

Semantic Days 2011 Tutorial

Semantic Web Technologies

Lecture 2: RDF, The Resource Description Framework

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DEPARTMENT OF
INFORMATICS



UNIVERSITY OF
OSLO

Outline

- 1 The RDF data model
- 2 The Turtle syntax

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2 The Turtle syntax

The conceptual components of RDF

The RDF data model in a nutshell:

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We shall look at each in turn.

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- Another word for an RDF triple is a *statement*

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 - has mayor: `http://dbpedia.org/ontology/leaderName`
 - Fabian Stang: `http://dbpedia.org/resource/Fabian_Stang`

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- Not necessarily dereferenceable
 - Separate a web page from what it talks about!
- Helps to avoid name clashes
- Can be used for cross-referencing

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- Remember: It's all just URIs!

RDF Graphs

- An *RDF graph* is a set of triples. E.g.

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dbp:Norway dbp-ont:capital dbp:Oslo .
```

```
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```

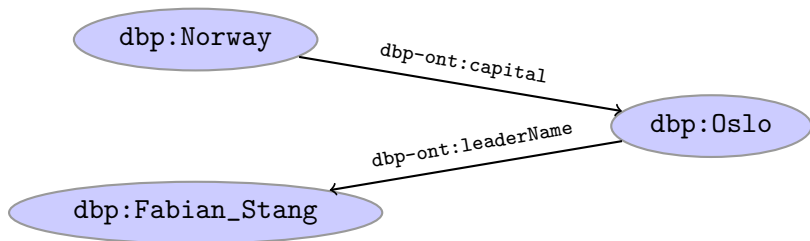
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- Often represented as a directed graph:



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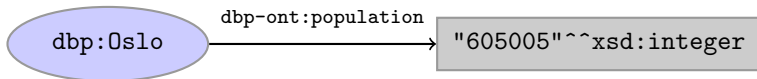
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 - Typed, with a URI indicating the type:
dbp:Oslo dbp-ont:population "605005"^^xsd:integer .

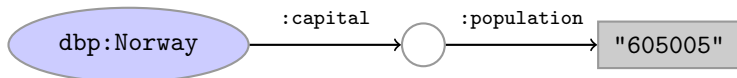
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- Usually represented with rectangles:

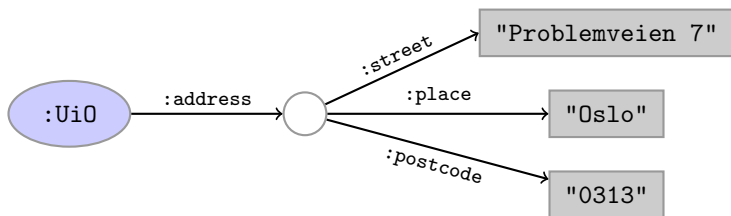


Blank nodes

- Blank nodes are like resources without a URI
- Can be used as subject or object, but not as predicate
- Norway's capital has population 605005:



- The address of UiO is Problemveien 7, 0313 Oslo:



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rdfs: <<http://www.w3.org/2000/01/rdf-schema#>> – RDF Schema
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 - dbp:Fabian_Stang **foaf:name** "Fabian Stang"

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RDF Serializations

There are many serializations for the RDF data model:

RDF/XML the W3C standard. Very complicated!

```
<?xml version="1.0"?>
<rdf:RDF xmlns:dbp="http://dbpedia.org/resource/"
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  <rdf:Description rdf:about="http://dbpedia.org/resource/Fabian_Stang">
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N-triples one triple per line. No abbreviations.

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```

Others TriX, TriG, RDF/JSON,...

Statements/assertions/triples

Full URIs are surrounded by < and >

```
<http://dbpedia.org/resource/Oslo>
```

Statements are triples terminated by a period:

```
<http://dbpedia.org/resource/Oslo>  
  <http://www.w3.org/1999/02/22-rdf-syntax-ns#type>  
    <http://dbpedia.org/ontology/Place> .
```

rdf:type may be abbreviated with 'a':

```
<http://dbpedia.org/resource/Oslo>  
  a  
    <http://dbpedia.org/ontology/Place> .
```

Namespaces

Namespace prefixes are declared with `@prefix`:

```
@prefix dbp: <http://dbpedia.org/resource/> .  
  
dbp:Oslo a <http://dbpedia.org/ontology/Place> .
```

A base namespace may be declared:

```
@prefix dbp: <http://dbpedia.org/resource/> .  
@prefix : <http://dbpedia.org/ontology/> .  
  
dbp:Oslo a :Place .
```

Literals

Literal values are enclosed in double quotes:

```
@prefix dbp: <http://dbpedia.org/resource/> .  
@prefix : <http://dbpedia.org/ontology/> .  
  
dbp:Oslo :officialName "Oslo" .
```

Possibly with type and language information:

```
dbp:Norway rdfs:label "Norge"@no .  
dbp:Oslo :population "605005"^^xsd:integer .
```

Statements with shared subjects

Statements may share a subject with ';'

```
dbp:Oslo :officialName "Oslo" ;  
         :population "605005"^^xsd:integer ;  
         :leaderName dbp:Fabian_Stang .
```

Statements may share subject and predicate with ','

```
dbp:Norway rdfs:label "Norway"@en ,  
                "Norwegen"@de ,  
                "Norge"@no .
```


Blank nodes

Blank nodes are designated with underscores or [...]

Norway has a capital with population 605005

```
dbp:Norway :capital _:someplace .
_:someplace :population "605005"^^xsd:integer .
```

There is a place with official name Oslo

```
[] a :Place ;
   :officialName "Oslo" .
```

UiO has address Problemveien 7, 0313 Oslo

```
:UiO :address [ :street "Problemveien 7" ;
                :place "Oslo" ;
                :postcode "0313" ] .
```

Supplementary reading—W3C specs:

- Concepts and Abstract Syntax:
 - <http://www.w3.org/TR/2004/REC-rdf-concepts-20040210/>
- RDF/XML Syntax Specification:
 - <http://www.w3.org/TR/2004/REC-rdf-syntax-grammar-20040210/>
- RDF Semantics:
 - <http://www.w3.org/TR/2004/REC-rdf-mt-20040210/>
- RDF Primer:
 - <http://www.w3.org/TR/2004/REC-rdf-primer-20040210/>



Exercise: RDF

- Write RDF in Turtle format
- Validate RDF using online validators
- Visualize RDF graph

Go to <http://sws.ifi.uio.no/semdays2011/> for more information.