Semantic Web for the Working Ontologist

Chapter 13: Ontologies on the Web

Data on the Web

Schemas:

- schema.org http://schema.org/
- Open Graph Protocol http://ogp.me/
- Good Relations Ontology http://www.heppresearch.com/

Formats:

- RDFa (W3C Recommendation)
- Microformats http://microformats.org/
- JSON LD (W3C Recommendation; does not completely intersect with RDF) http://json-ld.org/ https://www.w3.org/TR/json-ld/

RDFa extraction demo

- http://bioimages.vanderbilt.edu/baskauf/11926.htm
- View page source
- Go to W3C RDFa Validator: https://www.w3.org/2012/pyRdfa/Validator.html
- Paste in URL, or upload from saved HTML file.

Supposed Good Relations RDF

- http://www.bestbuy.com/site/apple-apple-watch-sport-42mm-space-gray-aluminum-case-space-gray-sports-band/4274802.p?id=1219733906250&skuId=4274802
- Check page source for RDFa
- https://www.w3.org/2012/pyRdfa/Validator.html
- Open Graph protocol, not Good Relations
- Significant lack of commitment to “pure” RDF (use of literals for everything)
- Could not find GR at sears.com, kmart.com, etc.

Taking a look at Good Relations

- Source is at http://www.heppnetz.de/ontologies/goodrelations/v1.html
- RDF/XML on GitHub
- Turtle on GitHub
- Ugliness; look at in Protégé
- Note that cardinality is given in literals, not OWL definitions (???)
- Note the usual problem of competing schemas and attempt to reconcile with schema.org

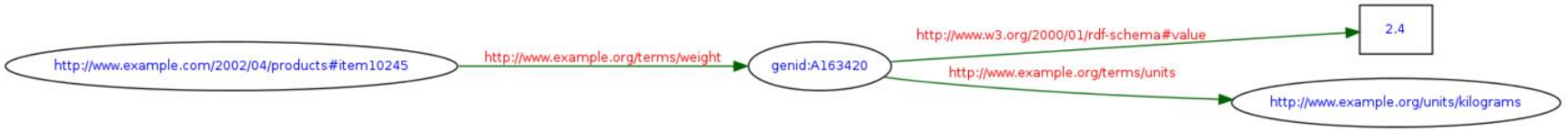
The literal problem

```
ex:flyingPig ex:hasMeasurement “21”^^xsd:integer.
```

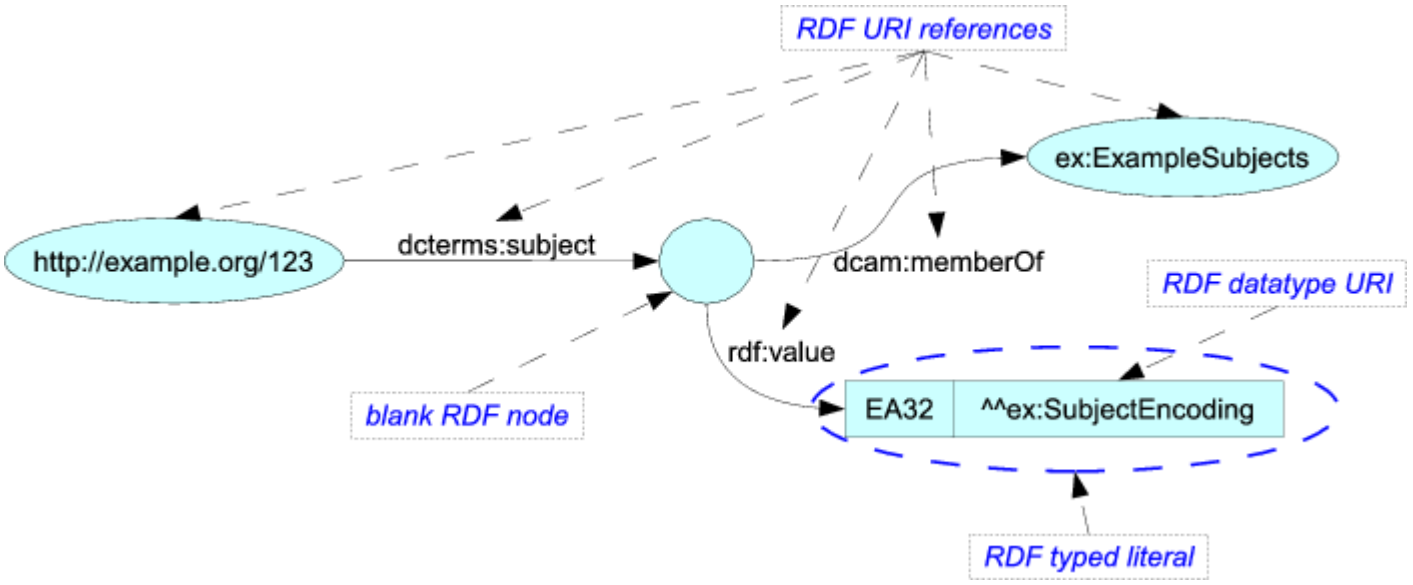
- The datatyping lets us know that the literal is a number.
- But what kind of measurement is this? What are the units?

Reification examples: rdf:value and DCMI RDF model

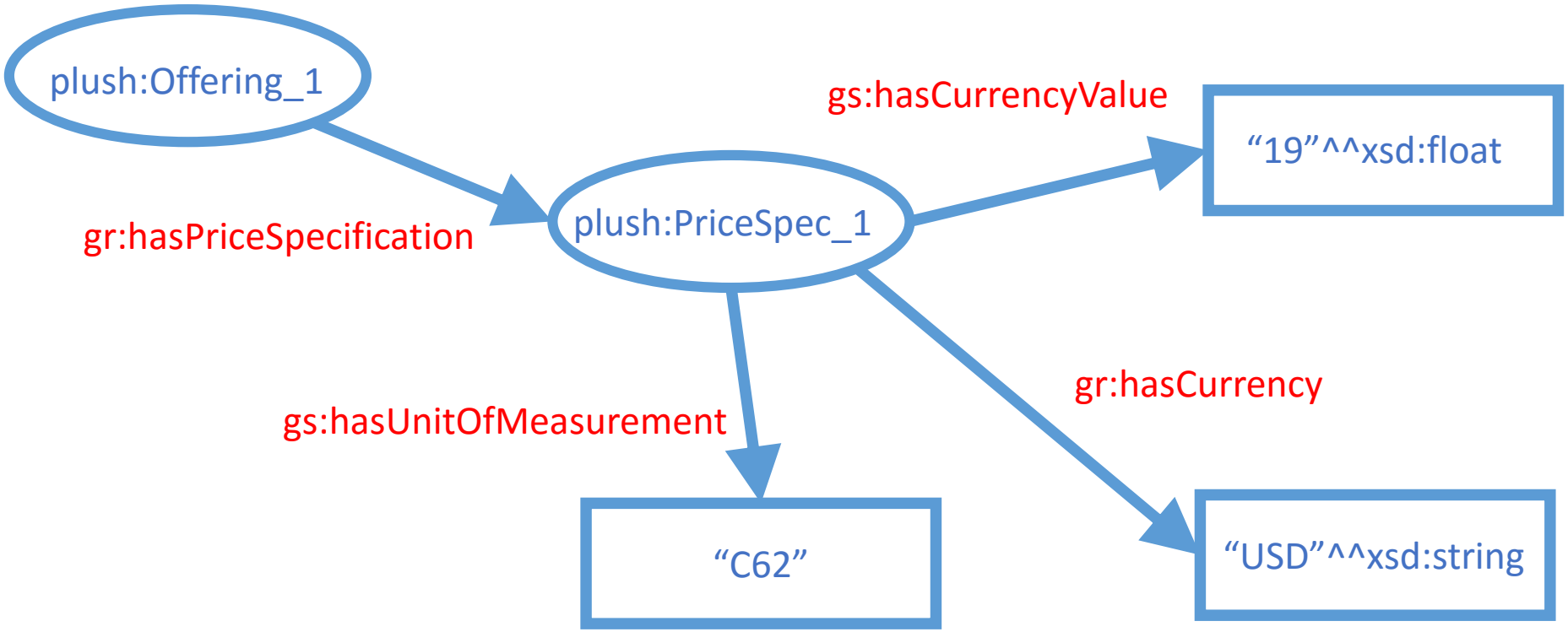
https://www.w3.org/TR/rdf-schema/#ch_value



http://dublincore.org/documents/dc-rdf/



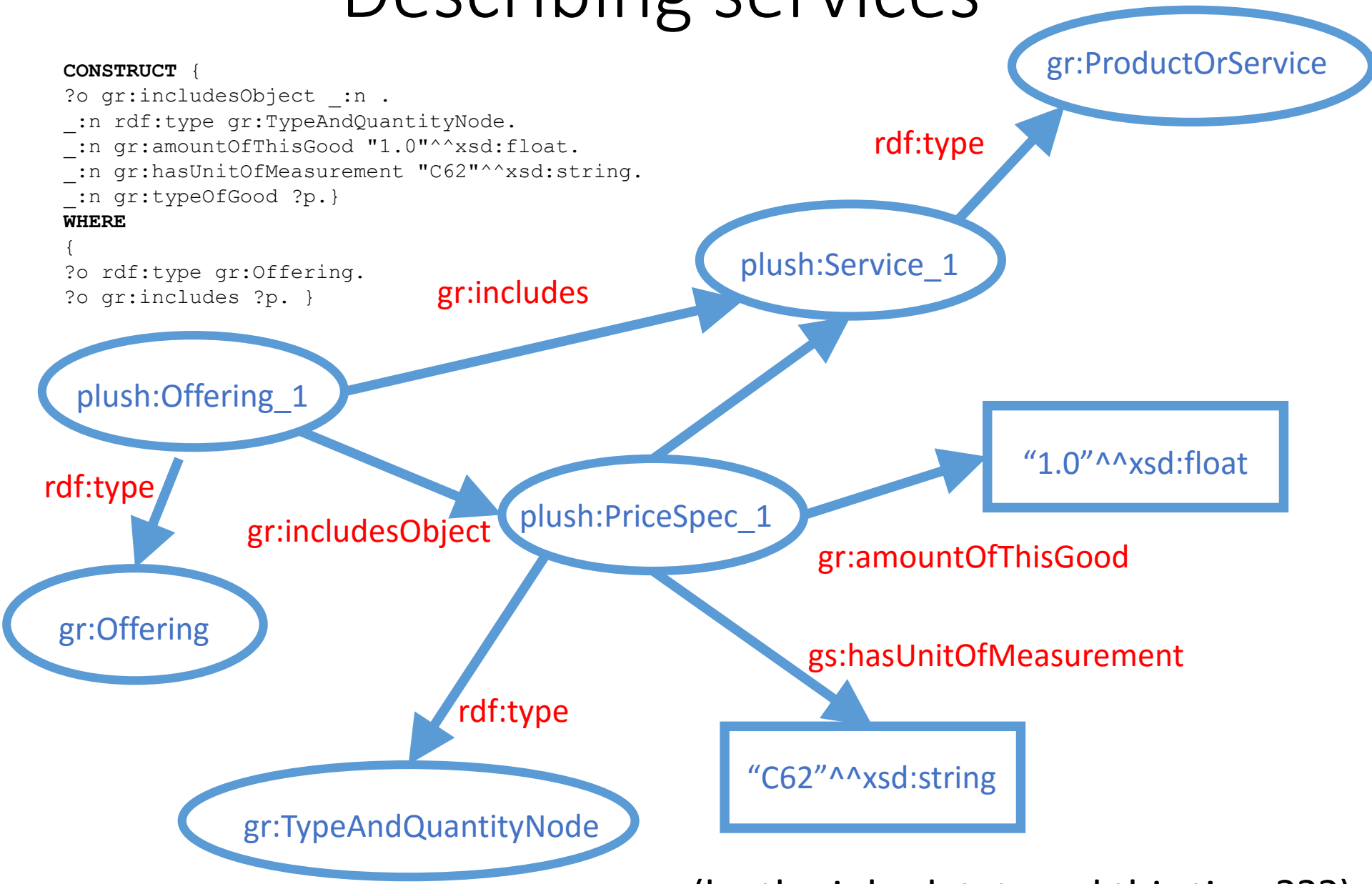
Reification of price specification



(by the job)

Describing services

```
CONSTRUCT {
?o gr:includesObject _:n .
_:n rdf:type gr:TypeAndQuantityNode.
_:n gr:amountOfThisGood "1.0"^^xsd:float.
_:n gr:hasUnitOfMeasurement "C62"^^xsd:string.
_:n gr:typeOfGood ?p.}
WHERE
{
?o rdf:type gr:Offering.
?o gr:includes ?p. }
```



(by the job; datatyped this time???)

What good does this do?

- Well, it provides an automatic way to say stuff that we were too lazy to assert explicitly.
- Unfortunately, can't be expressed in OWL, so what's the point of building the ontology?

- SPIN rules allow SPARQL "rules" to be "ontologized"

owl:Ontology and owl:imports

- Example:

dcterms:hasPart and dcterms:isPartOf

- There is no semantic relationship between these two terms, although they seem to be inverses.

my:ontology a owl:Ontology;

owl:imports <http://purl.org/dc/terms/>.

dcterms:hasPart owl:inverseOf dcterms:isPartOf.

Quantities, Units, and Dimensions (QUDT)

- Global reference for units
- Conversion services
- Dimension verification

owl:allValuesFrom to restrict possible values

```
qudt:Unit a owl:Class ;
     rdfs:subClassOf
        [ a owl:Restriction ;
            owl:allValuesFrom qudt:QuantityKind ;
            owl:onProperty qudt:quantityKind
        ] .
qudt:quantityKind a owl:ObjectProperty .
qudt:QuantityKind a owl:Class .
```

- operating on:

```
vocab-units:Foot a qudt:Unit ;
       qudt:quantityKind vocab-quantities:Length .
```

- entails:

vocab-quantities:Length a qudt:QuantityKind .

- (any reason why we couldn't have just said that?)

Conversion services

- Apply SPIN rules; again, not really done using OWL
- But what is gained by embedding these in the ontology as opposed to just telling people how to do the SPARQL?

Dimension verification

- Again, depends on SPIN rules that could have just been done by telling people what SPARQL queries to run.

CHEBI, an OBO ontology

- http://www.obofoundry.org/
- Water: http://www.ontobee.org/ontology/CHEBI?iri=http://purl.obolibrary.org/obo/CHEBI_15377