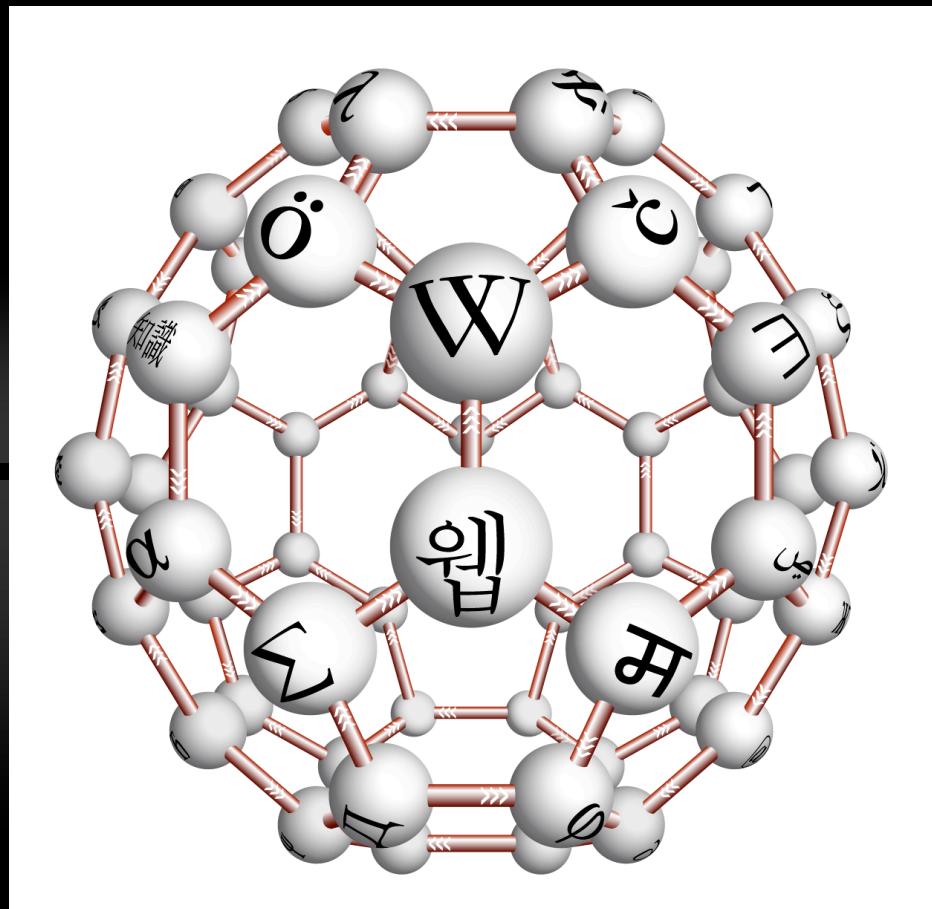




Semantic mediawiki



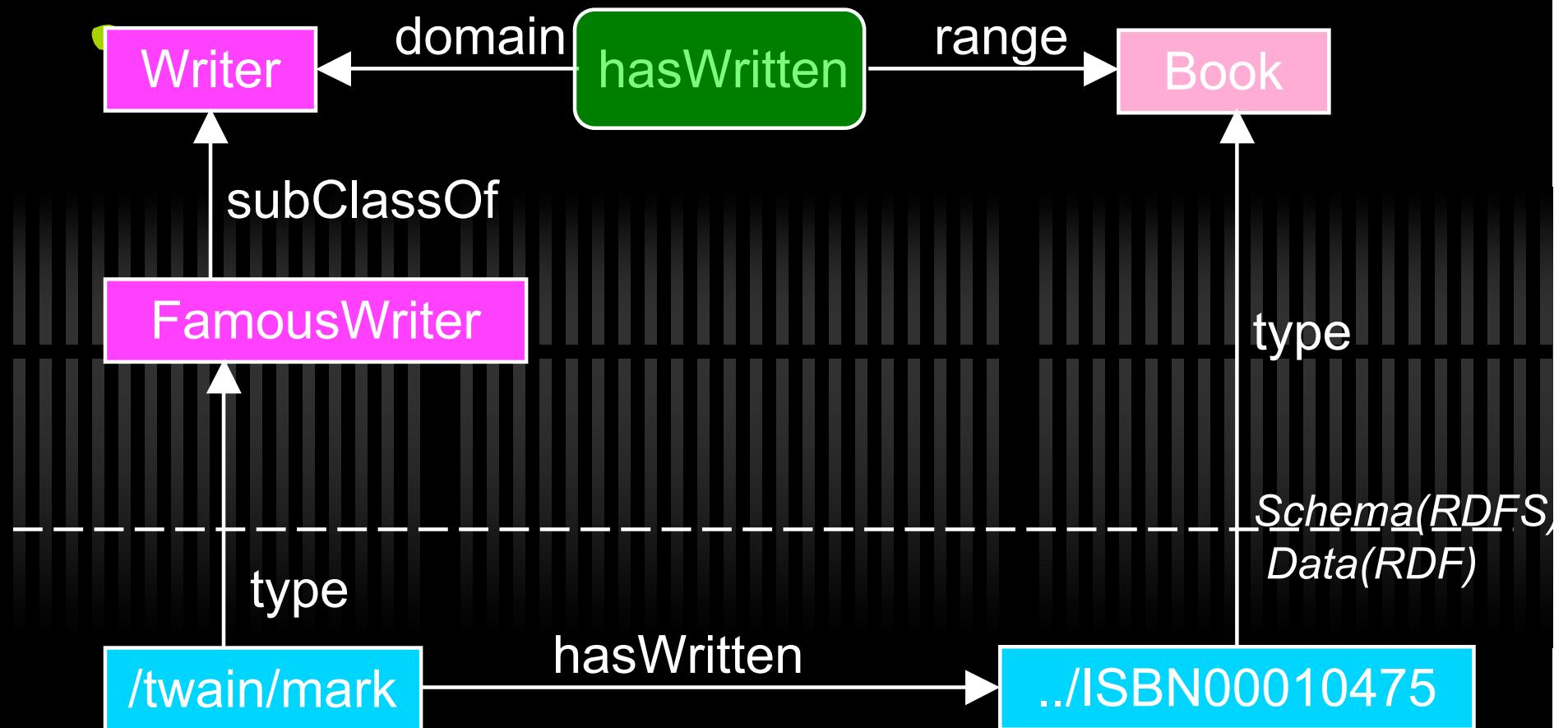
*Some slide taken
from Danny Drandevic*

Semantic MediaWiki

- ✓ Extension of **MediaWiki**
 - ✓ Popular Wiki engine
 - ✓ Powers Wikipedia
- ✓ Extends MediaWiki by enabling...
 - ✓ Typed links
 - ✓ Property – Value
 - ✓ Inline queries
 - ✓ New ways to explore the content
- ✓ Open source and well documented

An example RDF Schema

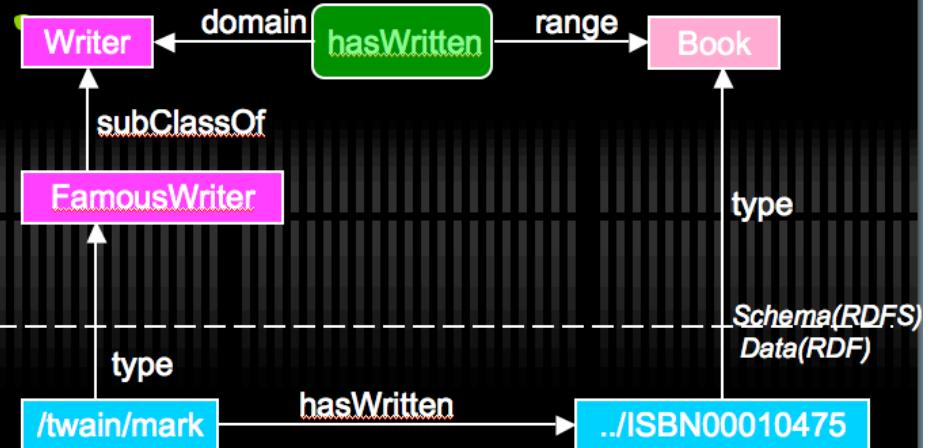
Annotation of WWW resources and *semantic* links



Concepts

An example RDF Schema

Annotation of WWW resources and *semantic* links



- ✓ INSTANCE <=> PAGE
- ✓ CLASS <=> CATEGORY
- ✓ RELATION <=> PROPERTY

Instance <-> Page

An example RDF Schema
Annotation of WWW resources and *semantic links*

```
graph TD; Writer[Writer] -- domain --> hasWritten[hasWritten]; hasWritten -- range --> Book[Book]; FamousWriter[FamousWriter] -- subClassOf --> Writer; Book -- type --> SchemaRDFS[Schema(RDFS)]; SchemaRDFS -- type --> DataRDF[Data(RDF)]; /twain/mark[/twain/mark] -- hasWritten --> ISBN00010475[./ISBN00010475]; /twain/mark -- type --> FamousWriter; /twain/mark -- type --> Book;
```

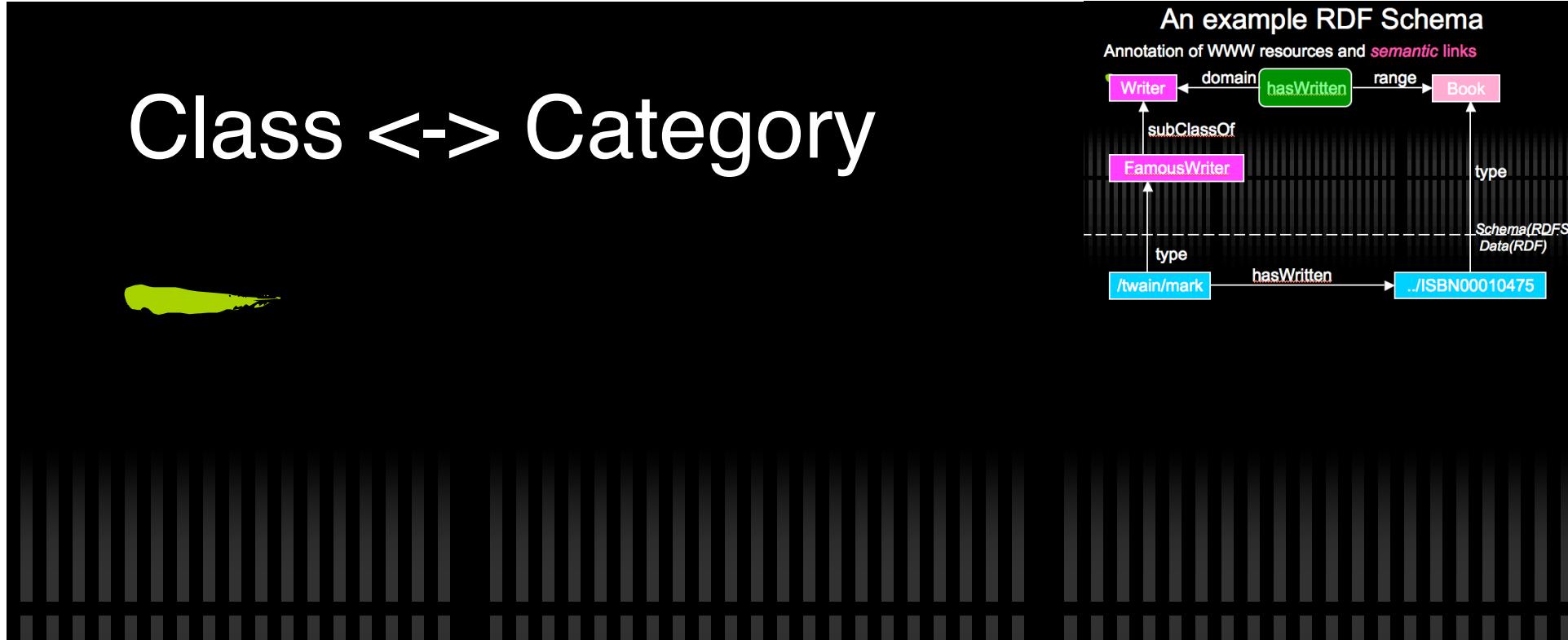
Schema(RDFS)
Data(RDF)

Editing Marco Ronchetti

Hi guys,
My nationality is [[Has nationality::Italy|italian]].
My nickname in this wiki is [[User:Ronchet|Ronchet]].
Here is my [http://latemar.science.unitn.it home] where you can find info about me.
You can reach me at the e-mail address [[Has e-mail::marco.ronchetti@unitn.it]].

[[Category:Man]]
[[Category:Speaker]]

Class <-> Category



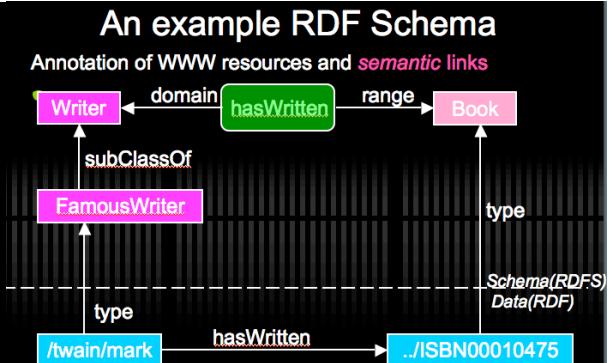
Editing Marco Ronchetti



Hi guys,
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My nickname in this wiki is [[User:Ronchet|Ronchet]].
Here is my [http://latemar.science.unitn.it home] where you can find info about me.
You can reach me at the e-mail address [[Has e-mail::marco.ronchetti@unitn.it]].

[[Category:Man]]
[[Category:Speaker]]

Relation <-> Property



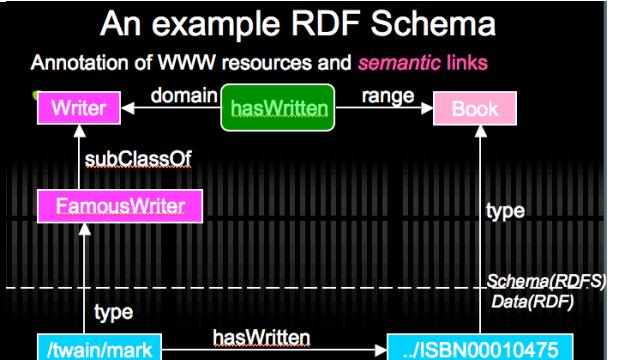
Editing Marco Ronchetti



Hi guys,
My nationality is [[Has nationality::Italy|italian]].
My nickname in this wiki is [[User:Ronchet|Ronchet]].
Here is my [http://latemar.science.unitn.it home] where you can find info about me.
You can reach me at the e-mail address [[Has e-mail::marco.ronchetti@unitn.it]].

[[Category:Man]]
[[Category:Speaker]]

Instance <-> Page



article discussion edit history move watch

Marco Ronchetti

Hi guys, My nationality is [italian](#).

My nickname in this wiki is [Ronchet](#).

Here is my [home](#) where you can find info about me. You can reach me at the e-mail address marco.ronchetti@unitn.it .

Facts about Marco Ronchetti RDF feed

Has e-mail	marco.ronchetti@unitn.it +
Has nationality	Italy +

Categories: [Man](#) | [Speaker](#)

Instance

- ✓ Blue links mean there is a page about it
- ✓ Red link means there is no page about it



The screenshot shows a Wikipedia article page for 'Denny Vrandecic'. The page has a dark theme. At the top, there is a navigation bar with tabs: 'article' (highlighted in yellow), 'discussion' (in red), 'edit', 'history', 'protect', 'delete', and 'mc'. The main title 'Denny Vrandecic' is in bold. Below the title, a text summary states: 'Denny is working at the AIFB. He is from Croatia, but lives in Germany for quite a while now.' Under the summary, there is a section titled 'Facts about Denny Vrandecic' with three items: 'Affiliation AIFB +', 'Located in Germany +', and 'Nationality Croatia +'. At the bottom of the page, there is a 'Categories' section with links to 'Tutor' and 'Man'.

Class <-> Category

category discussion edit history watch

Editing Category:Man

B | *T* | Ab |  | A |  |  | \sqrt{n} |  |  | - |  | +

[[Category:Person]]

*There are pages
describing
categories*

category discussion edit history

Category:Man

Articles in category "Man"

There are 2 articles in this category.

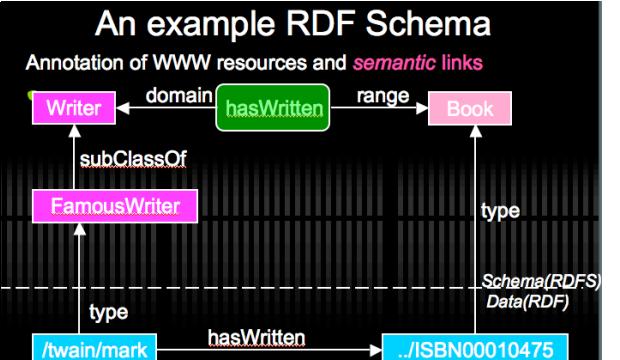
E

- Enrique Canessa

M

- Marco Ronchetti

Category: Person



Class <-> Category

category discussion edit history watch

Editing Category:Man

B A Ab A

[[Category:Person]]

*Subclass
(subcategory) of*

category discussion edit history

Category:Man

Articles in category "Man"

There are 2 articles in this category.

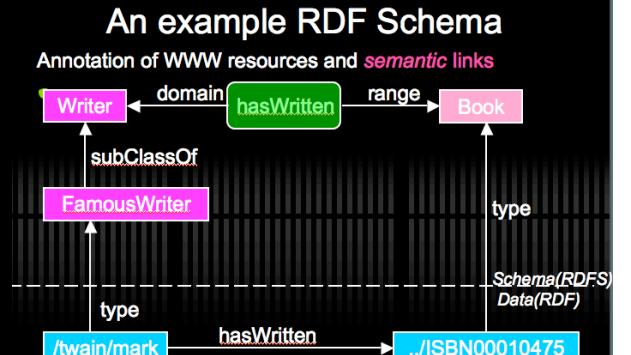
E

- Enrique Canessa

M

- Marco Ronchetti

Category: Person



Class <-> Category

category discussion edit history watch

Editing Category:Man

B A Ab A 
[[Category:Person]]

✓ Extensional description

- ✓ List of all instances
- ✓ But: only direct ones

category discussion edit history

Category:Man

Articles in category "Man"

There are 2 articles in this category.

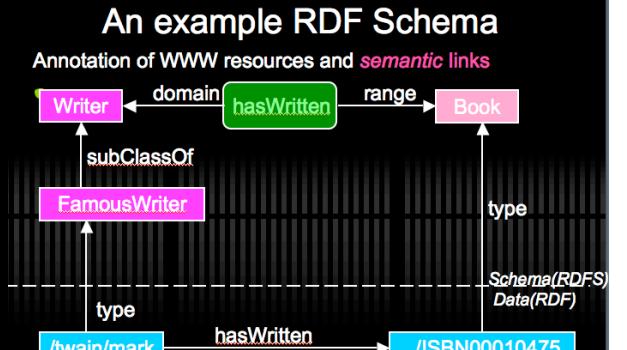
E

- Enrique Canessa

M

- Marco Ronchetti

Category: Person



Categories

- ✓ Informal description
- ✓ Can be discussed
- ✓ Can be edited

category discussion edit history protect delete

Category:Tutor

A tutor is a person that gives a course, talk, tutorial, or similar at the

Articles in category "Tutor"

There are 2 articles in this category.

D

- Denny Vrandecic

P

- Peter Haase

Category: Person

Relation <-> Property

property discussion edit history move watch

Editing Property:Has nationality

B A Ab A

Property that links a [[person]] to a [[country]]

*There are pages
describing
properties*

property discussion edit history move watch

Property:Has nationality

Property that links a person to a country

Pages using the property “Has nationality”

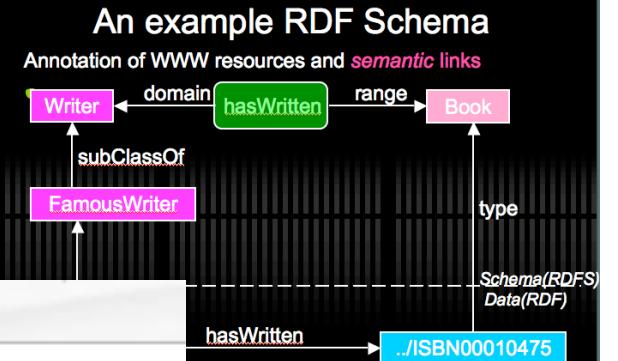
Showing 2 pages using this property.

E

Enrique Canessa + Chile +

M

Marco Ronchetti + Italy +



Relation <-> Property

property discussion edit history move

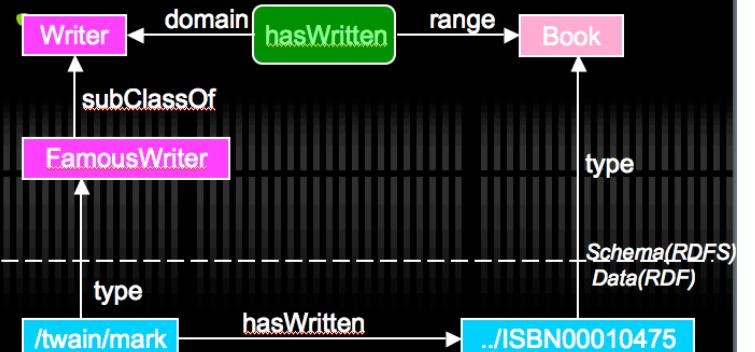
Editing Property:Has e-mail

B | Ab | A | | | \sqrt{n} | | |

```
[[has type::Email]]
```

An example RDF Schema

Annotation of WWW resources and *semantic* links



Datatype definition

Data values and types

- ✓ Attributes like [[birthdate::February 27 1978]] or [[population::3,635,389]] must know the *type* of the value
- ✓ This is done by adding [[has type::T]] on the page of the attribute
- ✓ Available, predefined types:

o [Annotation URI](#)

[Integer](#)

o [Date](#)

[Page](#)

o [Email](#)

[String](#)

o [Enumeration](#)

[Temperature](#)

o [Float](#)

[Text](#)

o [Geographic coordinate](#)

[URL](#)

Special:Categories

special

Categories

The following categories exist in the wiki.

(first | last) [View](#) (previous 50) (next 50) ([20](#) | [50](#) | [100](#) | [250](#) | [500](#))

- [City](#) (3 members)
- [Country](#) (1 member)
- [Man](#) (2 members)
- [Organizer](#) (1 member)
- [Person](#) (2 members)
- [Querypage](#) (2 members)
- [Speaker](#) (1 member)

(first | last) [View](#) (previous 50) (next 50) ([20](#) | [50](#) | [100](#) | [250](#) | [500](#))

Special:Properties

special

Properties

The following property types are available:

This type is among the standard datatypes of this wiki.

Showing below up to 200 items

[View \(previous 50\)](#) [\(next 50\)](#) [\(20 | 50 | 100 | 250 | 500\)](#)

1. Belongs to country of type [Page](#) (3) 
2. Has capital of type [Page](#) (1) 
3. Has e-mail of type [Email](#) (2) 
4. Has nationality of type [Page](#) (2) 
5. Has population of type [Number](#) (4) 
6. Located in of type [Page](#) (1) 
7. Testproperty of type [Page](#) (1) 

[View \(previous 50\)](#) [\(next 50\)](#) [\(20 | 50 | 100 | 250 | 500\)](#)

Special:Ask

special

Search by entering a query into the search field below. Further information is given on the [help page](#) for semantic search.

Sort by column

Query examples - Category

For example, the query:

`[[Category:Teacher]]`

is a query for all pages within the category **Teacher**, i.e. for all teachers. If you enter this in Special:Ask and click "Find results", SMW executes the query and displays results as a simple list of all requested pages. If there are many results, they can be browsed via the navigation links at the top and bottom of the query results

Query examples - Subcategories

For example, the query:

`[[Category:Person]]`

Will find all pages in the categories **Teachers**, **Students** and **Organizer** if these categories are subcategories of **Person**

Query examples - combining queries (AND)

For example, the query:

`[[Category:Person]] [[has nationality::Italy]]`

Will find all items in category Person that have the property of being italian. (AND)

Query examples - combining queries (OR)

For example, the query:

`[[Category:Organizer || Teacher]]`

Will find all items that are category Organizer OR in category Teacher (Set Union).

`[[Category:Organizer]] || [[has nationality::Italy]]`

Will find all items that are category Person PLUS (Union) all those that have the property of being italian. (OR)

Query examples - Properties

For example, the query:

`[[has nationality::Italy]]`

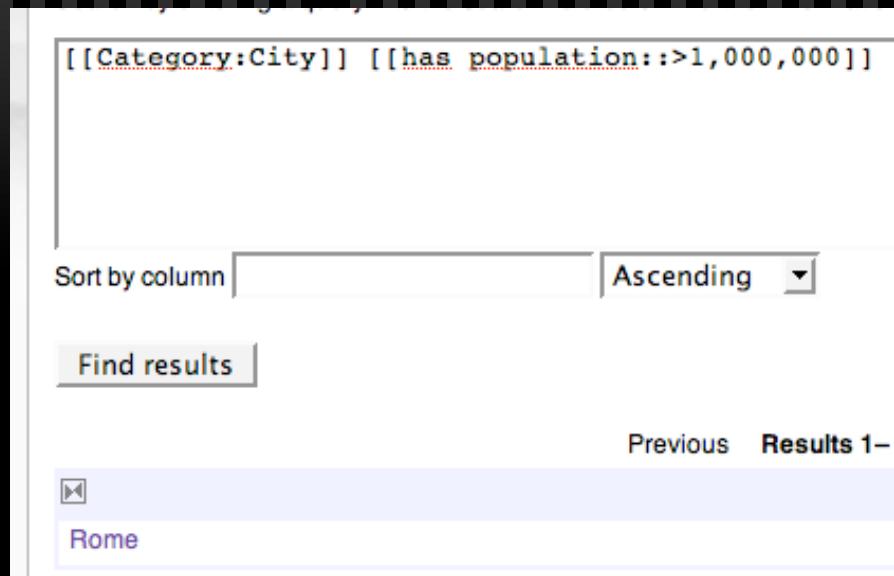
Will find all occurrences that have the specified property.

Query examples - conditions on attributes

For example, the query:

`[[Category:City]] [[Has population>1,000,000]]`

Will find all pages in the category **City**, having more than one million inhabitants.



The screenshot shows a search interface with the following elements:

- Query input field: `[[Category:City]] [[has population::>1,000,000]]`
- Sort by column:
- Sort order:
- Find results:
- Result table:

<input type="checkbox"/>	Rome
- Page navigation:

All cities having a has population property

~~[[Category:City]] [[has population::+]]~~

special

Search by entering a query into the search field below. Further information

```
[[Category:City]] [[has population::+]]
```

Sort by column Ascending ▾

Find results

Previous Results 1-

☒	Rome
☒	Trento
☒	Trieste

All cities having and their population

[[Category:City]] [[has population::*]]

special

Search by entering a query into the search field below. Further information is available in the [FAQ](#).

[[Category:City]] [[has population::*]]

Sort by column

Previous Results 1–3

	Has population
Rome	2,706,428
Trento	112,142
Trieste	208,621

Previous Results 1–3

All cities with more than 1,000,000 people and their population

[[Category:City]] [[has population:>1,000,000]]
[[has population::*]]

special

Search by entering a query into the search field below. Further information is given on the [help page](#) for search queries.

[[Category:City]] [[has population:>1,000,000]] [[has population::*]]

Sort by column

Previous Results 1–1 Next (20 | 50 | 100 | 250 | 500)

	Has population
<input type="checkbox"/>	Rome
	2,706,428

Embedding queries into pages


<ask>...</ask>

article discussion edit history move watch

Editing Person

B | Z | Ab | A | 

List of people in the Category Person:

```
<ask link="all">[[Category:Person]] [[Category:*))]] [[Has e-mail::*))]] [[Has nationality::*))]]</ask>
[[Category:Querypage]]
```



article discussion edit history move watch

Person

List of people in the Category Person:

	Category	Has e-mail	Has nationality
Enrique Canessa	Man Organizer Person	canessae@ictp.it	Chile
Marco Ronchetti	Man Person Speaker	marco.ronchetti@unitn.it	Italy

Category: Querypage

Formatting and sorting

See

http://ontoworld.org/wiki/Help:Inline_queries

Social aspects



- ✓ You are free to define categories and properties, but...
 - ✓ How to decide which properties and categories are important?
 - ✓ How to define the properties or categories?
 - ✓ How to ensure high quality data? What does it mean?
 - ✓ How to control the wiki knowledge base and its growth?

Querying and social aspects



- ✓ Querying can only be done on aligned vocabularies
 - ✓ If half of the people use “affiliation” and the other half “works for” you cannot query the knowledge easily
- ✓ Inside SMW, information integration usually happens with social tools, not with technology
- ✓ Gardening tools can help with aligning vocabularies, but not replace them
 - ✓ Tools that allow you to rename a property throughout the wiki
 - ✓ Or to join two different names

Exporting the data

Every page can export its knowledge as RDF

edit history protect delete move

C

He is from Croatia, but lives in Germany

ic

RDF feed

```
xmlns:wiki="&wiki;"  
xmlns:property="&property;">  
<!-- Ontology header -->  
<owl:Ontology rdf:about="">  
    <smw:exportDate rdf:datatype="http://www.  
</owl:Ontology>  
<!-- exported page data -->  
<smw:Thing rdf:about="&wiki;Denny_Vrandecic">  
    <rdfs:label>Denny Vrandecic</rdfs:label>  
    <smw:hasArticle rdf:resource="&wikiurl;De  
    <rdfs:isDefinedBy rdf:resource="&wikiurl;  
    <rdf:type rdf:resource="&wiki;Category-3A  
    <rdf:type rdf:resource="&wiki;Category-3A  
    <property:Affiliation rdf:resource="&wiki  
    <property:Located_in rdf:resource="&wiki;  
    <property:Nationality rdf:resource="&wiki  
</smw:Thing>  
<!-- auxilliary definitions -->  
<smw:Thing rdf:about="&wiki;Croatia">  
    <rdfs:label>Croatia</rdfs:label>  
    <smw:hasArticle rdf:resource="&wikiurl;Cr  
    <rdfs:isDefinedBy rdf:resource="&wikiurl;  
</smw:Thing>  
<owl:ObjectProperty rdf:about="&property:Nationality">
```

Go to the wiki!

- ✓ If you are e.g. Bjorn Hassler, and your user page is Bjorn:
 - ✓ Copy the content of your **User:Bjorn** page into a new page called **Bjorn Hassler**
 - ✓ Add to it the right categories (e.g. Man, Teacher)
 - ✓ Add to it the right properties and values (e.g. **Has nationality**, **Has e-mail**)
 - ✓ Replace the content of your old User: page **User:Bjorn** with a link to your new page **[[Bjorn Hassler]]**
 - ✓ Go to the Special:Ask page and play with queries
- ✓ Discuss in group and propose new Categories and Properties