

Introducing Policy Templates and Policy Variables in ODRL

W3C Workshop on the Future of ODRL

Andrea Cimmino

Universidad Politécnica de Madrid

andreajesus.cimmino@upm.es

Nicoletta Fornara

Università della Svizzera italiana

nicoletta.fornara@usi.ch

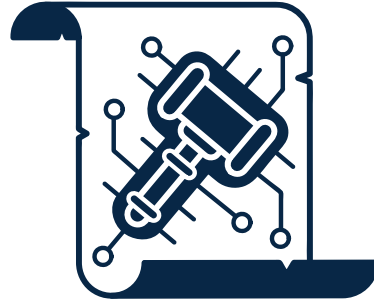
From descriptive policies to evaluable policies

Research



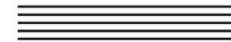
ODRE¹

Industry



FORCE²

**INTERNATIONAL DATA
SPACES ASSOCIATION**



Standard

ODRL Formal Semantics

Draft Community Group Report 06 July 2026

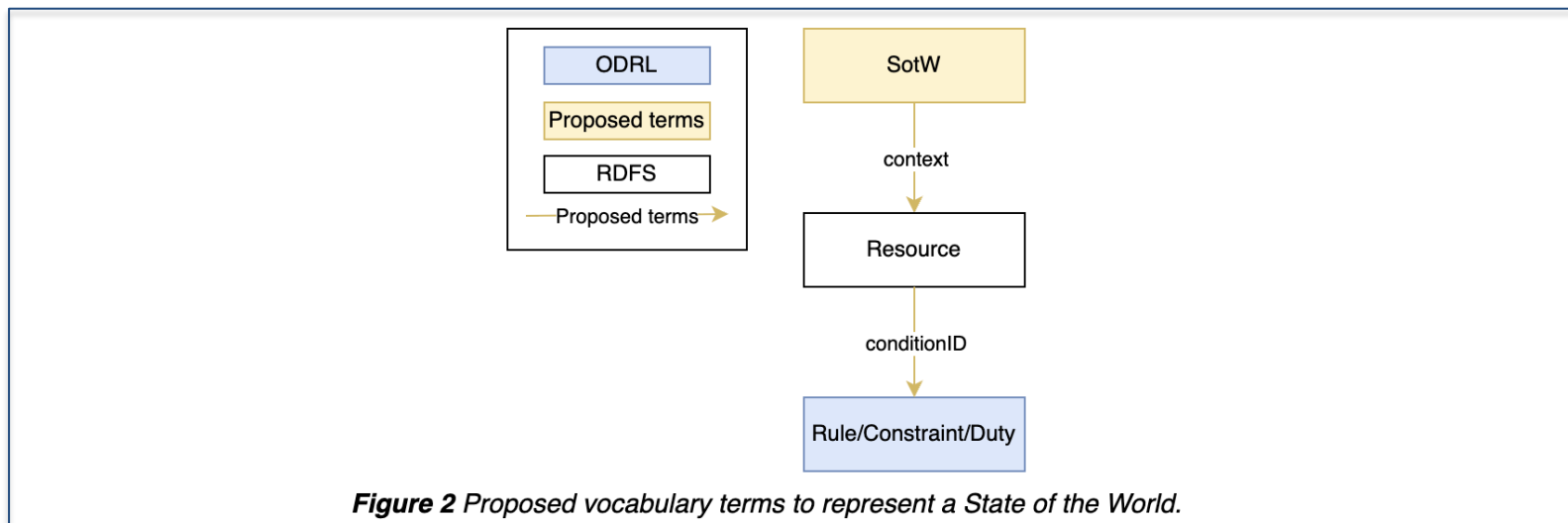
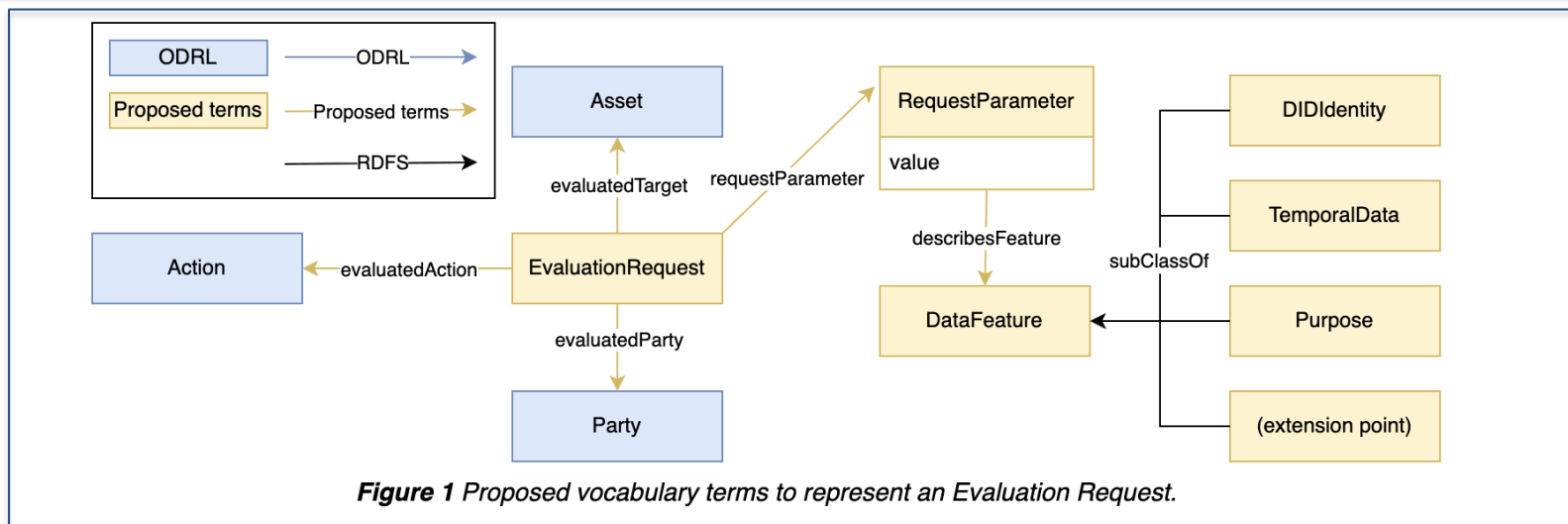
1. Cimmino, A., Cano-Benito, J., & García-Castro, R. (2025). Open Digital Rights Enforcement framework (ODRE): From descriptive to enforceable policies. *Computers & Security*, 150, 104282.
2. Slabbinck, W., Rojas, J., Esteves, B., Verborgh, R., & Colpaert, P. (2025). May the FORCE be with you? A Framework for ODRL Rule Compliance through Evaluation. In *NeXt-generation Data Governance workshop 2025*.

- Many practical enforcement scenarios require policies to have specific values written that are unknown when the policy is authored.

Papers related to the problem:

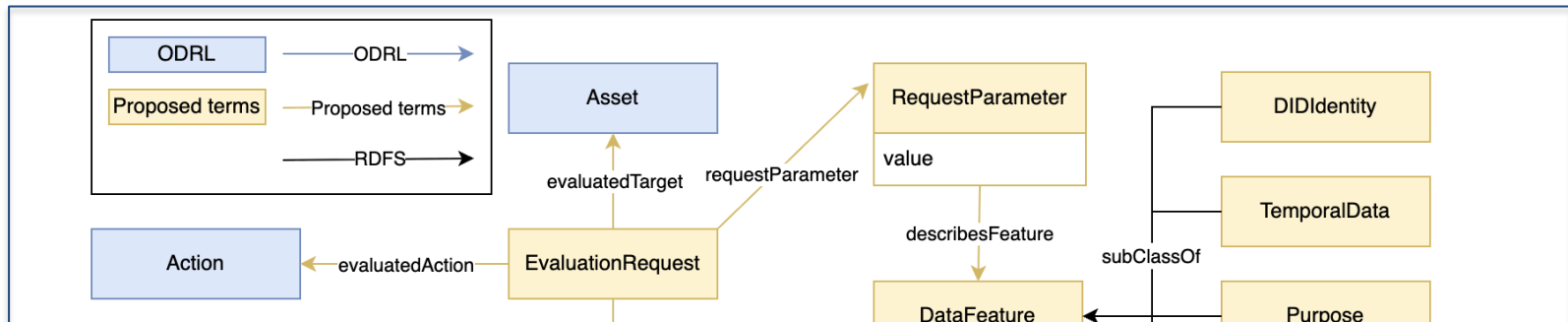
- ODRL Open Issues. W3C Workshop on the Future of ODRL.
- Towards ODRL 3.0. W3C Workshop on the Future of ODRL.
- CORAL-AC Dataset: COrpus of RLS And ODRL policies for Linked Access Control. OPAL 2026
- May the FORCE be with you?. SEMANTiCS 2025.
- Open Digital Rights Enforcement framework (ODRE): From descriptive to enforceable policies. Computers & Security 2025
- Improving ODRL 2.2: current limitations and theoretical solutions. OPAL 2025
- Injecting data into ODRL privacy policies dynamically with RDF mappings. WWW '23 Companion
- Practical challenges of ODRL and potential courses of action. WWW '23 Companion
- Interoperable and Continuous Usage Control Enforcement in Dataspaces. SDS 2024
- ...

A first step: defining external data required for evaluating policies



Esteves, B., Slabbinck, W., Sellami, Y., Cimmino, A., Rodríguez-Doncel, V., & Verborgh, R. Capturing Requests and Context for ODRL-based Access and Usage Control. *WOP-HAIBRIDGE 2025*.

A first step: defining external data required for evaluating policies



However, in the ODRL ontology there is no way to directly reference this data...we are missing the link

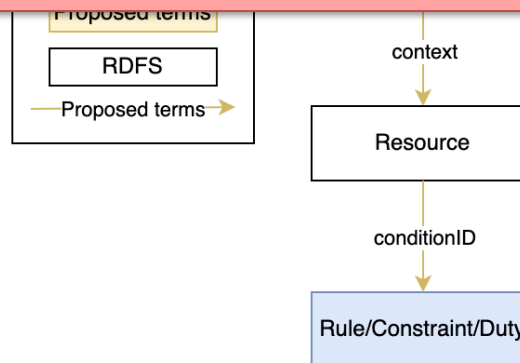


Figure 2 Proposed vocabulary terms to represent a State of the World.

Esteves, B., Slabbinck, W., Sellami, Y., Cimmino, A., Rodríguez-Doncel, V., & Verborgh, R. Capturing Requests and Context for ODRL-based Access and Usage Control. *WOP-HAIBRIDGE 2025*.

Classes

- odrlx:PolicyTemplate,
- odrlx:PolicyVariable

Properties:

- odrlx:variableType

- **Policy authors do not need to define a complete ODRL Policy directly**, but rather a reusable policy structure that can be instantiated into a specific policy before enforcement.

```
ex:CookiePolicyTemplate a odrl:PolicyTemplate ;
odrl:permission [
  odrl:target ex:newspaperHomePage ;
odrl:action odrl:read ;
odrl:assignee ex:readerVariable ;
odrl:duty [
  odrl:action ex:acceptCookie ;
  odrl:assignee ex:readerVariable ;
  odrl:target ex:AcceptCookiesLink
]; odrl:constraint [
  a odrl:Constraint ;
  odrl:leftOperand odrl:dateTime ;
  odrl:operator odrl:lteq ;
  odrl:rightOperand ex:SessionCookieExpirationTimeVariable
]].

ex:newspaperHomePage a odrl:Asset .
ex:AcceptCookiesLink a odrl:Asset . ex:acceptCookies a odrl:Action .
```

```
ex:CookiePolicyTemplate a odrl:PolicyTemplate ;
```

```
odrl:permission [
```

```
  odrl:target ex:newspaperHomePage ;
```

```
odrl:action odrl:read ;
```

```
odrl:assignee ex:reader ;
```

```
odrl:duty [
```

```
  odrl:action ex:acceptCookie ;
```

```
  odrl:assignee ex:readerVariable ;
```

```
  odrl:target ex:AcceptCookiesLink
```

```
]; odrl:constraint [
```

```
  a odrl:Constraint ;
```

```
  odrl:leftOperand odrl:dateTime ;
```

```
  odrl:operator odrl:lteq ;
```

```
  odrl:rightOperand ex:SessionCookieExpirationTimeVariable
```

```
]].
```

```
ex:newspaperHomePage
```

```
ex:AcceptCookiesLink
```

```
ex:readerVariable a odrl:PolicyVariable ;
```

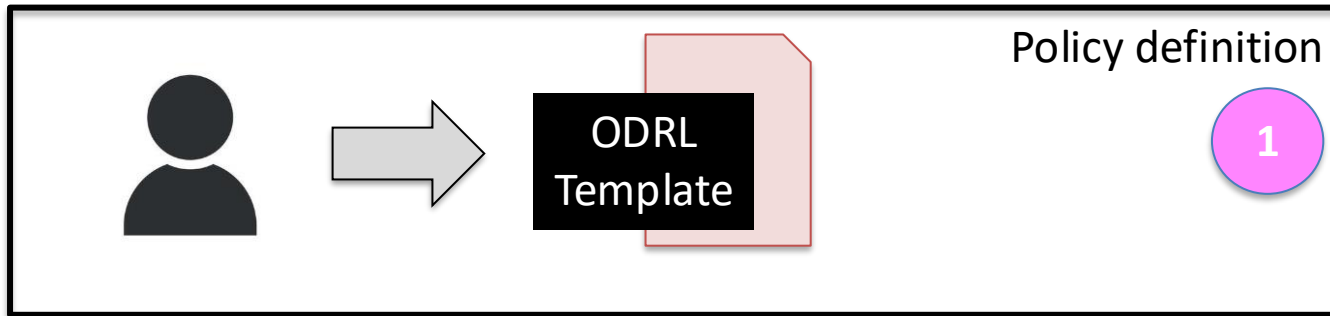
```
  odrl:variableType xsd:anyURI, odrl:Party ;
```

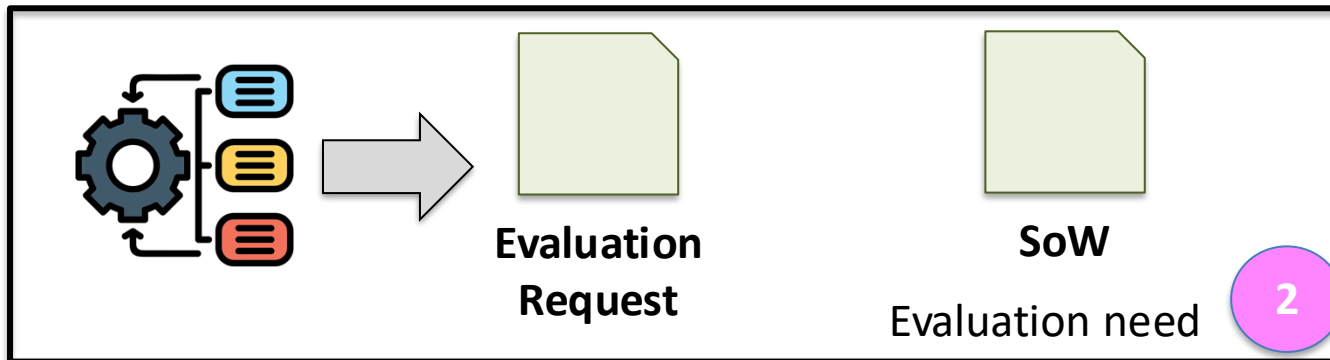
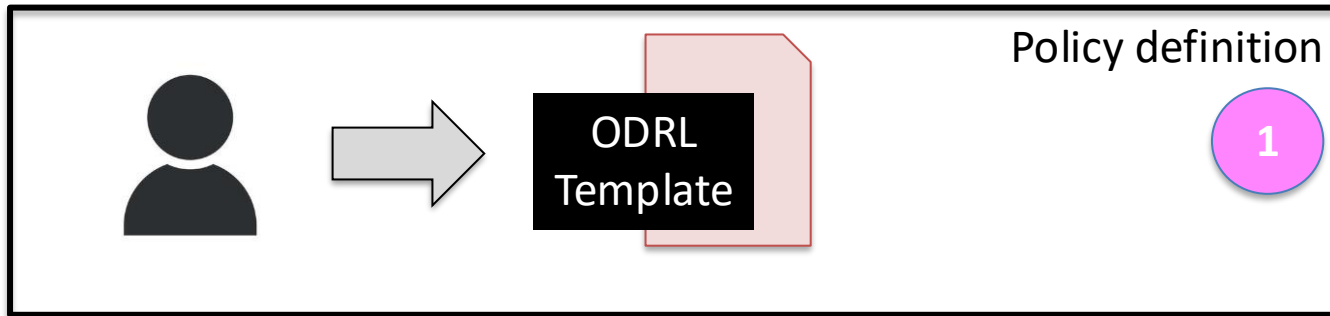
```
  rdfs:comment "The identifier of the agent that accepted the cookie." .
```

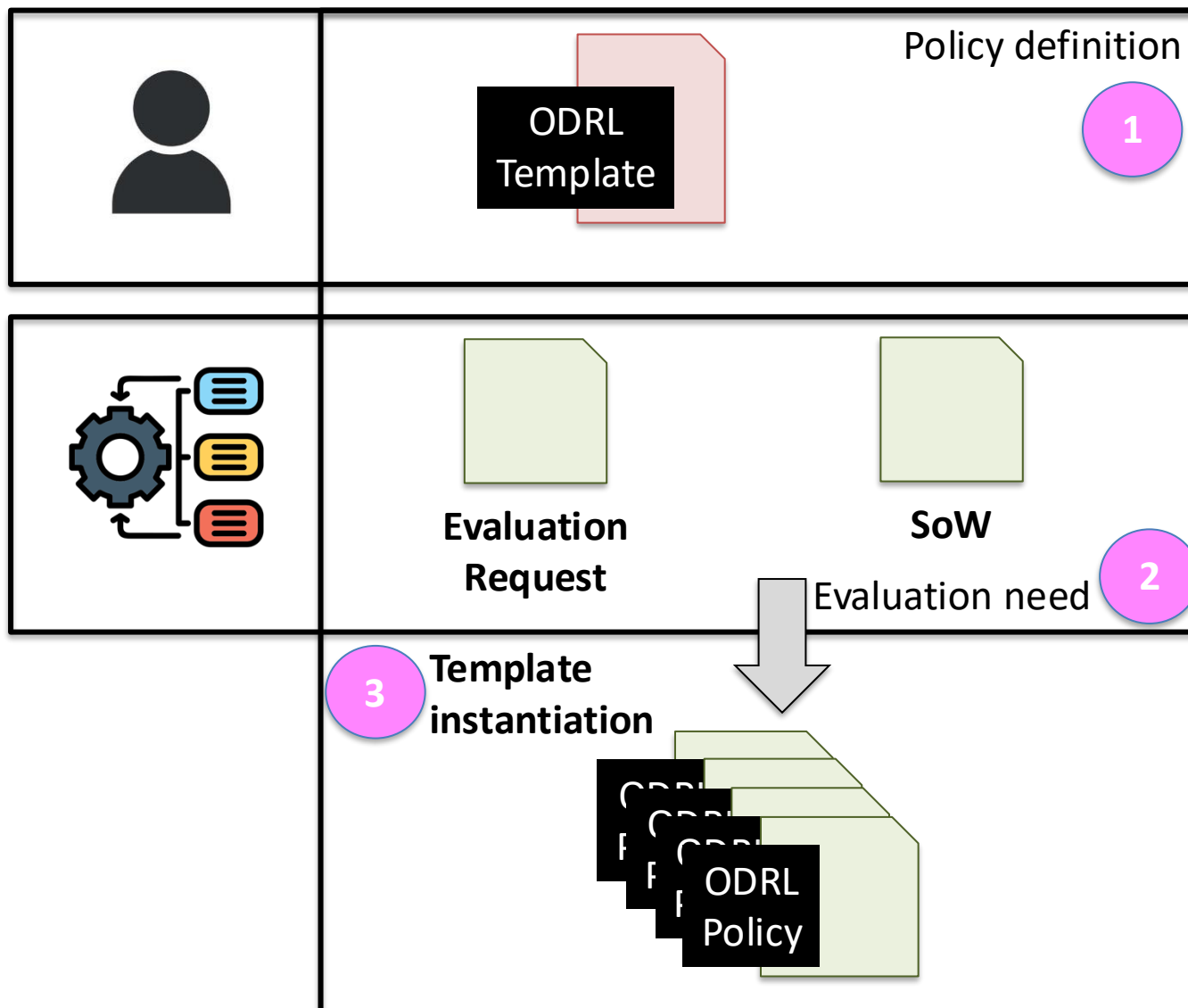
```
ex:SessionCookieExpirationTimeVariable a odrl:PolicyVariable ;
```

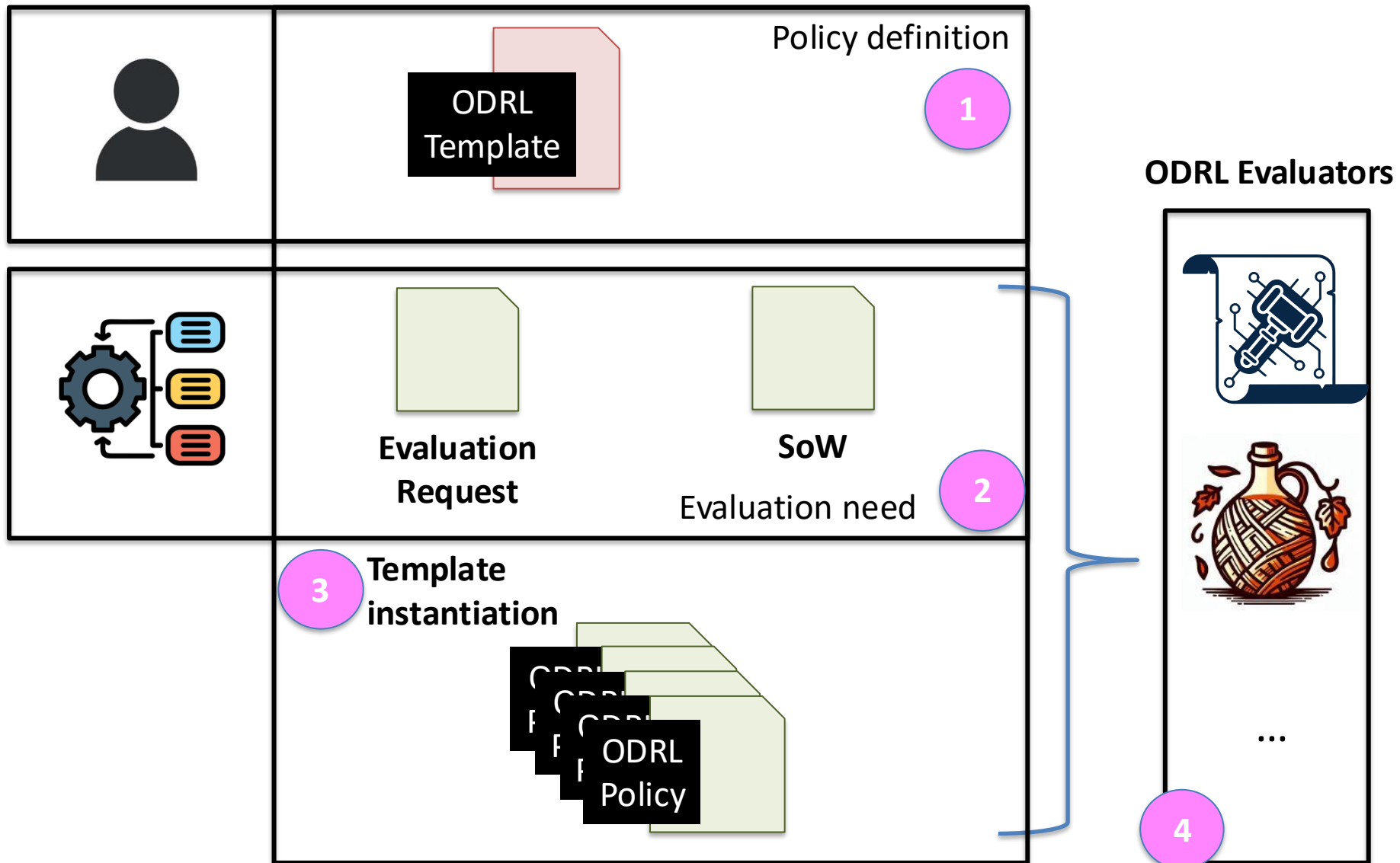
```
  odrl:variableType xsd:dateTime ;
```

```
  rdfs:comment "The expiration time of the accepted session cookie." .
```









- The behaviour of a PolicyTemplate could be kept deliberately simple:
 - 1 policy template creates N policies $N \in (1, \text{inf})$
- As first-class citizens in a future version of ODRL, behaviour could be considerably richer:
 - Policy template could contain conditional fragments that are instantiated only when certain conditions hold
 - It could define mutually exclusive instantiation branches so that one policy or another is generated depending on the evaluation context
 - ...

- Presented approach is small to be compatible with ODRL 2.2
- The templating proposal is based on the ontology engineering practice based on template instantiation: **Reasonable Ontology Templates (OTTR)**
- **Policy templates reduce duplication** by allowing recurring policy structures to be reused across actors, targets, assets, and contexts.
- **Policy variables make dynamic enforcement explicit and machine-processable**, avoiding ad hoc placeholders encoded in strings, blank nodes, or implementation-specific conventions.
- Policy variables allows to create explicit references between different rules requiring the same data.
- **Policy templates and variables improve interoperability among policy evaluators**



