



bootstrapping a web-application from RDF data

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Agenda

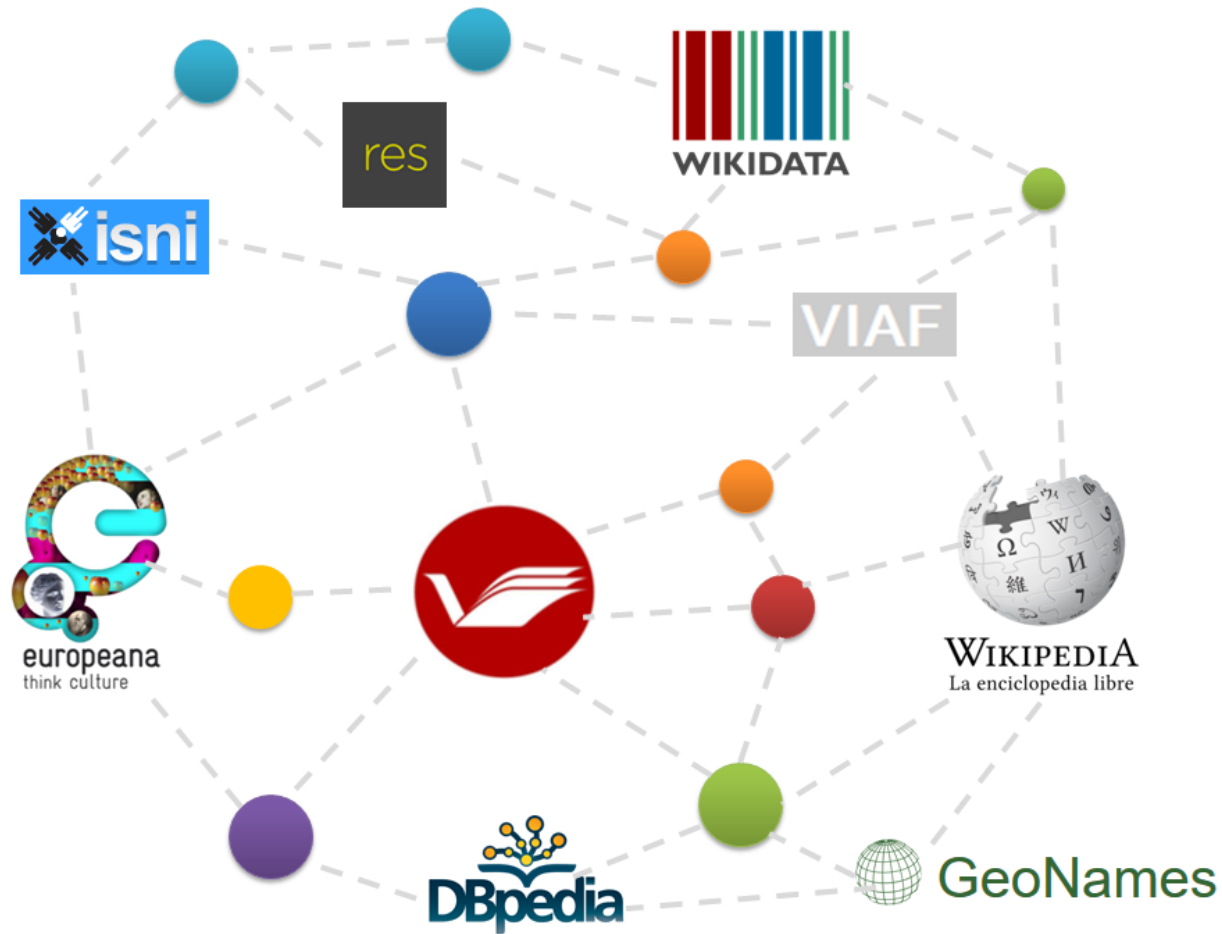
1. Introduction
2. CubicWeb
3. OWL2YAMS
4. RDF data import
5. Future Works

Introduction

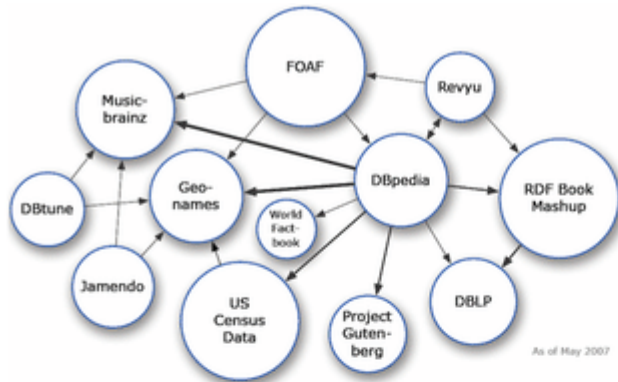
What is the Linked Open Data



What is the Linked Open Data



What is the Linked Open Data



2007



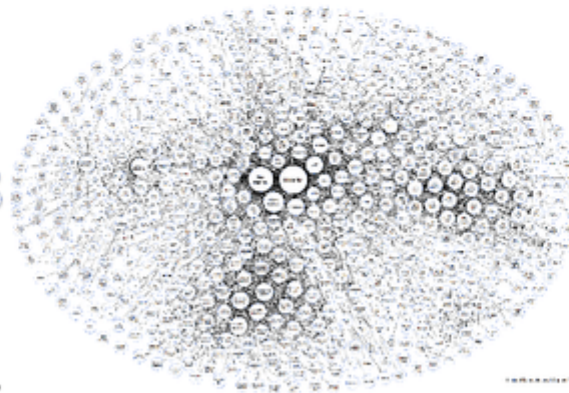
2008



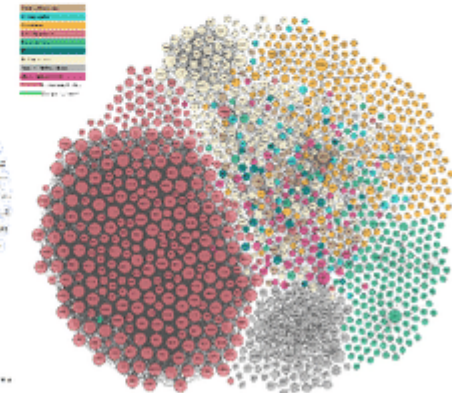
2009



2011

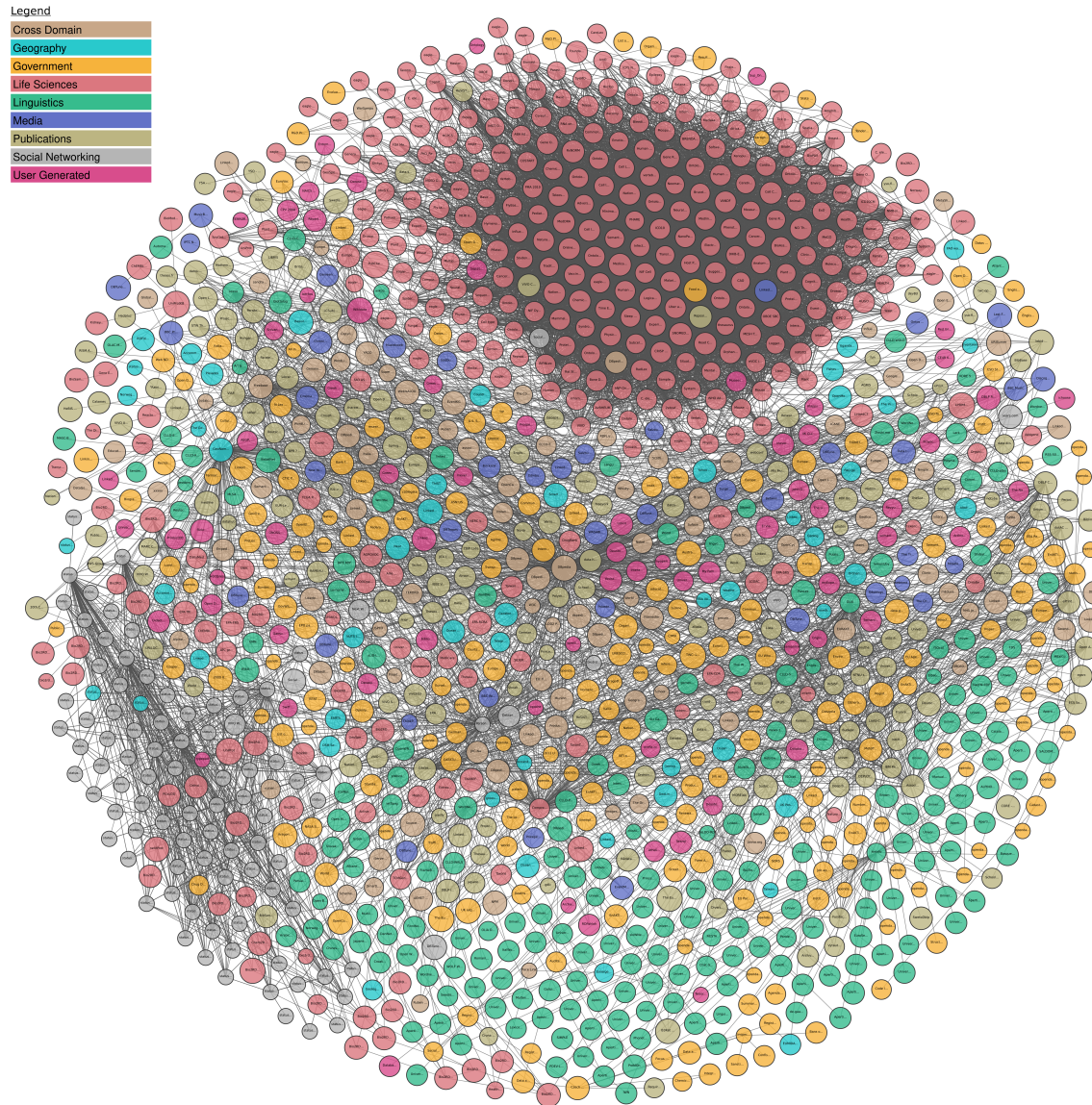


2014



2017

What is the Linked Open Data



What is RDF ?



- RDF triples: **subject predicate object**
- subject and predicate are URI,
- object can be an URI, a string, a number, a date, etc.

What is RDF ?

n-triples

```
<http://example.org/theBook>  
<http://purl.org/dc/elements/1.1/title>  
"A room of one's home".
```

```
<http://example.org/theBook>  
<http://purl.org/dc/elements/1.1/creator>  
<http://example.org/virginia>.
```

```
<http://example.org/virginia>  
<http://xmlns.com/foaf/0.1/name>  
"Virginia Woolf".
```

```
<http://example.org/virginia>  
<http://www.w3.org/2002/07/owl#sameAs>  
<https://dbpedia.org/page/Virginia_Woolf>.
```

What is RDF ?

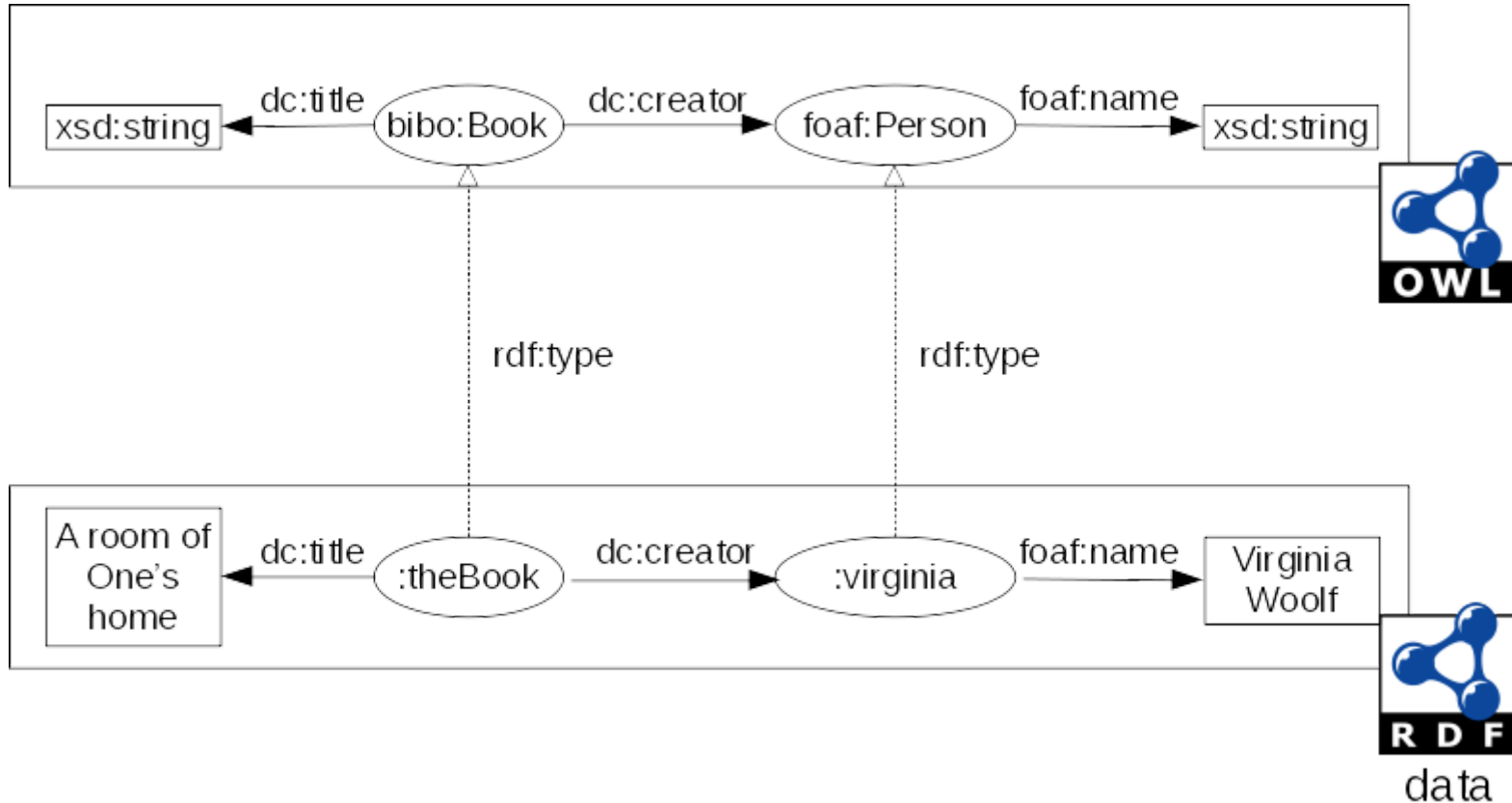
turtle

```
@prefix : <http://example.org/>.
@prefix dc: <http://purl.org/dc/elements/1.1/>.
@prefix owl: <http://www.w3.org/2002/07/owl#>.
@prefix dbpedia: <http://dbpedia.org/resource/>.
@prefix foaf: <http://xmlns.com/foaf/0.1/>.

:theBook dc:title "A room of one's home";
         dc:creator :virginia.

:virginia foaf:name "Virginia Woolf";
         owl:sameAs dbpedia:Virginia_Woolf.
```

What is an Ontology ?



What is an Ontology ?

Ontology example

ontology.owl

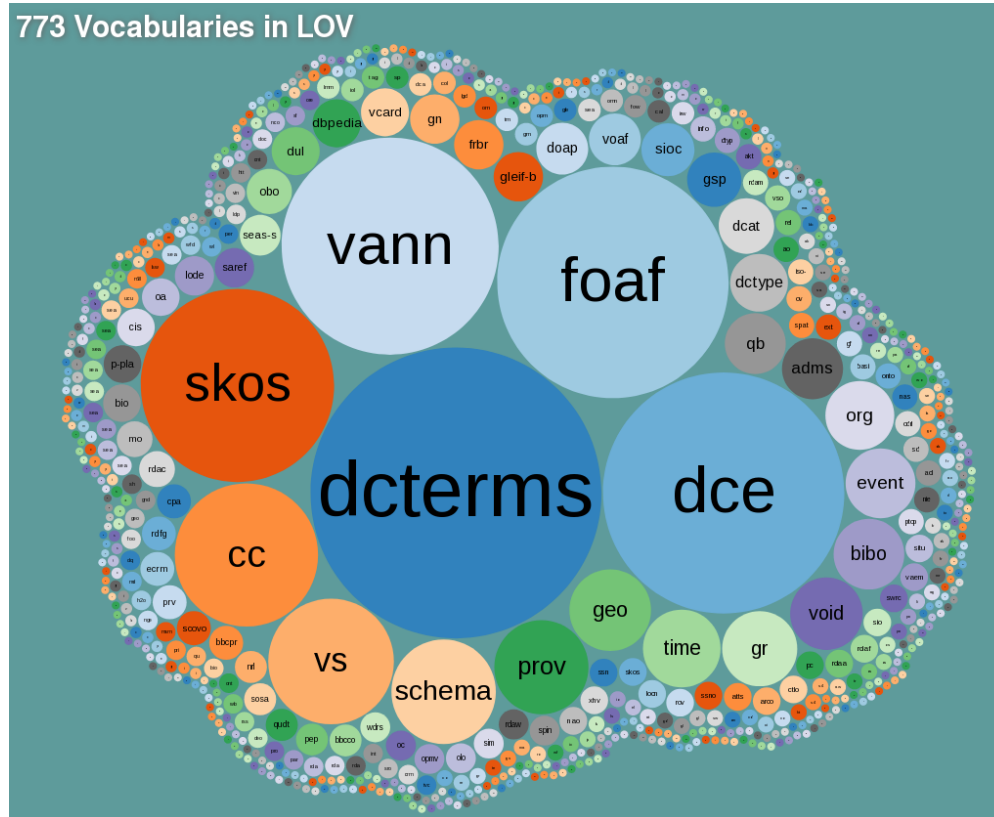
```
[...]
@prefix bibo: <http://purl.org/ontology/bibo/>.
@prefix foaf: <http://xmlns.com/foaf/0.1/>.
@prefix dc: <http://purl.org/dc/elements/1.1/>.

foaf:Person rdf:type owl:Class.
foaf:name rdf:type owl:DatatypeProperty;
          rdfs:domain foaf:Person;
          rdfs:range xsd:string.

bibo:Book rdf:type owl:Class.
dc:title rdf:type owl:DatatypeProperty;
         rdfs:domain bibo:Book;
         rdfs:range xsd:string.

dc:creator rdf:type owl:ObjectProperty;
          rdfs:domain bibo:Book;
          rdfs:range foaf:Person.
```


Linked Open Vocabularies



<https://lov.linkeddata.es/dataset/lov/>



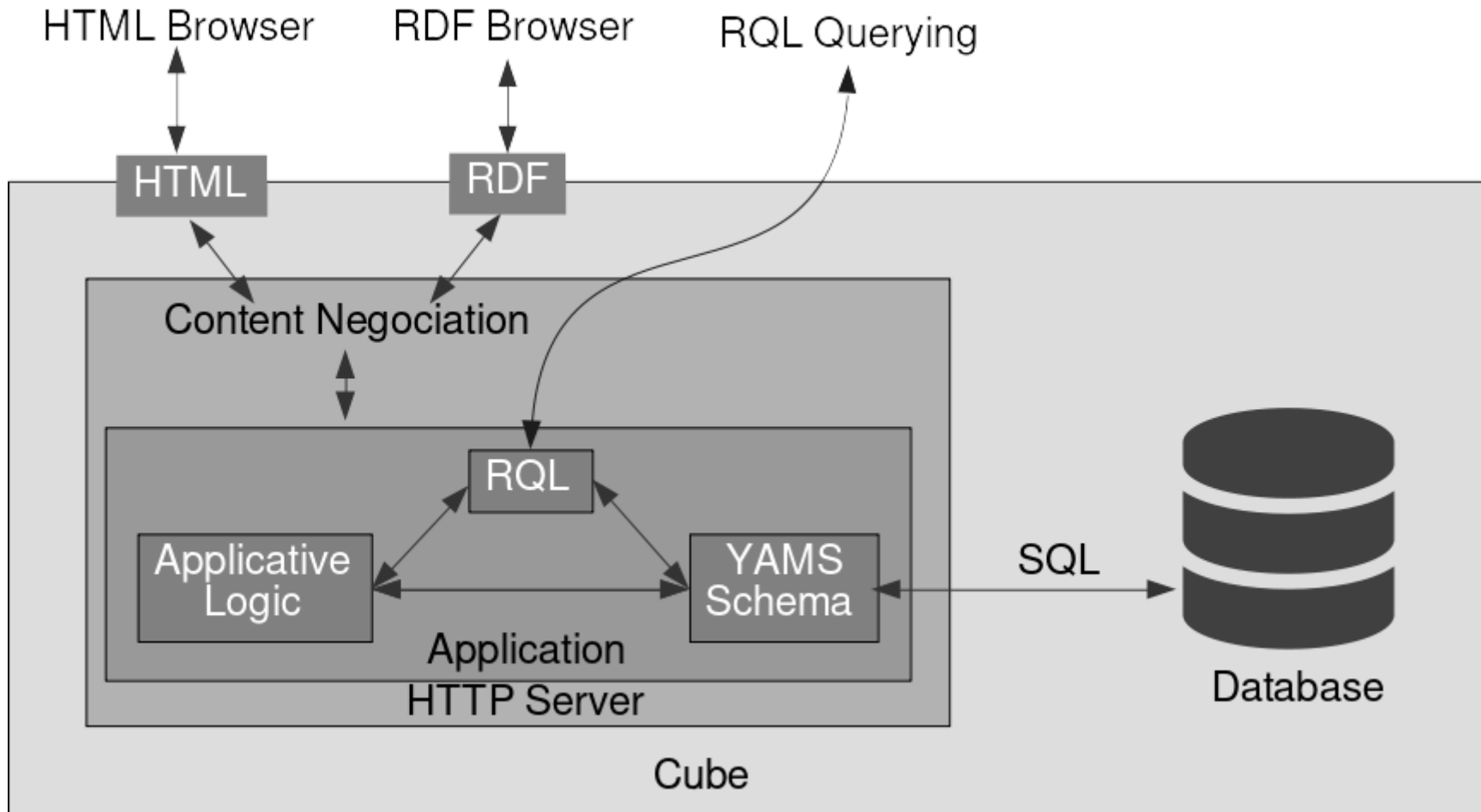
History of CubicWeb

Created in 2001, inspired by Tim Berners-Lee talk on the Semantic Web.

Purpose:

- a semantic web application framework,
- developed in Python (LGPL),
- explicit data model,
- reusable components (called cubes),
- a front agnostic way to serve your data.

CubicWeb Architecture



YAMS Schema

```
class Blog(EntityType):  
    title = String()  
  
class BlogEntry(WorkflowableEntityType):  
    title = String()  
  
class entry_of(RelationDefinition):  
    subject = "BlogEntry"  
    object = "Blog"
```

URLs in CubicWeb

Each entity has a unique `eid` (entity identifier) and two default URLs

- `http://my-cubicweb-server-url.org/BlogEntry/42`
- `http://my-cubicweb-server-url.org/42`

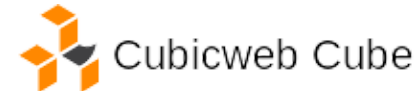
on which content negotiation is possible

With CubicWeb you can make a schema-based Web application

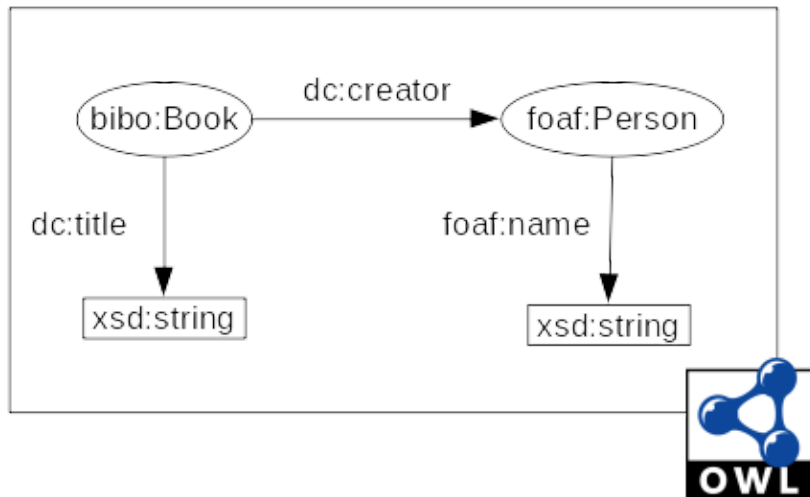
What if, my schema is an OWL ontology ?

OWL2YAMS

OWL2YAMS algorithm



OWL Ontology



```
class FoafPerson(EntityType):
    foaf_name = String()

class BiboBook(EntityType):
    dc_title = String()

class dc_creator(RelationDefinition):
    subject = "FoafPerson"
    object = "BiboBook"
```



YAMS Entity	ExternalURI
FoafPerson	foaf:Person
foaf_name	foaf:Name
BiboBook	bibo:Book
dc_title	dc:title
dc_creator	dc:creator

Tutorial

Installation

```
pip install owl2yams
```

Use an ontology to create a web server

```
owl2yams -m /Path/to/ontology.owl -n my_app
```

Run your instance to check the schema and the administration interface

```
cubicweb-ctl pyramid my_app
```

What if, I already have RDF data ?

RDF data import

RDF data import algorithm

RDF Data

```
@prefix : <http://example.org/>
```

```
:virginia a foaf:Person;  
  foaf:name "Virginia Woolf".
```

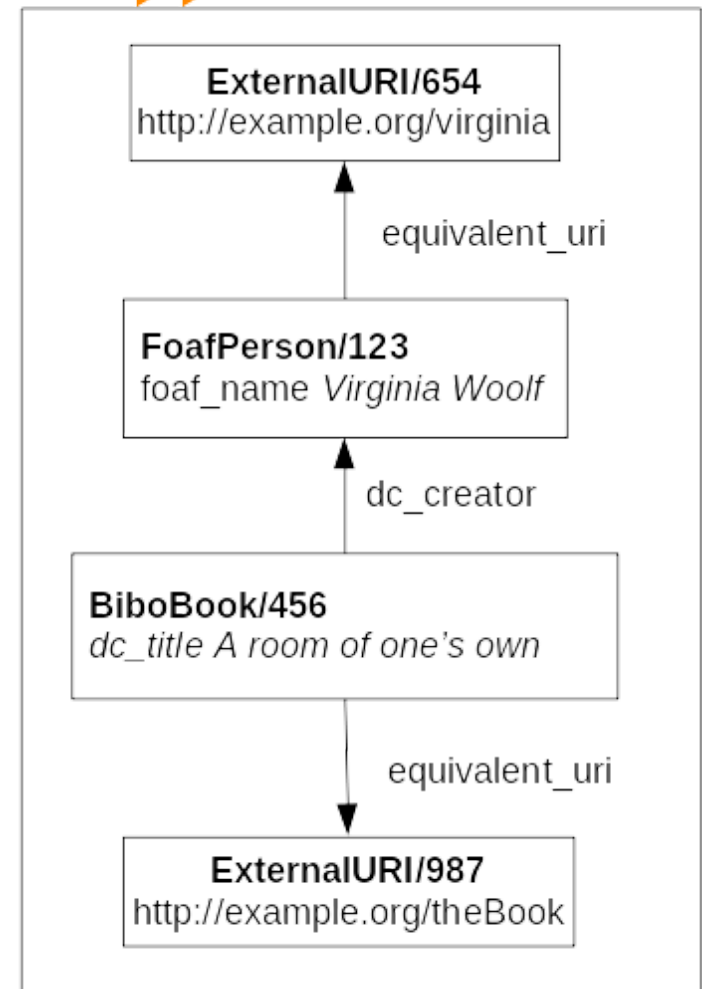
```
:theBook a bibo:Book;  
  dc:title "A room of one's own" ;  
  dc:creator :theBook.
```



ExternalURI	YAMS Entity
foaf:Person	FoafPerson
foaf:Name	foaf_name
bibo:Book	BiboBook
dc:title	dc_title
dc:creator	dc_creator



Cubicweb Instance



Import some data described

Import RDF data in your instance

```
cubicweb-ctl import-rdf my_app -f /Path/To/Rdf/data.rdf
```

Launch your instance to consult and manipulate your data

```
cubicweb-ctl pyramid my_app
```

Future works

- OWL2YAMS
 - Fix multi heritage bugs (used in Foaf)
 - Allow multiple attribute values when importing RDF data
 - Use ontology import links/external URI to create YAMS model
- CubicWeb
 - Handle SPARQL to query CubicWeb instance
 - CubicWeb as a Service

Thank you

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Don't hesitate to contribute on this free software !

<https://forge.extranet.logilab.fr/cubicweb/cubicweb>

<https://forge.extranet.logilab.fr/cubicweb/owl2yams>

[matrix] TODO change size

<https://matrix.to/#/#cubicweb:matrix.logilab.org>