

COMP318

Ontologies and Semantic Web

RDF - Part 9



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Where were we

- RDF as a data modelling language
 - RDF syntax
- RDFS schema language

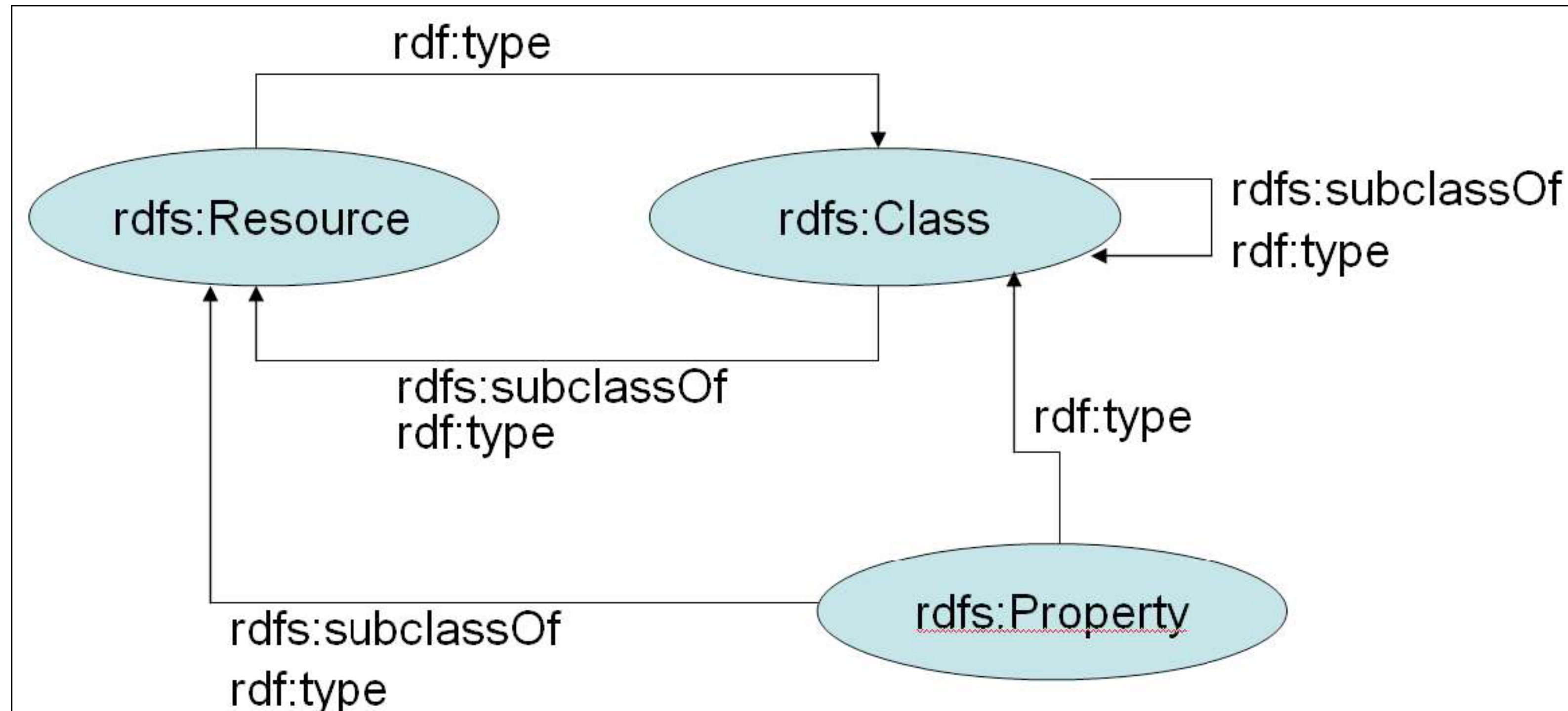
RDFS schema language

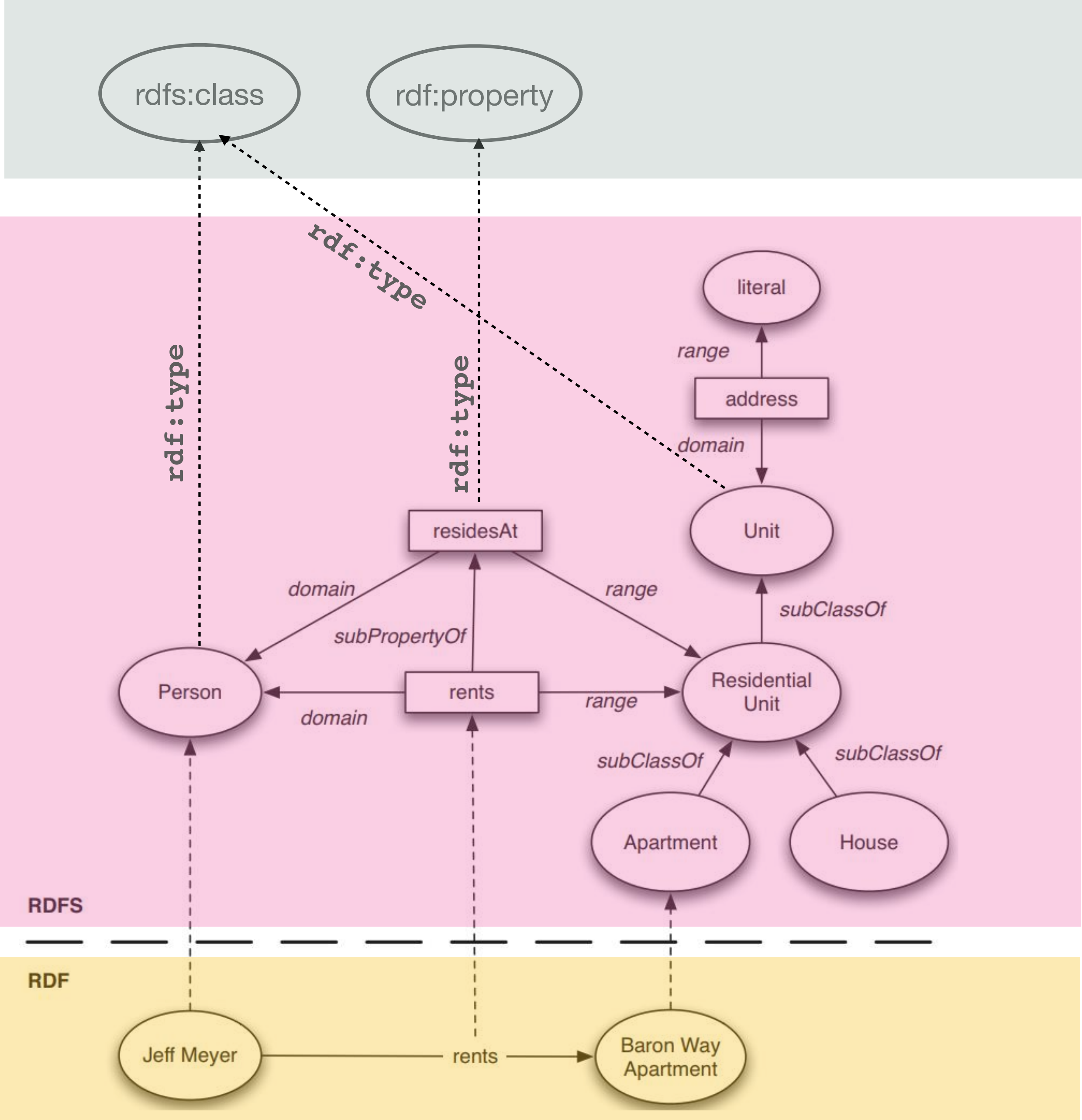
- RDFS “extends” RDF by introducing a set of distinguished resources in the language
 - Similar to how traditional programming languages are extended by defining language defined keywords
 - however....
- In RDF we can already use any resource in any triple
 - Anyone can say Anything principle
- By introducing a set of distinguishing resources we give certain triples a special meaning, as identified by RDFS standard
 - `swp:Unit rdfs:subClassOf rdfs:Class`

RDF Layer vs RDF Schema Layer

- “*Jeff Meyer rents BaronWayApartment*”
- The schema is itself written in RDF Schema, that can express its components:
 - *subClassOf, Class, Property, subPropertyOf, Resource, etc.*

RDFS Vocabulary





Vocabulary Layer

Domain Schema Layer (RDFS)

Data Layer (RDF)

Typing data by usage

- We introduce the resources `rdfs:domain` and `rdfs:range`
 - allow us to describe how a property is used wrt the defined classes
- When a property is used in a triple `:s :p :o`
 - the class the subject belongs to (`:p rdfs:domain :D`)
 - the class the object belongs to (`:p rdfs:range :R`)

Typing data by usage

- The meaning of `rdfs:domain` and `rdfs:range` is defined by the inferences that we can derive from the statements
- RDFS inferencing interprets `rdfs:domain` with
 - *if $s : p o$ and $p \text{ rdfs:domain } D$ then $s \text{ rdf:type } D$*
- RDFS inferencing interprets `rdfs:range` with
 - *if $s : p o$ and $p \text{ rdfs:range } R$ then $o \text{ rdf:type } R$*

Inferences in RDFS domain and range

- Domain and range give some information about how the property `:p` is to be used:
 - domain refers to the subject of any triple that uses `:p` as its predicate,
 - range refers to the object of any such triple.
- When we assert that property `:p` has domain `:D` (resp, range `:R`), we state that:
 - whenever `:s :p :o`, we can infer that the subject (respectively, object) of that triple is a member of the class `:D` (respectively, `:R`).
 - If `:p` is used inconsistently wrt its declaration, RDFS will infer the necessary `rdf:type` information to make `:p` compliant with its domain and range declarations
 - But will not signal an error, because in RDFS we cannot assert that a particular instance is not a member of a given class

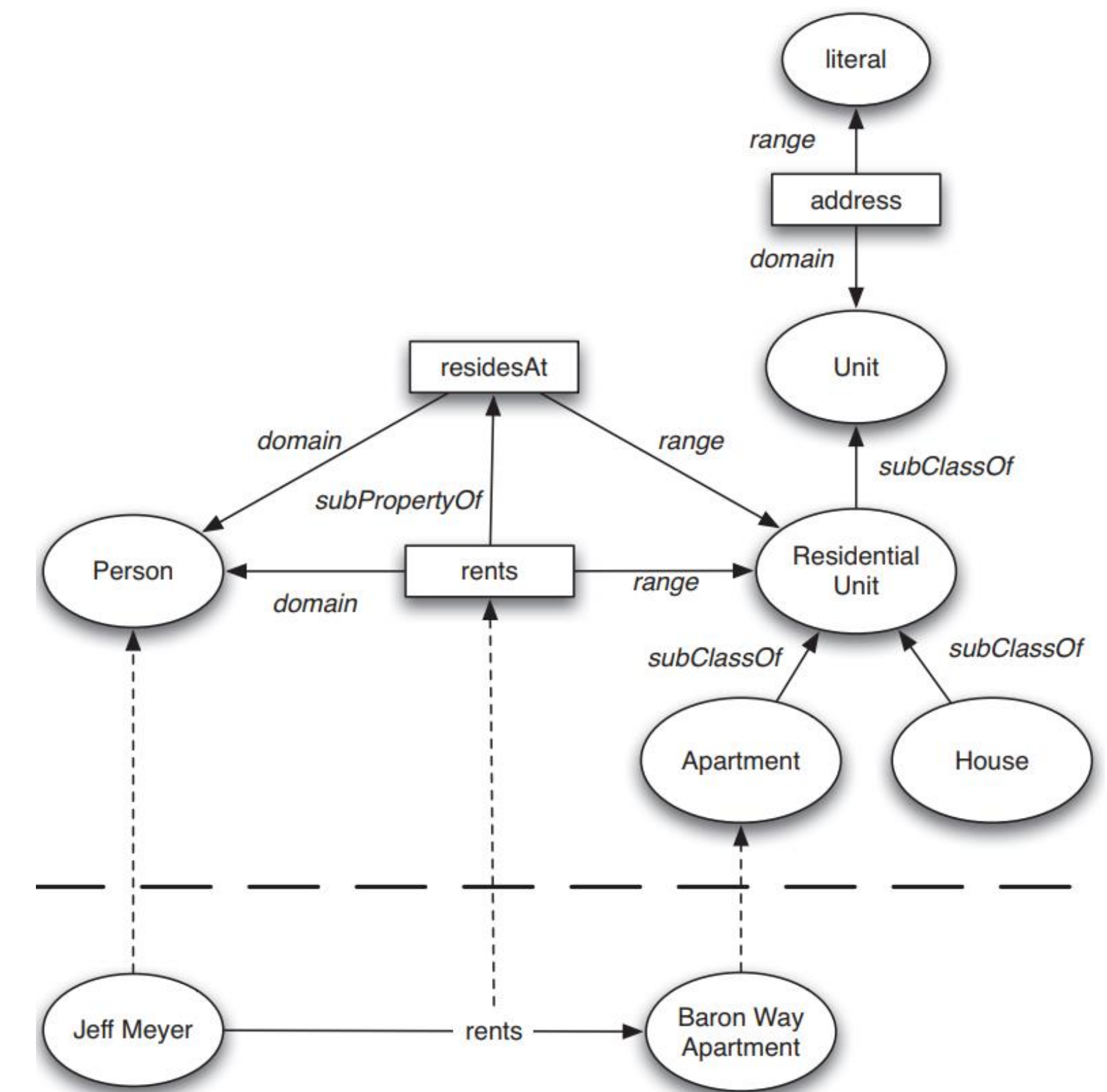
Combining `RDFS:subClassOf` with `rdfs:domain` and `rdfs:range`

- Let's consider the following triples:

```
swp:ResidentialUnit rdfs:subClassOf swp:Unit
```

```
swp:rents rdfs:range swp:ResidentialUnit
```

- If we assert that `?x swp:rents ?y`
 - `?y` a resource that might not be even a `swp:ResidentialUnit`
 - then we can still derive `?y rdf:type swp:Unit`
- The definitions of RDFS domain and range are quite aggressive:
 - we can draw conclusions about the type of any element based simply on its use in a triple
 - as long as we have domain or range information about the predicate.



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End of RDF - Part 9

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