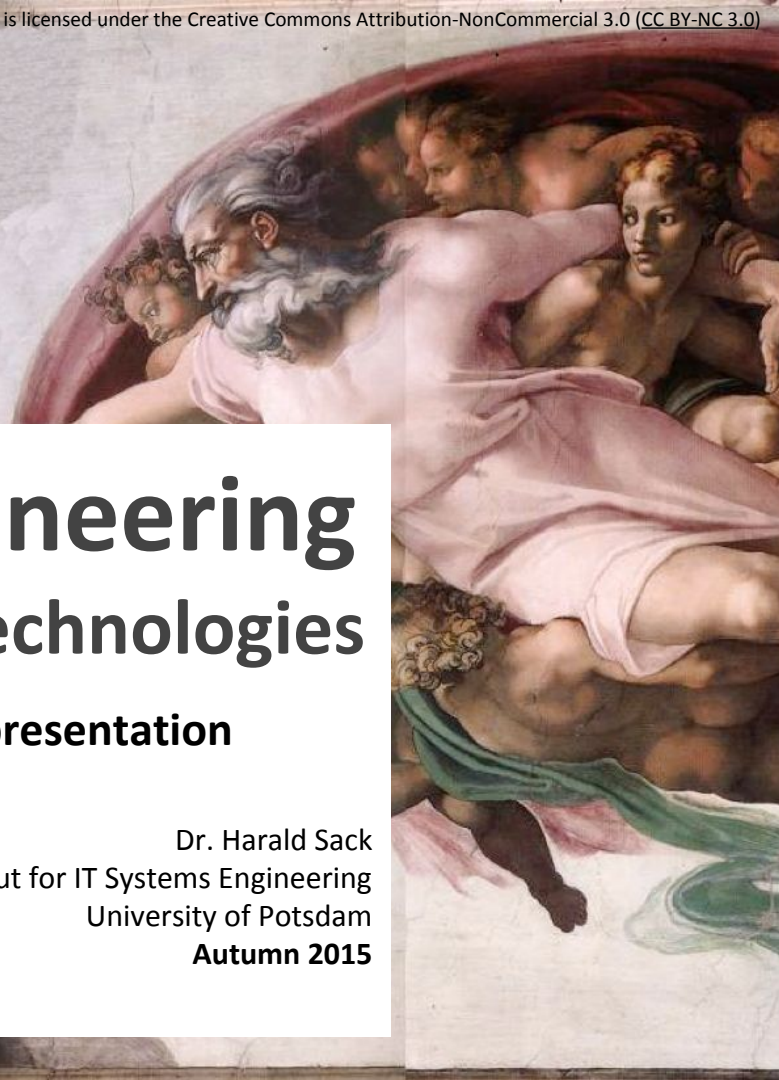
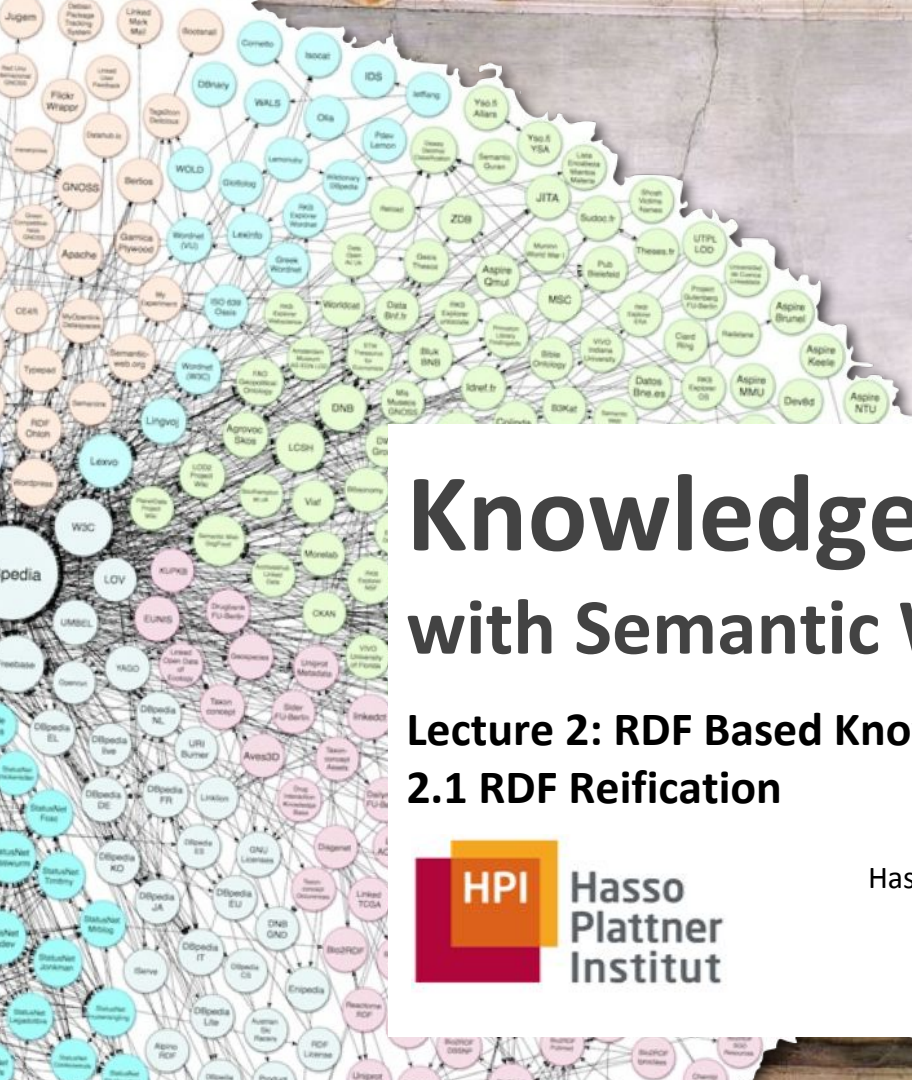




Knowledge Engineering with Semantic Web Technologies

Lecture 2: RDF Based Knowledge Representation 2.1 RDF Reification



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Autumn 2015

The Semantic Web Technology Stack (not a piece of cake...)

Most apps use only a subset of the stack

Querying allows fine-grained data access

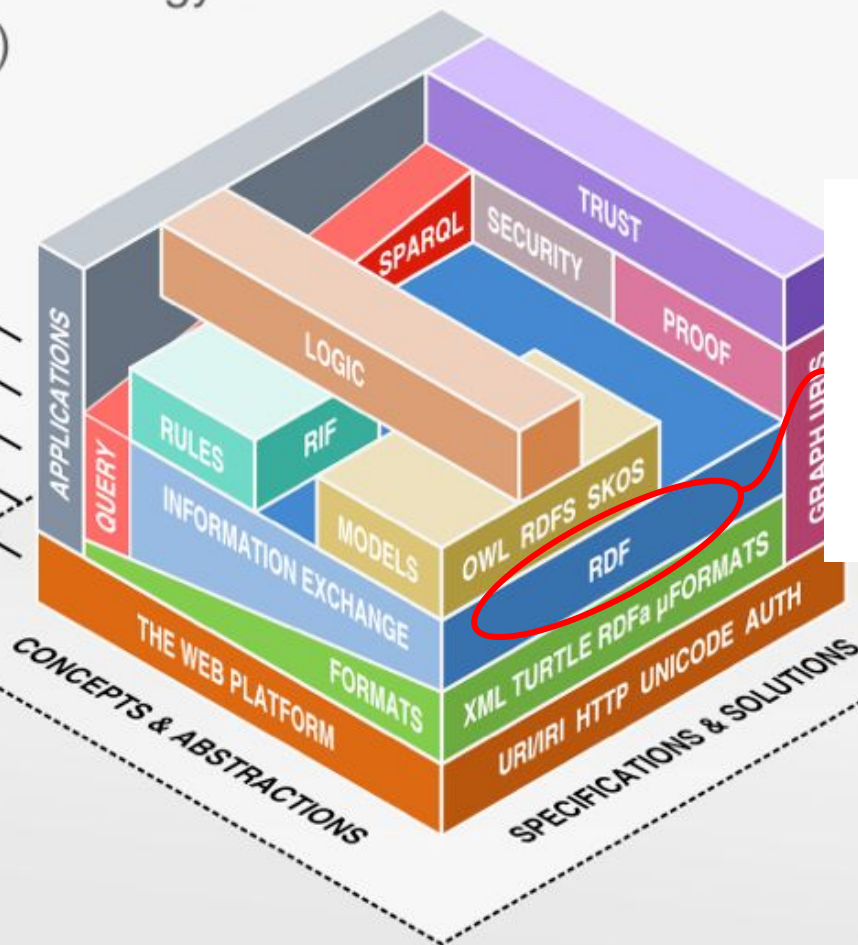
Standardized information exchange is key

Formats are necessary, but not too important

The Semantic Web is based on the Web

Linked Data uses a small selection of technologies

LINKED DATA



Resource
Description
Framework
(RDF)



“My dear Watson,
...I suppose that it was
the gardener who has
killed the butler!”

RDF Reification

- RDF permits interleaving of statements,
i.e. to make statements about statements
- Example:
 - Sherlock Holmes supposes that the gardener has killed the butler
 - **Part 1:** the gardener has killed the butler
`ex:Gardener ex:hasKilled ex:butler .`
 - **Part 2:** Sherlock Holmes supposes...
`dbpedia:Sherlock_Holmes ex:supposes ????`

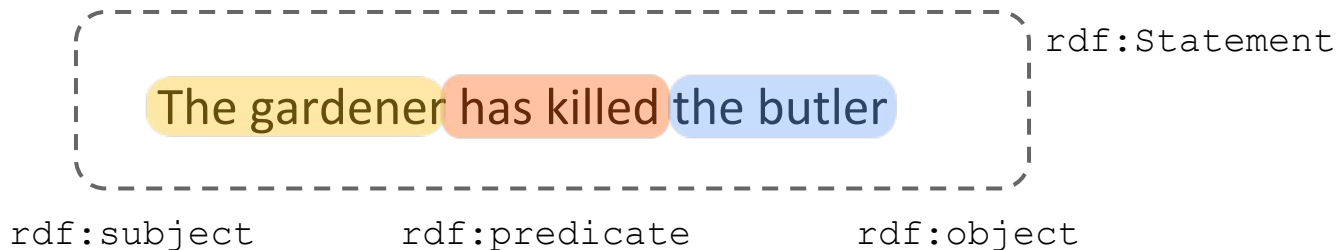
```
@prefix dbpedia <http://dbpedia.org/resource/> .  
@prefix ex: <http://example.org/Crimestories#> .
```

RDF Reification

- **rdf:Statement**

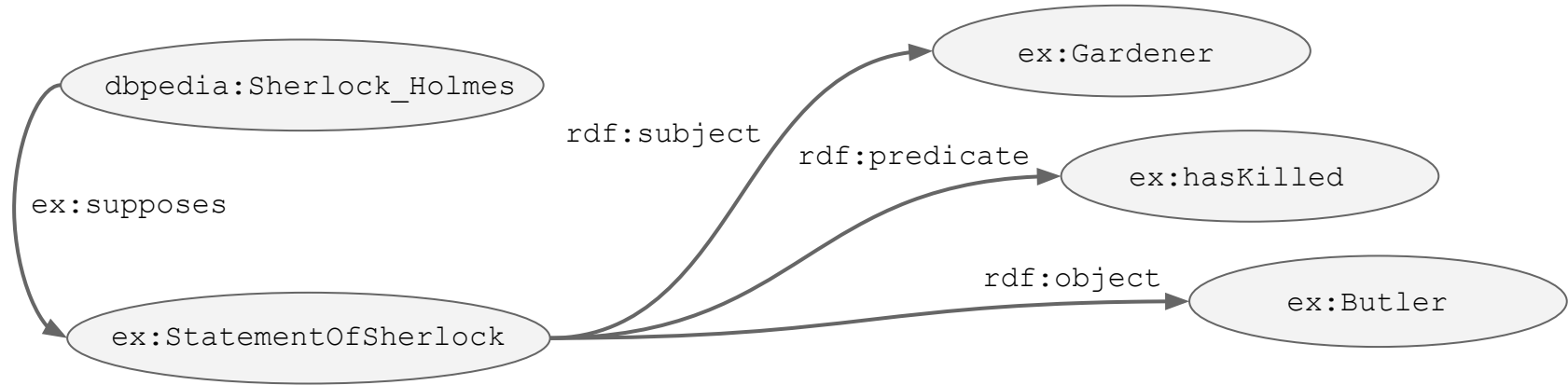
defines an RDF statement consisting of subject, predicate, object

- `rdf:subject` - the described resource
- `rdf:predicate` - the original property
- `rdf:object` - the value of the property



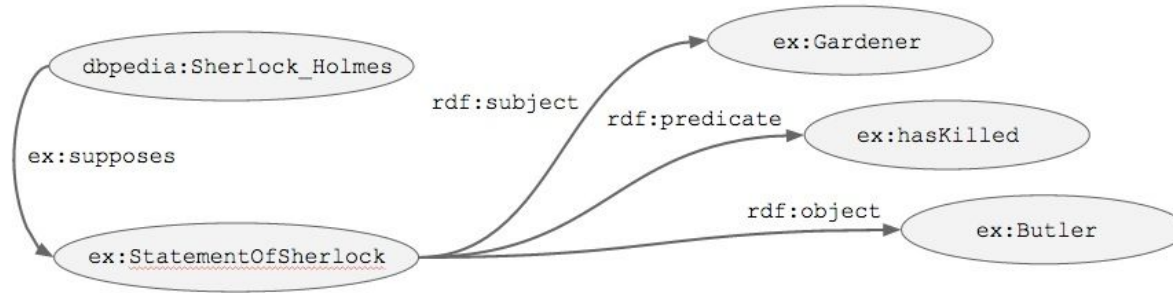
RDF Reification

Sherlock Holmes supposes that the gardener has killed the butler



```
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .  
@prefix dbpedia <http://dbpedia.org/resource/> .  
@prefix ex: <http://example.org/Crimestories#> .
```

RDF Reification



```
@prefix dbpedia: <http://dbpedia.org/resource/> .  
@prefix rdf:     <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .  
@prefix ex:      <http://example.org/Crimestories#> .
```

```
dbpedia:SherlockHolmes ex:supposes ex:StatementOfSherlock .  
:StatementOfSherlock a rdf:Statement ;  
    rdf:subject    ex:Gardener ;  
    rdf:predicate  ex:hasKilled ;  
    rdf:object     ex:Butler .
```

RDF Reification

- what is the use of reification?
 - modeling **data provenance**
 - formalizing statements about **reliability** and **trust**
 - define **metadata** about statements
- **but you should be careful....**
 - with reification relations can be transformed into classes (**type conflicts**)
 - definition of **infinite recursions** and **cycles**



RDF and Data Integration



RDF and Data Integration

A simple example: Bibliographic Database

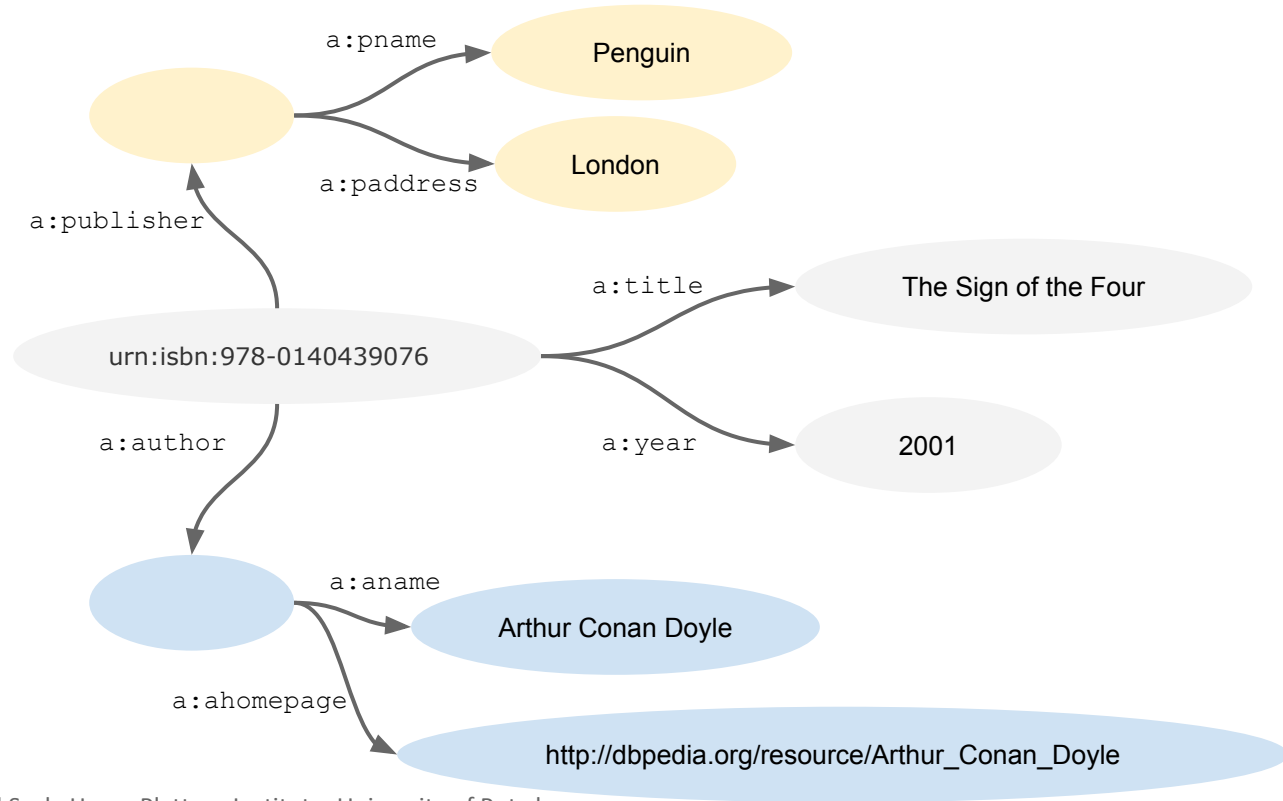
ID	Author	Title	Publisher	Year
ISBN 978-0140439076	ACD-01	The Sign of the Four	P-01	2001

ID	Name	Homepage
ACD-01	Arthur Conan Doyle	http://dbpedia.org/resource/Arthur_Conan_Doyle

ID	Name	Location
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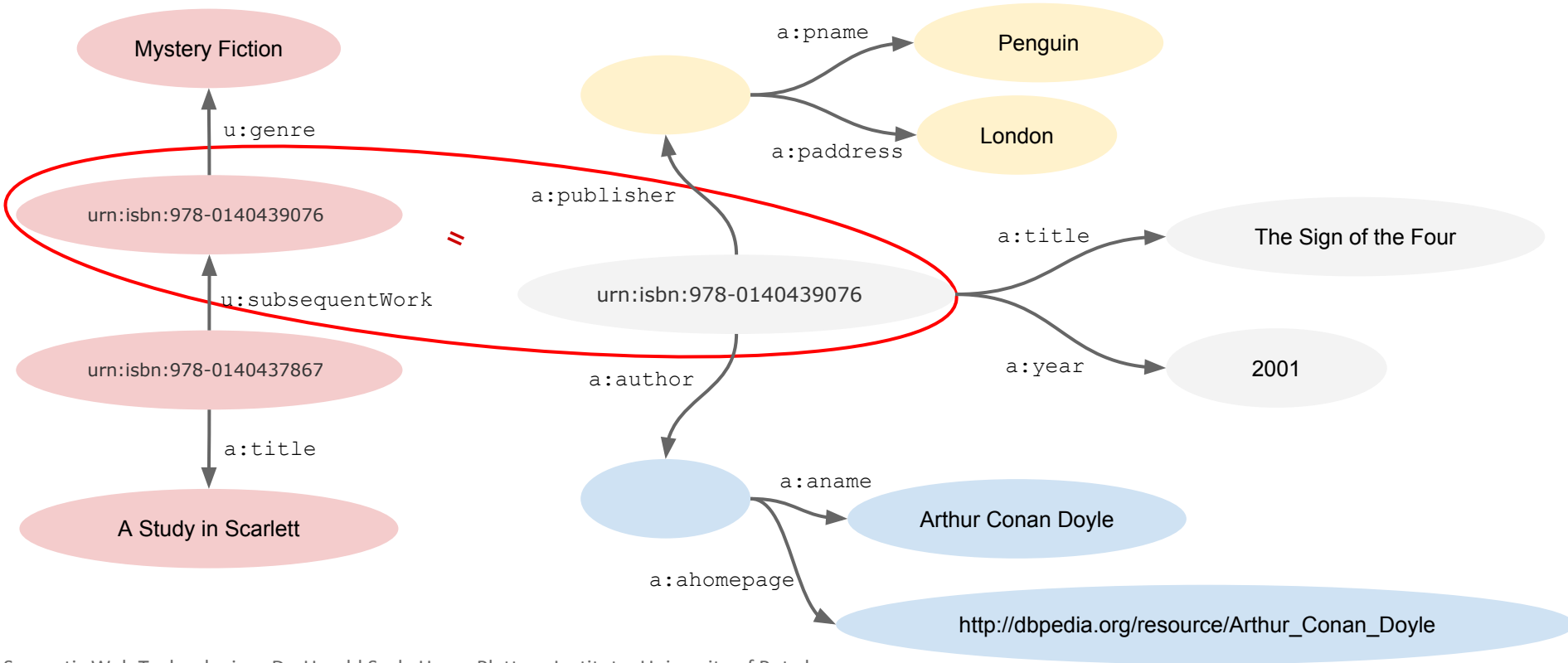
RDF and Data Integration

A simple example: Bibliographic Database



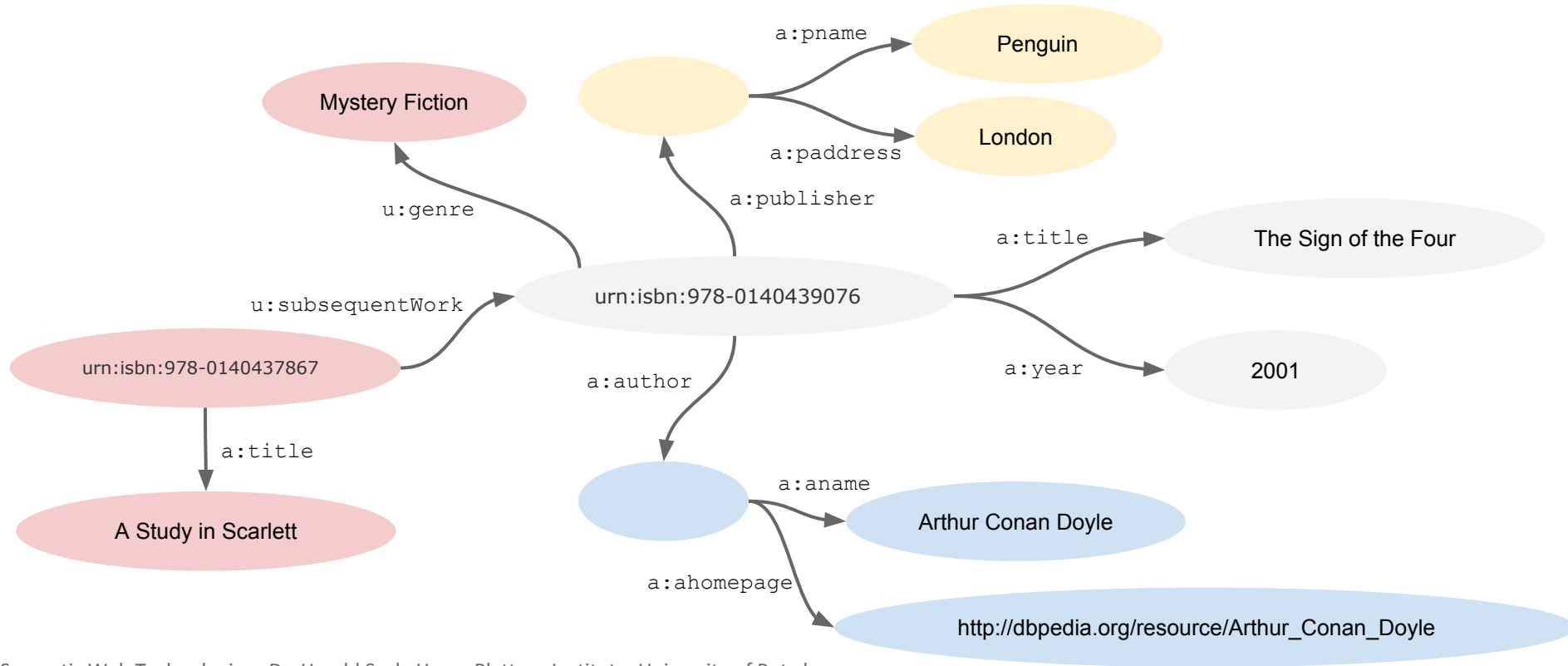
RDF and Data Integration

A simple example: Bibliographic Database



RDF and Data Integration

A simple example: Bibliographic Database





Next: 02 - Model Building with RDFS

OpenHPI - Course Knowledge Engineering with Semantic Web Technologies

Lecture 2: RDF Based Knowledge Representation