COMP318

Ontologies and Semantic Web

RDF - Part 4

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Recap

- RDF
  - XML syntax
  - URIs

RDF Serialisation formats

- RDF has been given a syntax in XML
  - This syntax inherits the benefits of XML
  - Other serialisations of RDF possible:
    - Notation 3 (N3)
      - Syntax for RDF
      - Logical language for RDF
    - N-Quads
      - Superset of N-triples for serialising multiple RDF graphs
    - Turtle
      - Refinement of N3
      - Just RDF representation
    - JSON-LD
      - JSON based serialisation

Terse RDF Triple Language

- Turtle
  - Refinement of N3
  - Just RDF representation
- Plain text syntax for RDF
  - Based on Unicode
  - RDF 1.1 turtle recommendation in 2014
- Concise syntax
  - Mechanisms for namespace abbreviation
  - Allows grouping of triples according to subject
- Shortcuts for collections
- In short:
  - Takes good things of RDF/XML
  - and leaves out angle brackets (unless you choose to avoid the abbreviations!)

```
@prefix swp:<http://www.swpExample.org/ontology/flats.ttl#>
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>
@prefix dbpedia: <http://dbpedia.org/resource>
@prefix dbpedia_owl: <http://dbpedia.org/ontology>
@prefix dc: <http://purl.org/dc/terms>

{
  swp:BaronWayApartment swp:isPartOf swp:BaronWayBuilding .
  swp:BaronWayBuilding dc:title “BaronWay Building” ;
                       dbpedia_owl:location dbpedia:Amsterdam ,
                                            dbpedia:TheNetherlands .
  dbpedia:Amsterdam dbpedia_owl:country dbpedia:TheNetherlands ;
                    rdf:type  dbpedia_owl:City .
 }
```

Prefixes

- Mechanism for namespace abbreviation
  - Vocabularies are typically defined at the same URI

- Syntax:

```
@prefix abbr: <URI>
```

- Default:

```
@prefix : <URI>
```

- Example:

```
@prefix swp:<http://www.swpExample.org/ontology/flats.ttl#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
```

```
@prefix swp:<http://www.swpExample.org/ontology/flats.ttl#> .
@prefix dc: <http://purl.org/dc/terms> .
{
  swp:BaronWayApartment swp:isPartOf swp:BaronWayBuilding .
  swp:BaronWayBuilding dc:title “BaronWay Building” .
  ...
 }
```

Abbreviations in Turtle

- URIs: <URI>

```
<http://www.swpExample.org/ontology/flats.ttl#>
```

- Qnames (Qualified names): namespace-abbr?:localname
  - allow us to drop the angle brakets

- Literals: `"string"(@lang)?(^^type)?`

```
"John" "Hello"@en-GB "1.4"^^xs:decimal
```

- Typed literal shortcuts
  - `integer: 2 45`
  - `decimal: 2.4 5.67`
  - `boolean: true false`

```
@prefix swp:<http://www.swpExample.org/ontology/flats.ttl#>
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>
@prefix dbpedia: <http://dbpedia.org/resource>
@prefix dbpedia_owl: <http://dbpedia.org/ontology>
@prefix dc: <http://purl.org/dc/terms>
{
  swp:BarownWayApartment swp:isPartOf swp:BaronWayBuilding .
  swp:BaronWayApartment swp:hasNumberOfBedrooms 3 .
  swp:BarownWayApartment swp:isPartOf swp:BaronWayBuilding .
  swp:BaronWayBuilding dbpedia_owl:location dbpedia:Amsterdam .
  dbpedia:Amsterdam dbpedia_owl:country dbpedia:TheNetherlands .

  swp:BaronWayBuilding dc:title “BaronWay Building” ;
                       dbpedia_owl:location dbpedia:Amsterdam ,
                       dbpedia:TheNetherlands .
  dbpedia:Amsterdam dbpedia_owl:country dbpedia:TheNetherlands ;
                    rdf:type  dbpedia_owl:City .

}
```

Blank Nodes in Turtle

- **Simple blank node: [ ] or _:x**

```
swp:jeff swp:owns [] .

swp:jeff scp:owns _:x .
```

- **Blank node as subject: [predicate object; predicate object ...]**

```
[ swp:hasName "Jeff"] .

[ swp:rents
  swp:BaronWayApartment;

  ex:hasName "Meyer"] .
```

- **Collections: (object1 ... objectn)**

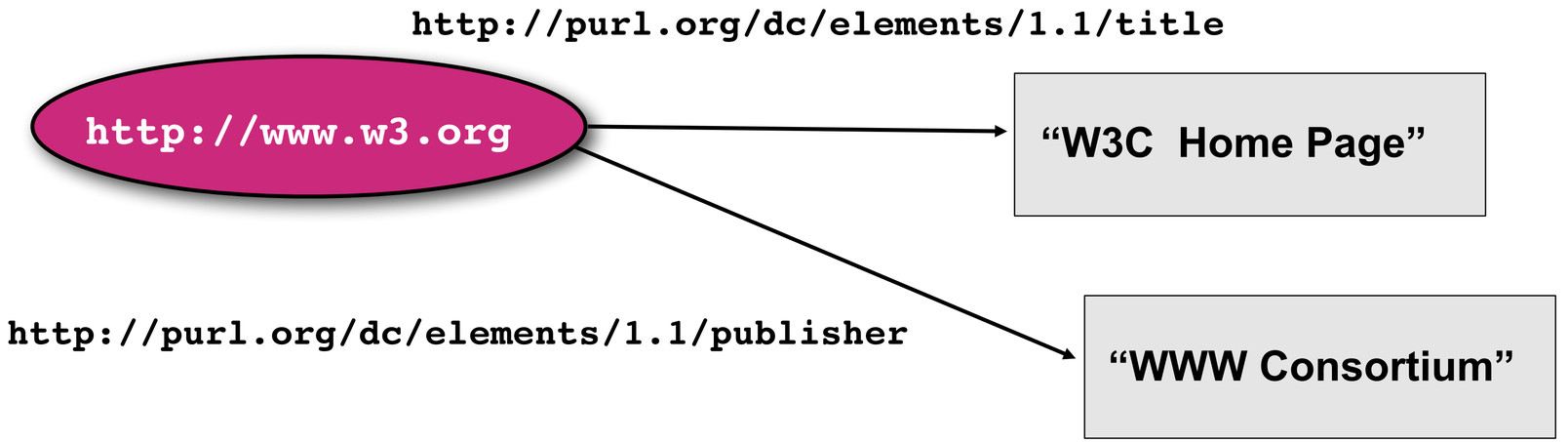
```
swp:BaronWayApartment
swp:tenant
(:jeff :mary) .
```

Short for

```
swp:BaronWayApartment
swp:tenant

[ rdf:first :jeff;

rdf:rest [ rdf:first :mary;

rdf:rest rdf:nil ]

] .
```

Literals

- Literals represent data values
  - denoted as string
  - interpreted via assigned datatype
    - literals without explicitly associated datatype are treated like strings

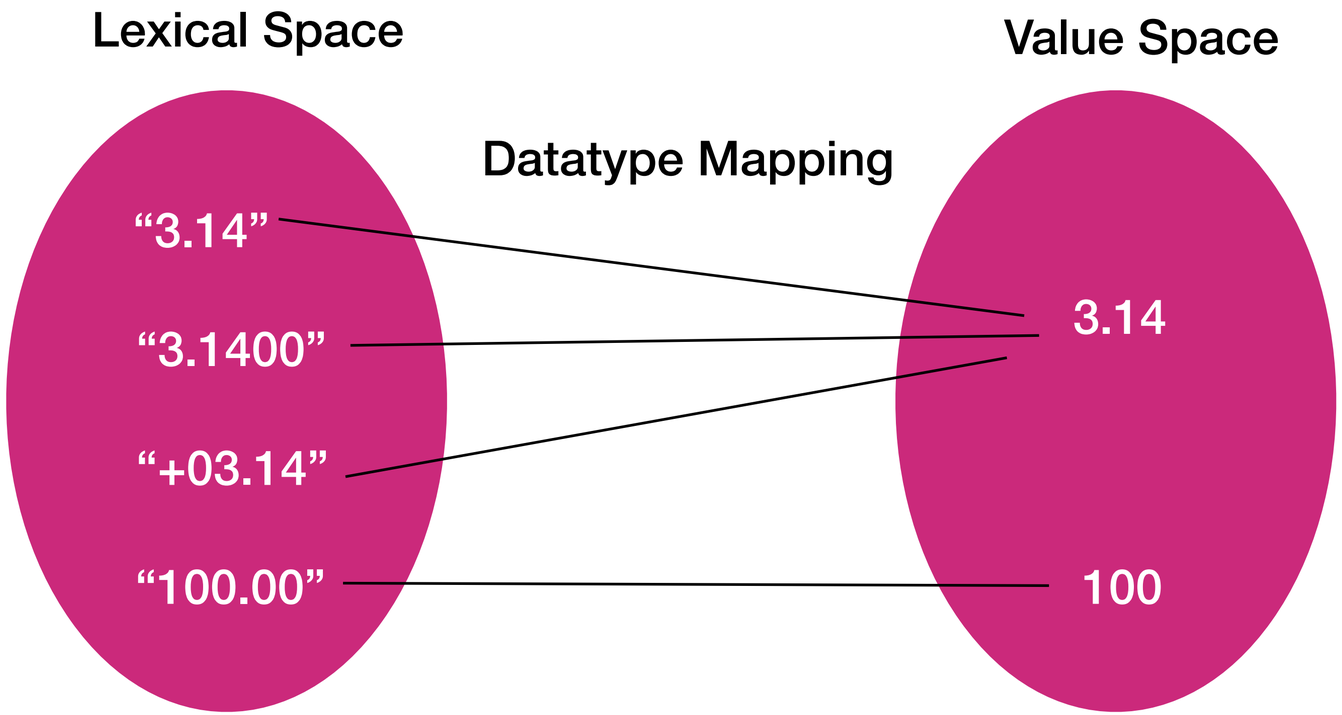


Datatypes in RDF TURTLE

- Without datatypes literals are untyped, interpreted as strings
  - e.g. `"02"`, ”`2`”, ”`2.0`” all different
- typing literals with datatypes allows for more adequate treatment of values
  - semantic is clearer
- datatypes denoted by URIs and can be freely chosen
  - frequently: xsd datatypes from XML
    - syntax of typed literal: `"datavalue"^^datatype-URI`
- `rdf:XMLLiteral` is the only datatype that is part of the RDF standard
  - denotes arbitrary balanced XML “snippets”

Datatypes in RDF

- Example: `xsd:decimal`



"3.14"="+03.14" holds for `xsd:decimal` but not for `xsd:string`

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End of RDF - Part 4

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