COMP318

Ontologies and Semantic Web

RDF - Part 7

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Where were we

- RDF data model
- Serialisations
  - XML syntax
  - Turtle syntax
  - RDFa

RDF Vocabulary

- RDF is an application domain independent data model that allows users to describe resources in a vocabulary of their choice
  - RDF does not assume nor it define the semantics of any particular application domain, just the data model
- The RDF vocabulary defines a number of resources and properties
  - We have already seen `rdf:XMLLiteral`…

Container elements

- Group together a number of resources about which we want to make a statement as a whole
  - e.g we might want to talk about all the apartments in a building
- `rdf:_1, rdf:_2, …` are used to name the content of container elements
  - Alternatively we can use `rdf:li`

Types of container elements

- `rdf:Bag` unordered container, that allows for multiple occurrences
  - e.g apartments in a building, documents in a folder
- `rdf:Seq` ordered container, that may contain multiple occurrences. The order might be imposed
  - e.g floors in a building, list of tenants in alphabetical order
- `rdf:Alt` is a set of alternatives
  - e.g different language versions of a policy document
- `rdfs:Container` is the superclass of all container class, including `rdf:Bag`, `rdf:Seq` and `rdf:Alt`
  - It is part of the schema vocabulary for RDF

RDF collections

- A limitation of RDF containers is that there is no way to close them:
  - i.e. to state that these are all the members of the container

- RDF collections allows to describe groups containing only the specified members
  - e.g BaronWay Building contains BaronWay apartment, AmsterdamWay Apartment, and AmstelWay Apartment
  - constructed using the predefined collection vocabulary for lists:
  - `rdf:List, rdf:first, rdf:rest` and `rdf:nil`

Providing structures in RDF documents

- Types in RDF
  - Introduce structure in RDF documents using the RDF vocabulary
    - `swp:ListOfTenant rdf:type rdf:List .`
  - But also application specific vocabulary
    - `swp:BaronWayBuilding rdf:type dbpedia-owl:Building .`
    - `dbpedia-owl:Building` is a resource representing the class of all buildings

RDF Vocabulary

- RDF vocabulary is defined in the namespace: `http://www.w3.org/1999/02/22-rdf-syntax-ns#` and includes
  - Classes:
    - `rdf:Property rdf:Statement rdf:XMLLiteral rdf:Seq rdf:Bag rdf:Alt rdf:List`
  - Properties:
    - `rdf:type rdf:subject rdf:predicate rdf:object rdf:first rdf:rest rdf:value`
  - Resources:
    - `rdf:nil`

Defining a schema for RDF data

- `rdf:type` allows us to express class membership
  - `swp:BaronWayBuilding rdf:type dbpedia-owl:Building .`
  - `dbpedia-owl:Building` is a resource representing the class of all buildings
    - Definition of what is "`dbpedia-owl:Building`" ⇒ A language for defining types in RDF:
- A language to add domain information and structure to an RDF model using:
  - Define classes:
    - `dbpedia-owl:Building` is a class
  - Relationships between classes:
    - `dbpedia-owl:Building` is a sub-class of `dbpedia-owl:Location`
  - Properties of classes:
    - `dbpedia-owl:Building` has property `dbpedia-owl:hasName`
  - RDF Schema is such a language

RDF vs RDFS

- RDFS: RDF language for describing structured information
  - **concrete things (individuals)**:
    - the book entitled “Lord of the rings”, the author “J.R.R Tolkien”, the apartment “BaronWay Apartment”,…
  - **relations between individuals**:
    - The book “Lord of the rings” is authored by “J.R.R Tolkien”
  - **types of literals and resources**:
    - They belong to class of elements sharing the same characteristics
      - natural numbers, dates, buildings ...

- How do we model classes of individuals?

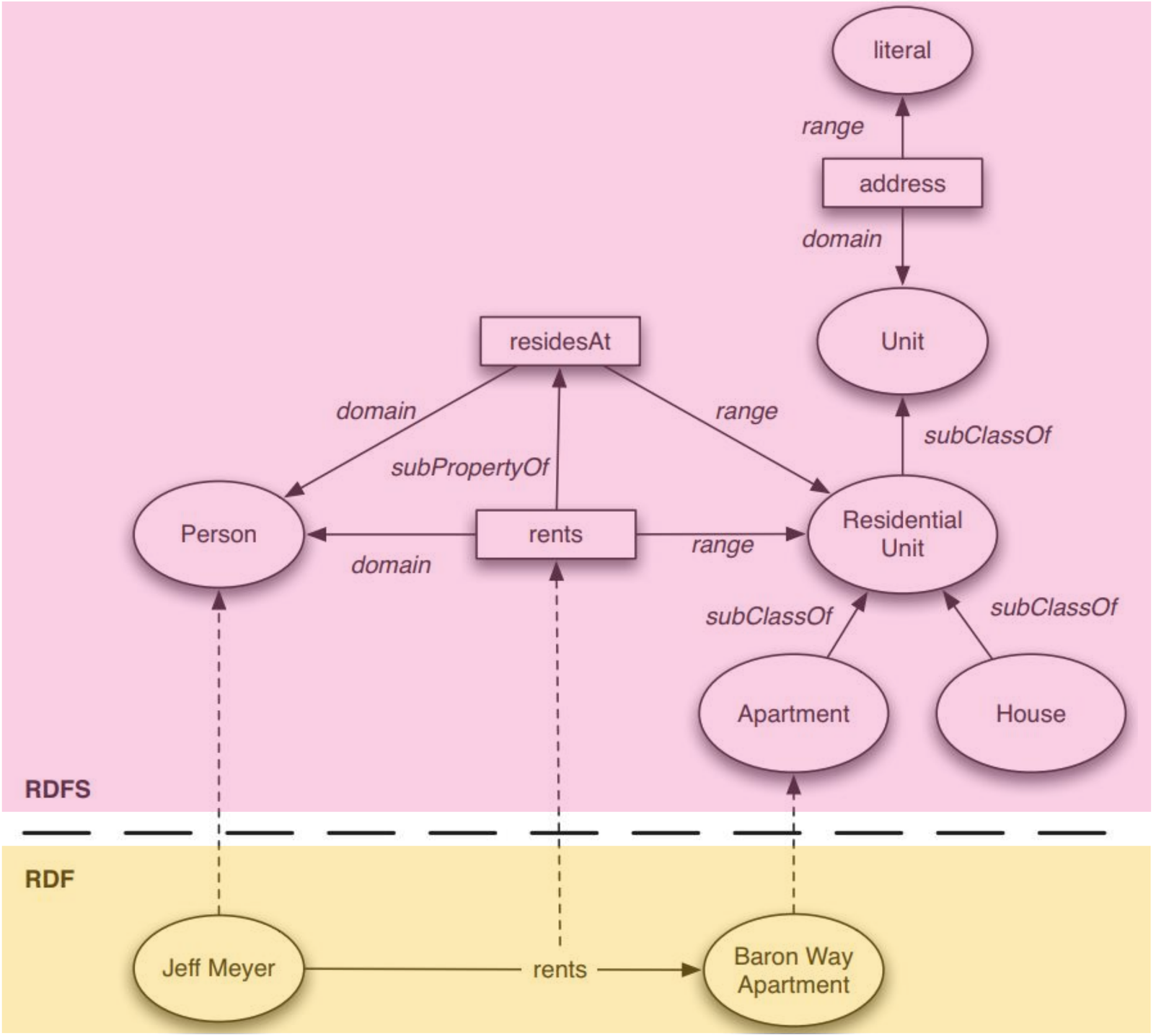
Basic Ideas of RDF Schema

- RDF is a universal language that lets users describe resources in their own vocabularies
  - RDF does not assume, nor does it define semantics of any particular application domain

- The user can do so in RDF Schema using:
  - Classes and Properties
  - Class Hierarchies and Inheritance
  - Property Hierarchies

Classes and their Instances

- We must distinguish between
  - Concrete “things” (**individual** objects) in the domain: *Semantic Web*, *John Smith* etc.
  - Sets of individuals sharing properties called **classes**: *lecturers*, *students*, *courses* etc.
- Individual objects that belong to a class are referred to as instances of that class
- The relationship between instances and classes in RDF is through `rdf:type`


literal
range
address
domain
Unit
residesAt
domain
range
subClassOf
subPropertyOf
Person
rents
range
Residential Unit
domain
subClassOf
subClassOf
Apartment
House
RDFS
RDF
Jeff Meyer
rents
Baron Way Apartment

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End of RDF - Part 7

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