NAMESPACES IN OWL

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URIs

- General

```
   foo://example.com:8042/over/there?name=ferret#nose
   \_/   \______________/\_________/ \_________/ \__/
    |           |            |            |        |
scheme     authority       path        query   fragment
   |   _____________________|__
  / \ /                        \
  urn:example:animal:ferret:nose
```

- Semantic Web

```
 http://www.w3.org/2002/07/owl#Class
scheme| authority|   path    |fragment
```

URIs (cont.)

- Uniform Resource Identifier
- Global naming scheme
- Allowed: Multiple URIs refers to a single thing
  - No unique name assumption
  - Todd_Detwiler, Landon_Detwiler, LT_Detwiler
- Disallowed: Single URI refers to multiple things

Namespaces

- Namespace

  http://www.w3.org/2002/07/owl#Class

- Qname

  owl:Class

Namespaces (cont.)

- Provide context for names within
- Disambiguate between things of "same name" from different contexts
  - i.e. "mouse" in an ontology of mammals vs. "mouse" in an ontology of computer components
  - http://www.institution1.edu/mammal#mouse
  - http://www.institution2.edu/computer#mouse

OWL Class

Classes provide an abstraction mechanism for grouping resources with similar characteristics. Like RDF classes, every OWL class is associated with a set of individuals, called the class extension. The individuals in the class extension are called the instances of the class. A class has an intensional meaning (the underlying concept) which is related but not equal to its class extension. Thus, two classes may have the same class extension, but still be different classes.

W3C OWL Reference: http://www.w3.org/TR/owl-ref/

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OWL Class Description

OWL distinguishes six types of class descriptions:

1. a class identifier (a URI reference)
2. an exhaustive enumeration of individuals that together form the instances of a class
3. a property restriction
4. the intersection of two or more class descriptions
5. the union of two or more class descriptions
6. the complement of a class description

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Modular Class Definitions

Countries Ontology

```
<rdf:RDF xmlns = “http://.../Countries#” >
…
<owl:Class rdf:ID="Country">
</owl:Class>
<owl:Class rdf:ID="IndependentState">
   <rdfs:subClassOf>
     <owl:Class rdf:about="#Country"/>
   </rdfs:subClassOf>
</owl:Class>
…
```

Extended Countries Ontology

```
<rdf:RDF xmlns = “http://.../ExtCountries#”
   xmlns:countries = “http://.../Countries#” >
…
<owl:Class rdf:about="countries#IndependentState">
   <rdfs:subClassOf>
      <owl:Restriction>
         <owl:someValuesFrom rdf:resource="#x"/>
         <owl:onProperty rdf:resource="#hasX"/>
      </owl:Restriction>
   </rdfs:subClassOf>
</owl:Class>
…
```

Ontology modifications

- Modifying resources in an imported ontology
  - OK
    - Adding property values
    - Adding property restrictions
  - Not OK
    - Contradictory modifications
    - Removal of property values
    - Removal of property restrictions

The Issue at Hand [1]

- "every OWL class is associated with a set of individuals, called the class extension… A class has an intensional meaning (the underlying concept) which is related but not equal to its class extension"
  - Is it fair to say that the "intensional meaning" of a class is the set of all possible individual members?
  - Two classes are equivalent in OWL if they have the same intensional meaning (owl:sameAs not owl:equivalentClass)

The Issue at Hand [2]

- A Single URI cannot refer to 2 different things
- Classes are 2 different things if they have different intesional meanings
- It follows then that if 2 classes differ in their possible instances, they cannot have the same URI
- If this is true, what of our IndependentState example?

Property Types


```
<owl:Restriction>
   <owl:someValuesFrom rdf:resource="#x"/>
   <owl:onProperty rdf:resource="#hasX"/>
</owl:Restriction>
```

- What if hasX is an annotation property?
- Object property?
- Datatype property?

Referring to Other Ontologies

Radiological ontology 1

```
<owl:Class rdf:about="fma#Heart">
   <rdfs:subClassOf>
      <owl:Restriction>
         <owl:onProperty rdf:resource="#hasImg"/>
         <owl:allValuesFrom rdf:resource="#Img"/>
      </owl:Restriction>
   </rdfs:subClassOf>
</owl:Class>
```

Radiological ontology 2

```
<owl:Class rdf:ID="#Img">
   <rdfs:subClassOf>
      <owl:Restriction>
         <owl:onProperty
      rdf:resource="#hasRelatedAnatomy"/>
         <owl:allValuesFrom
      rdf:resource="fma#Anatomical_structure"/>
      </owl:Restriction>
   </rdfs:subClassOf>
</owl:Class>
```