to have **machine-  
readable** policies?

# Scenarios

**Compliance checking** - Regulate the behavior of agents

*“a company needs to check if the behaviour of its employees is compliant with the policies attached to the digital assets used inside the company”*

# Scenarios

**Access Control** - Determine access by users or software agents to digital resources

*“I want the data that I have stored on my Solid Pod to be used only for the purpose of research and development and by Belgium universities”*



# Scenarios

**Licensing** - Determine how to integrate resources with different policies and deal with incompatibilities

*“I’m doing a project where I use a dataset with a Data Exploration Licence and a software library with an Academic Free License 3.0 license, can I do this at all?”*

# Scenarios

**Validation** – Verify if policies are conformant with a limited subset / are not malicious

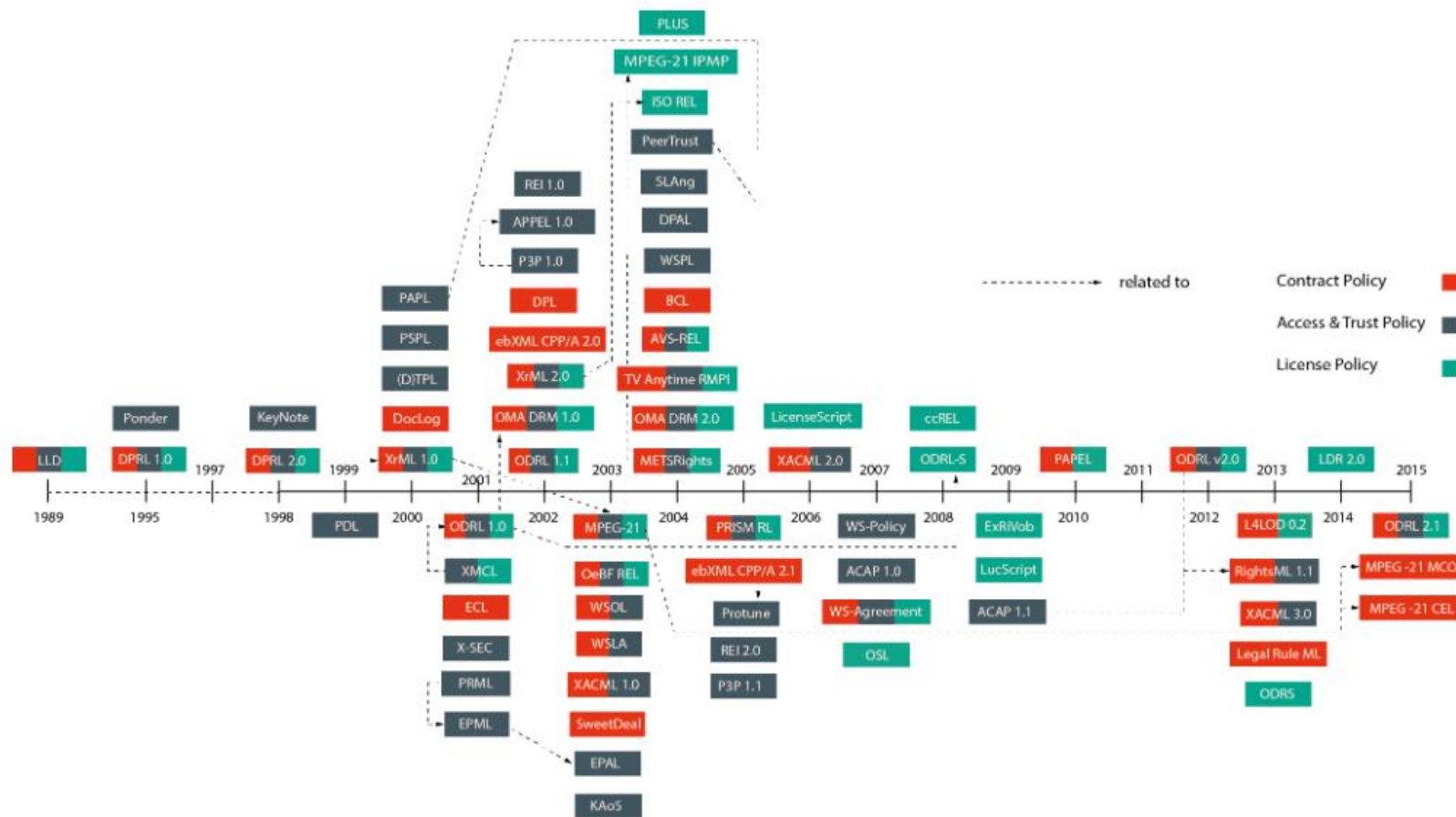
*“How can I make sure that policies with 1 million rules are not introduced in the data portal I’m working on?”*

# Scenarios

**Planning** – Different types of policies are needed when different stakeholders are involved in data exchange protocols

*“I want to do an action, I don't have permission to do it, what do I have to do to get permission to do it?”*

# Policy languages through the years



Pellegrini, Tassilo & Schönhofer, Andrea & Kirrane, Sabrina & Steyskal, Simon & Fensel, Anna & Panasiuk, Oleksandra & Mireles-Chavez, Victor & Thurner, Thomas & Dörfler, Markus & Polleres, Axel. (2018). **A Genealogy and Classification of Rights Expression Languages - Preliminary Results**. 21st International Legal Informatics Symposium (IRIS 2018)

# Open Digital Rights Language

W3C Recommendation		TABLE OF CONTENTS
1.	Introduction	
1.1	Aims of the Model	
1.2	Conformance	
1.3	Terminology	
2.	ODRL Information Model	
2.1	Policy Class	
2.1.1	Set Class	
2.1.2	Offer Class	
2.1.3	Agreement Class	
2.2	Asset Class	
2.2.1	Relation Property	
2.2.2	Part Of Property	
2.2.3	Target Policy Property	
2.3	Party Class	
2.3.1	Function Property	
2.3.2	Part Of Property	
2.3.3	Assigned Policy Properties	
2.4	Action Class	
2.5	Constraints	
2.5.1	Constraint Class	
2.5.2	Logical Constraint Class	
2.5.3	Constraint property with a Rule	
2.5.4	Refinement property with an Action	

## ODRL Information Model 2.2

W3C Recommendation 15 February 2018

### This version:

<https://www.w3.org/TR/2018/REC-odrl-model-20180215/>

### Latest published version:

<https://www.w3.org/TR/odrl-model/>

### Latest editor's draft:

<https://w3c.github.io/poe/model/>

### Implementation report:

<https://w3c.github.io/poe/test/implementors>

### Previous version:

<https://www.w3.org/TR/2018/PR-odrl-model-20180104/>

### Editors:

[Renato Iannella](#), [Monegraph](#), [r@iannel.la](mailto:r@iannel.la)

[Serena Villata](#), [INRIA](#), [serena.villata@inria.fr](mailto:serena.villata@inria.fr)

### Issue list:

[Github Repository](#)

Please check the [errata](#) for any errors or issues reported since publication.

See also [translations](#).

Copyright © 2018 W3C® (MIT, ERCIM, Keio, Beihang). W3C liability, trademark and permissive document

# Why ODRL?

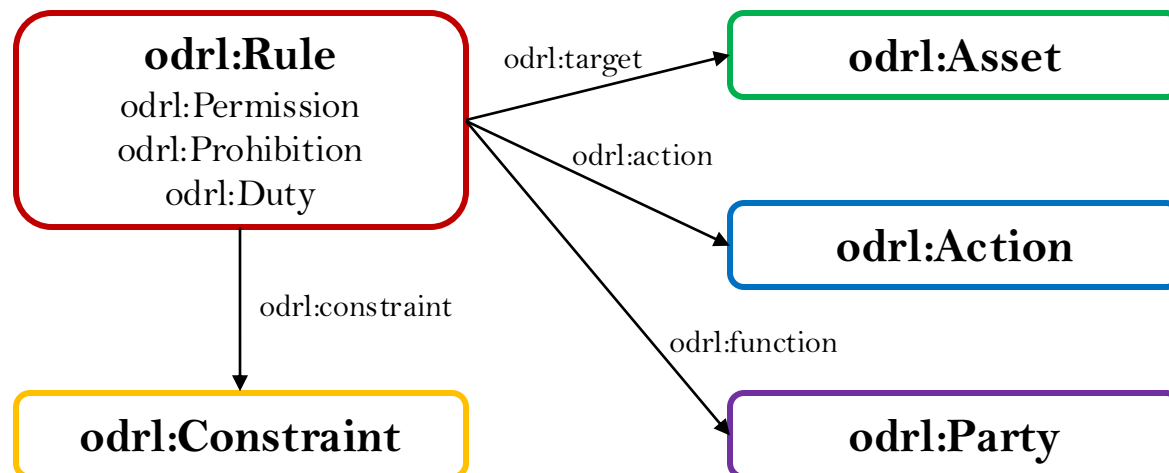
- W3C Recommendation
- Maintained by the [W3C ODRL Community Group](#)
- Composed by several specifications
  - [ODRL Information Model – W3C Recommendation](#)
  - [ODRL Core Vocabulary – W3C Recommendation](#)
  - [ODRL Implementation Best Practices](#)
  - [ODRL Profile Best Practices](#)
  - [ODRL Formal Semantics](#)
- Suitable for declarative and enforceable policies alike
- Successfully deployed in real-world use-cases
- Easily extendable through the use of ODRL profiles

# ODRL

*“provide a standard description model and format to express permission, prohibition, and obligation statements to be associated to content in general”*

*“These machine-readable policies may be linked directly with the content they are associated to with the aim to allow consumers to easily retrieve this information.”*

## ODRL Information Model



Who [**can** | **cannot** | **must**] act **what**  
in **which** resource **how**

# ODRL

***Policy***

A group of one or more Rules

***Rule***

An abstract concept that represents the common characteristics of Permissions, Prohibitions, and Duties.

***Action***

An operation on an Asset

***Permission***

The ability to exercise an Action over an Asset

***Prohibition***

The inability to exercise an Action over an Asset

***Duty***

The obligation to exercise an agreed Action.

***Asset***

A resource or a collection of resources that are the subject of a Rule

***Party***

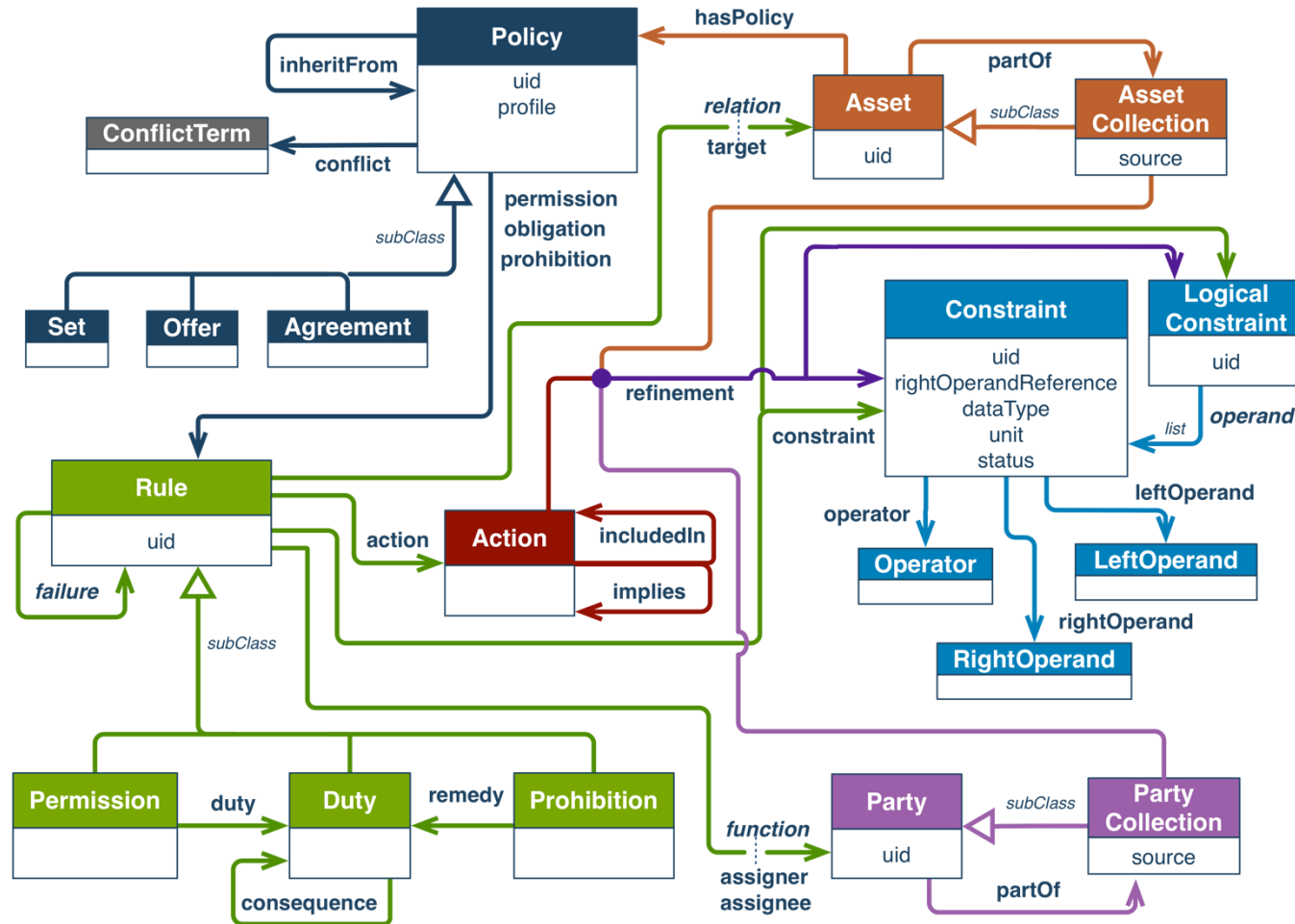
An entity or a collection of entities that undertake Roles in a Rule

***Constraint***

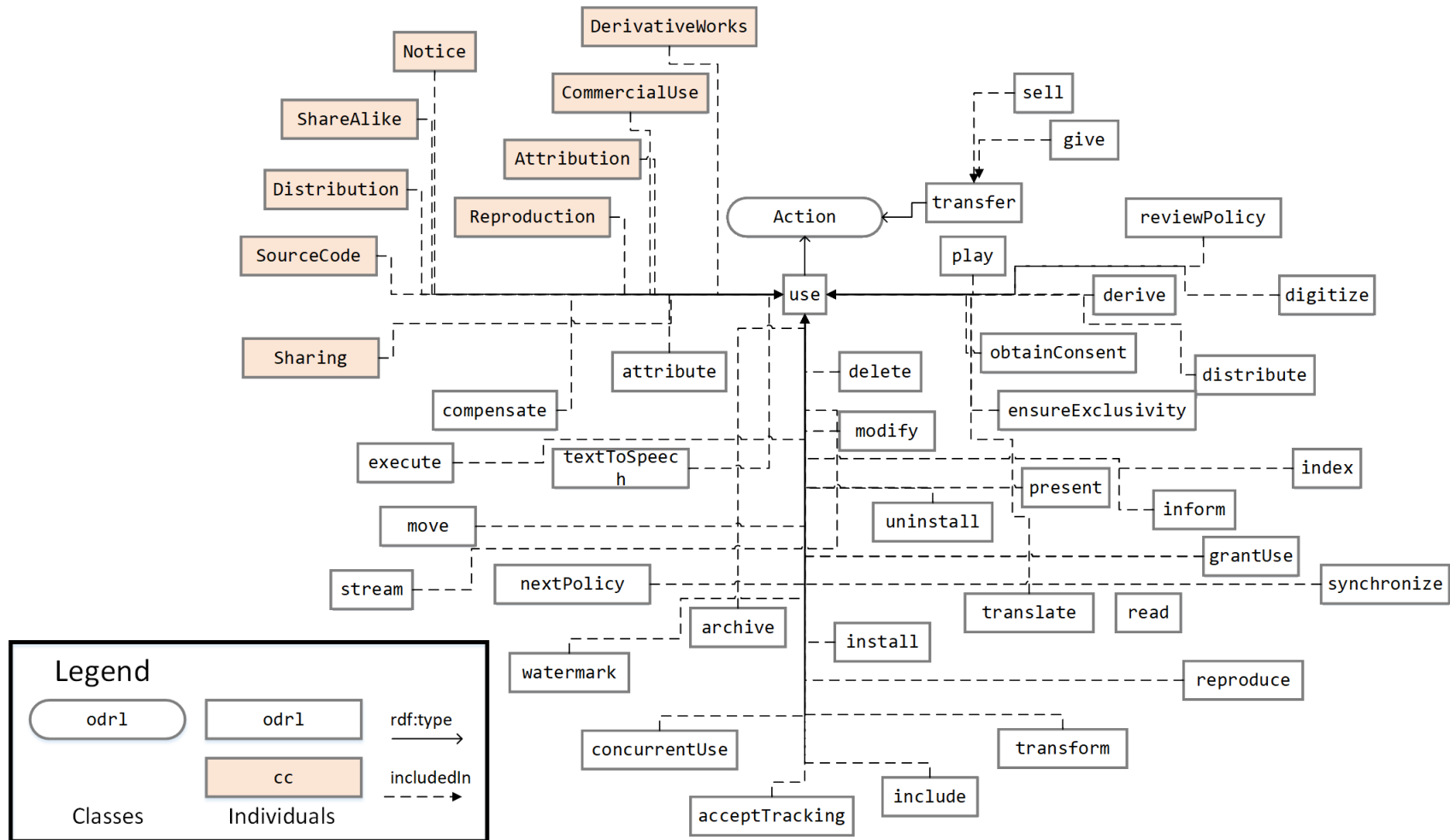
A boolean/logical expression that refines an Action and Party/Asset collection or the conditions applicable to a Rule.



# ODRL



## A taxonomy of actions



# A taxonomy of parties & constraints

4.3	Party Functions
4.3.1	Attributed Party
4.3.2	Attributing Party
4.3.3	Compensated Party
4.3.4	Compensating Party
4.3.5	Consenting Party
4.3.6	Consented Party
4.3.7	Contracting Party
4.3.8	Contracted Party
4.3.9	Informed Party
4.3.10	Informing Party
4.3.11	Tracking Party
4.3.12	Tracked Party

4.5	Constraint Left Operands
4.5.1	Absolute Asset Position
4.5.2	Absolute Spatial Asset Position
4.5.3	Absolute Temporal Asset Position
4.5.4	Absolute Asset Size
4.5.5	Count
4.5.6	Datetime
4.5.7	Delay Period
4.5.8	Delivery Channel
4.5.9	Elapsed Time
4.5.10	Event
4.5.11	File Format
4.5.12	Industry Context
4.5.13	Language
4.5.14	Media Context
4.5.15	Metered Time
4.5.16	Payment Amount
4.5.17	Asset Percentage
4.5.18	Product Context
4.5.19	Purpose
4.5.20	Recipient
4.5.21	Relative Asset Position
4.5.22	Relative Spatial Asset Position
4.5.23	Relative Temporal Asset Position
4.5.24	Relative Asset Size
4.5.25	Rendition Resolution
4.5.26	Geospatial Named Area
4.5.27	Geospatial Coordinates
4.5.28	System Device
4.5.29	Recurring Time Interval
4.5.30	Unit Of Count
4.5.31	Version
4.5.32	Virtual IT Communication Location

# Example policies

```
{
  "@context": "http://www.w3.org/ns/odrl.jsonld",
  "@type": "Set",
  "uid": "http://example.com/policy:1010",
  "permission": [{
    "target": "http://example.com/asset:9898.movie",
    "assignee": "John",
    "action": "play"
  }]
}
```

This permission permits only John to play the 9898 movie.

# Example policies

```
{
  "@context": "http://www.w3.org/ns/odrl.jsonld",
  "@type": "Set",
  "uid": "http://example.com/policy:1010",
  "permission": [{
    "target": "http://example.com/asset:9898.movie",
    "action": "display",
    "constraint": [{
      "leftOperand": "spatial",
      "operator": "eq",
      "rightOperand": "https://www.wikidata.org/wiki/Q183",
      "comment": "i.e Germany"
    }]
  }]
}
```

This permission permits the 9898 movie to be displayed only in Germany.

# Example policies

```
{
  "@context": "http://www.w3.org/ns/odrl.jsonld",
  "@type": "Set",
  "uid": "http://example.org/policy/5",
  "permission": [{
    "target": "http://example.com/asset/1",
    "assignee": "http://example.com/party/Alice",
    "action": "use"
  }],
  "prohibition": [{
    "target": "http://example.com/asset/1",
    "assignee": "http://example.com/party/Bob",
    "action": "use"
  }]
}
```

This permission allows Alice to use Asset 1, but Bob can't.

# Example policies

```
{
  "@context": "http://www.w3.org/ns/odrl.jsonld",
  "@type": "Agreement",
  "uid": "http://example.com/policy:4444",
  "profile": "http://example.com/odrl:profile:12",
  "permission": [{
    "target": "http://example.com/myPhotos:BdayParty",
    "assigner": "http://example.com/user44",
    "assignee": {
      "@type": "PartyCollection",
      "source": "http://example.com/user44/friends",
      "refinement": [{
        "leftOperand": "foaf:age",
        "operator": "gt",
        "rightOperand": { "@value": "17", "@type": "xsd:integer" }
      }]
    }
  },
  "action": { "@id": "ex:view" }
}]
}
```

This permission only allows the assigners' friends which are over 17 years old to view the target asset (birthdate photos).

# Example policies

```
{
  "@context": "http://www.w3.org/ns/odrl.jsonld",
  "@type": "Agreement",
  "uid": "http://example.com/policy:4444",
  "profile": "http://example.com/odrl:profile:12",
  "permission": [{
    "target": "http://example.com/myPhotos:BdayParty",
    "assigner": "http://example.com/user44",
    "assignee": {
      "@type": "PartyCollection",
      "source": "http://example.com/user44/friends",
      "refinement": [{
        "leftOperand": "foaf:age",
        "operator": "gt",
        "rightOperand": { "@value": "17", "@type": "xsd:integer" }
      }]
    }
  },
  "action": { "@id": "ex:view" }
}]
}
```

This permission only allows the assigners' friends which are over 17 years old to view the target asset (birthdate photos).



# Example policies

```
"@context": "http://www.w3.org/ns/odrl.jsonld",
"@type": "Offer",
"uid": "http://example.com/policy:88",
"profile": "http://example.com/odrl:profile:09",
"permission": [{
  "assigner": "http://example.com/assigner:sony",
  "target": "http://example.com/music/1999.mp3",
  "action": "play",
  "duty": [{
    "action": [{
      "rdf:value": { "@id": "odrl:compensate" },
      "refinement": [{
        "leftOperand": "payAmount",
        "operator": "eq",
        "rightOperand": { "@value": "5.00", "@type": "xsd:decimal" },
        "unit": "http://dbpedia.org/resource/Euro"
      }]
    }]
  }]
}],
```

The assigner of this permission allows users to play the target asset, while including a duty to compensate this action by paying 5€.

# Example policies

```
@prefix cc:      <http://creativecommons.org/ns#> .
@prefix rdfs:    <http://www.w3.org/2000/01/rdf-schema#> .
@prefix dct:     <http://purl.org/dc/terms/> .
@prefix odr1:    <http://www.w3.org/ns/odr1/2/> .
@prefix rdf:     <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .

<http://purl.org/NET/rdflicense/MIT1.0>
  a      odr1:Policy ;
  rdfs:label "MIT License" ;
  dct:source <http://opensource.org/licenses/MIT> ;
  dct:hasVersion "1.0" ;
  dct:language <http://www.lexvo.org/page/iso639-3/eng> ;
  dct:publisher "MIT" ;
  odr1:permission
    [ odr1:action cc:Distribution , cc:DerivativeWorks , cc:Reproduction , odr1:modify , odr1:sell ;
      odr1:duty
        [ odr1:action cc:Notice
        ]
    ] ;
```

MIT License

# Validating policies

```
@prefix odr1: <http://www.w3.org/ns/odr1/2/> .  
@prefix sh: <http://www.w3.org/ns/shacl#> .  
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
```

```
#https://github.com/simonstey/ODRL-SHACL-Shapes/wiki
```

```
odr1:PolicyShape  
  a sh:NodeShape ;  
  sh:targetClass odr1:Policy ;  
  sh:nodeKind sh:IRI ;  
  sh:message "Policies must have an identificative URI";  
  sh:property [  
    sh:path [  
      sh:alternativePath ( odr1:permission odr1:prohibition odr1:obligation)  
    ] ;  
    sh:message "Policies must have at least one permission, obligation or prohibition.";  
    sh:minCount 1 ;  
  ] .
```

# Using Profiles

- Define additional concepts: actions, constraints, party functions, ...
- Examples:
  - Big Data: <https://w3c.github.io/odrl/profile-bigdata/>
  - Temporal: <https://w3c.github.io/odrl/profile-temporal/>
  - Access Control: <https://w3id.org/oac>

# ODRL tools

- GitHub W3C ODRL CG: <https://github.com/w3c/odrl/>
- GitHub OEG projects on ODRL: <https://github.com/oeg-upm/licensius>
- Validator: <https://odrlapi.appspot.com/>
- DALICC (licences): <https://www.dalicc.net/>
  - Licence compatibility
  - License composition