



# OWL Meta Modeling on SMW

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# OWL Meta Modeling on SMW

- Goal: Encoding OWL ontology constructs in wiki pages
  - Class
  - Property
  - Individual
- Solution: Using templates and semantic forms to help users maintain ontological description

# Features

- Each entity is described by several templates
  - Axiom template - encodes an OWL axiom
  - Annotation template – encodes non-axiom information (e.g. name)
- Templates generate and render ontological description
- Templates can be edited by semantic forms

# Example Page: Category:Rabbit

Category:Rabbit

Category:Rabbit [ <a href="#">Edit</a> ]	
Label:	Rabbit
Plural:	Rabbits
In ontology:	Rabbit Ontology

## "Category:Rabbit" in "Rabbit" controlled natural language

- Rabbit is a [Animal](#).
- No Rabbit is a [NonRabbit](#).
- Rabbit and [Hare](#) are equivalent.
- Rabbit and [Wolf](#) are mutually exclusive.
- Every Rabbit is exactly one of [Bugs Bunny](#) OR [Peter Rabbit](#).
- Every Rabbit is a [White Rabbit](#) or a [Black Rabbit](#).
- Every Rabbit eats [FreshVegetable](#),
- Every Rabbit has part [Whisker](#).
- Every Rabbit has child(ren) only [Rabbit](#) or nothing.
- Every Rabbit has eye color of [Red](#).
- Every Rabbit has leg(s) exactly 4.
- Every Rabbit has head at least 1.
- Every Rabbit has parent at most 2.
- Rabbit is a concept, plural Rabbits.

## Facts about Rabbit ⓘ

CnILabel	Rabbit + <a href="#">?</a>
CnIPluralLabel	Rabbits + <a href="#">?</a>
In ontology	Rabbit Ontology + <a href="#">?</a>
Is definition	No + <a href="#">?</a>
Owl:allValuesFrom	Property:has child;Category:Rabbit + <a href="#">?</a>
Owl:cardinality	Property:has leg;4 + <a href="#">?</a>
Owl:complementOf	NotRabbit + <a href="#">?</a>
Owl:disjointWith	Wolf + <a href="#">?</a>
Owl:equivalentClass	Hare + <a href="#">?</a>
Owl:hasValue	Property:has eye color;Red + <a href="#">?</a>
Owl:maxCardinality	Property:has parent;2 + <a href="#">?</a>
Owl:minCardinality	Property:has head;1 + <a href="#">?</a>
Owl:oneOf	Bugs Bunny;Peter Rabbit + <a href="#">?</a>

# Example: Class Description

## Basic Information

This page is a definition:

A definition gives both sufficient and necessary cond

Label (English name of Rabbit):

Plural Form (plural form of the name of Rabbit):

In Ontology:

```
{ {Class
| is definition=No
| label=Rabbit
| plural=Rabbits
| ontology=Rabbit Ontology
}}
```

## Relation to other classes

Rabbit is  None  subClassOf  equivalentClass  complementOf  disjointWith  
the class

Remove

```
{ {ClassRelation
| type=subClassOf
| class=Animal
}}
```

## The class must have some property values from

Every Rabbit have some values of the property

from the class

Remove

```
{ {Some
| on property=eat
| on class=FreshVegetable
}}
```

# Example: Property Description

Type:  None  String  Page  Date  URL

Name:

Inverse Name:

Domain:

Range:

Functionalproperty:

Inversefunctionalproperty:

Symmetricproperty:

Transitiveproperty:

In Ontology:

```
{ {Property
| smwtype=String
| name=eats
| inverseName=is eaten by
| domain=Life
| range=Consumable Thing
| FunctionalProperty=No
| InverseFunctionalProperty=No
| SymmetricProperty=No
| TransitiveProperty=No
| inOntology=Rabbit Ontology
} }
```

Relation to properties

Property Eat is  None  subPropertyOf  equivalentProperty  inverseOf  
the property

```
{ {PropertyRelation
| type=subPropertyOf
| property=consume
} }
```

# Example: Individual Description

Individual

Name:

In Ontology:

```
{ {Individual  
| name=Bugs Bunny  
| inOntology=Rabbit Ontology  
}}
```

Define the type of the individual

Individual **Bugs Bunny** is of type

```
{ {Membership  
| class=Rabbit  
}}
```

Property and its value of the individual

**Bugs Bunny** has a property   
whose value is

```
{ {PropertyValue  
| on property=likes  
| has value=Peter Rabbit  
}}
```

# Conclusion

- OWL Meta Modeling on SMW
  - An OWL Meta Model and GUI that enables users to edit ontologies in the OWL language
- Can be used to build online ontology tools
  - Collaborative online OWL ontology editor
  - Import/export Ontology
  - Tree based ontology navigation/editing



# Questions?

**<http://tw.rpi.edu/dev/cnl>**

# Backup

- Currently not supported
  - owl:Ontology
  - owl:DatatypeProperty
  - owl:Thing
  - owl:Nothing
  - owl:AllDifferent
  - owl:DifferentMembers
  - owl:DataRange
  - owl:DeprecatedClass
  - owl:DeprecatedProperty