Expressing weather observations as linked data;
ISO 19100 geographic information meets semantic web head on

Jeremy Tandy

Smile for the camera (Earth Observation) / Linking Geospatial Data – 5 March 2014

World Meteorological Organisation (WMO)

WMO

specialised agency of the United Nations since 1951

weather, water and climate

facilitates free and unrestricted exchange of data and information […]

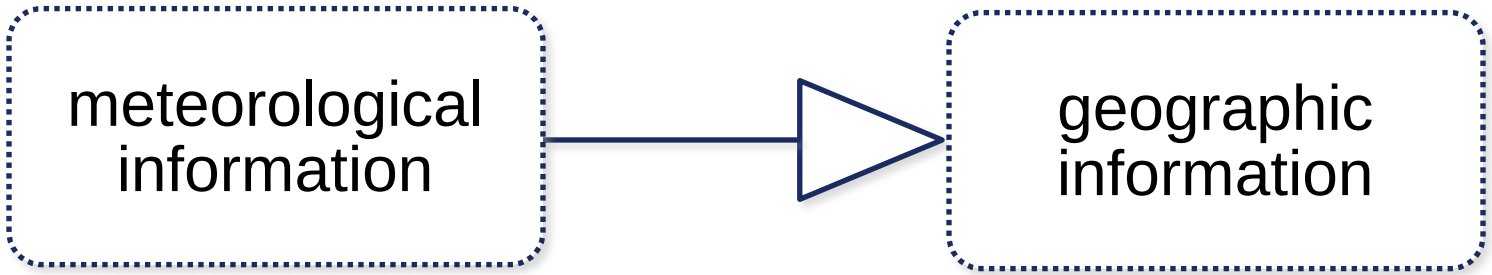
Met Office is WMO *Member* on behalf of UK

Weather, water and climate in context

meteorological information

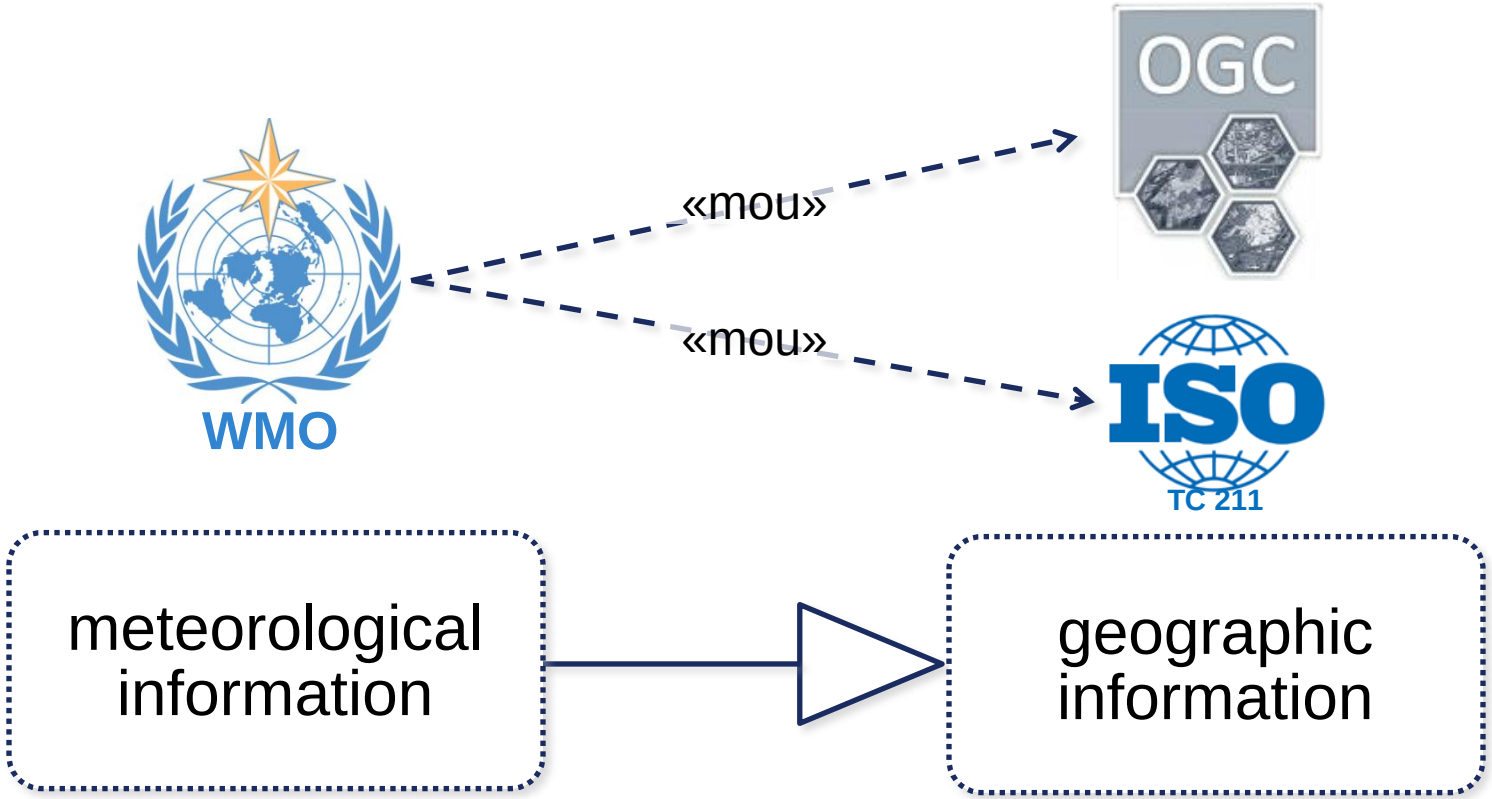
Weather, water and climate in context

WMO



Building on broader standards:

memorandum of understanding



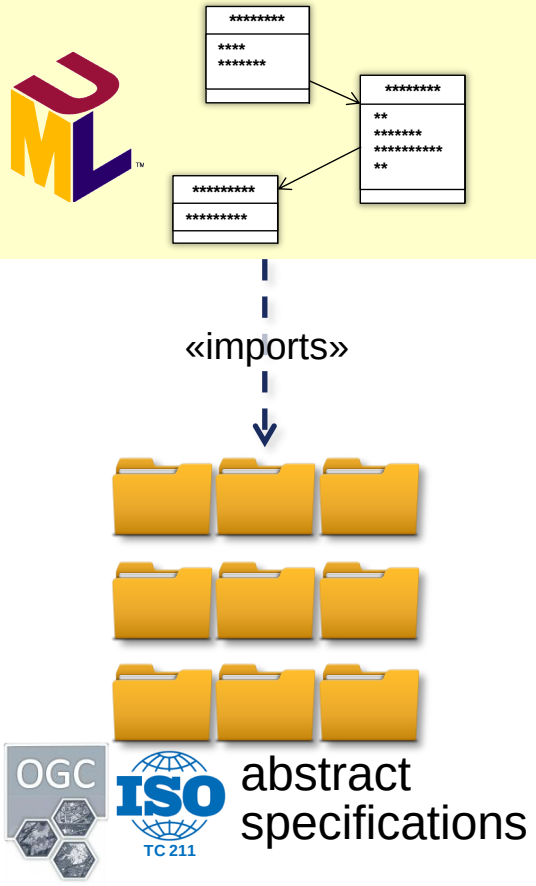
Geographic information:
abstract specifications

OGC ISO TC 211 abstract specifications

- metadata
- features
- geometry
- time
- spatial referencing
- coverages
- observations and measurements
- etc.

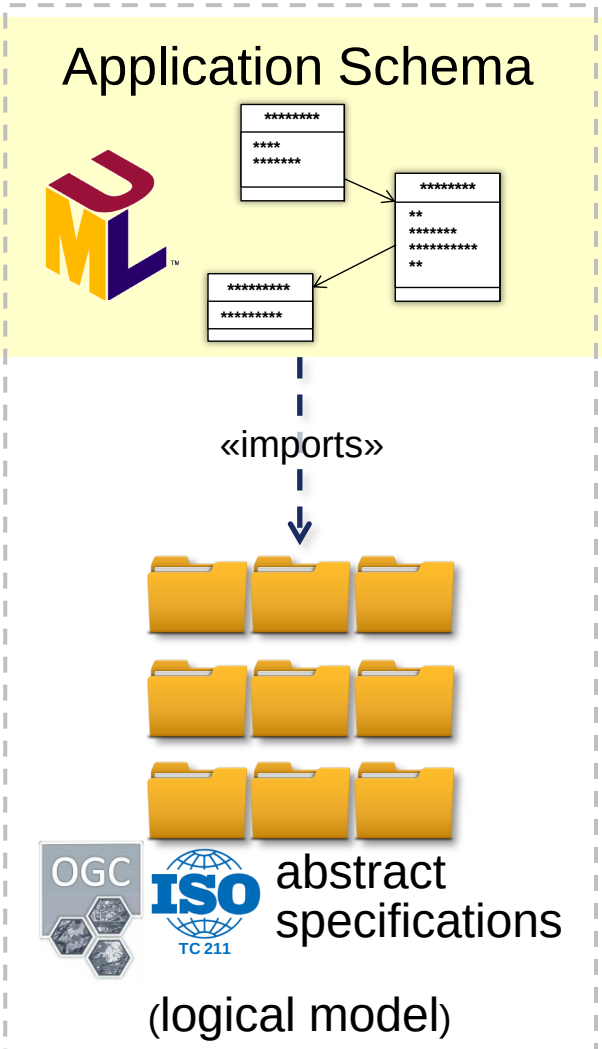
Geographic information:

domain or application specific data models



- Modele pour l'Echange des informations sur le Temps, le Climat et l'Eau (METCE)
- ICAO Meteorological Information Exchange Model (IWXXM)
- WaterML2

Application Schema = semantic model



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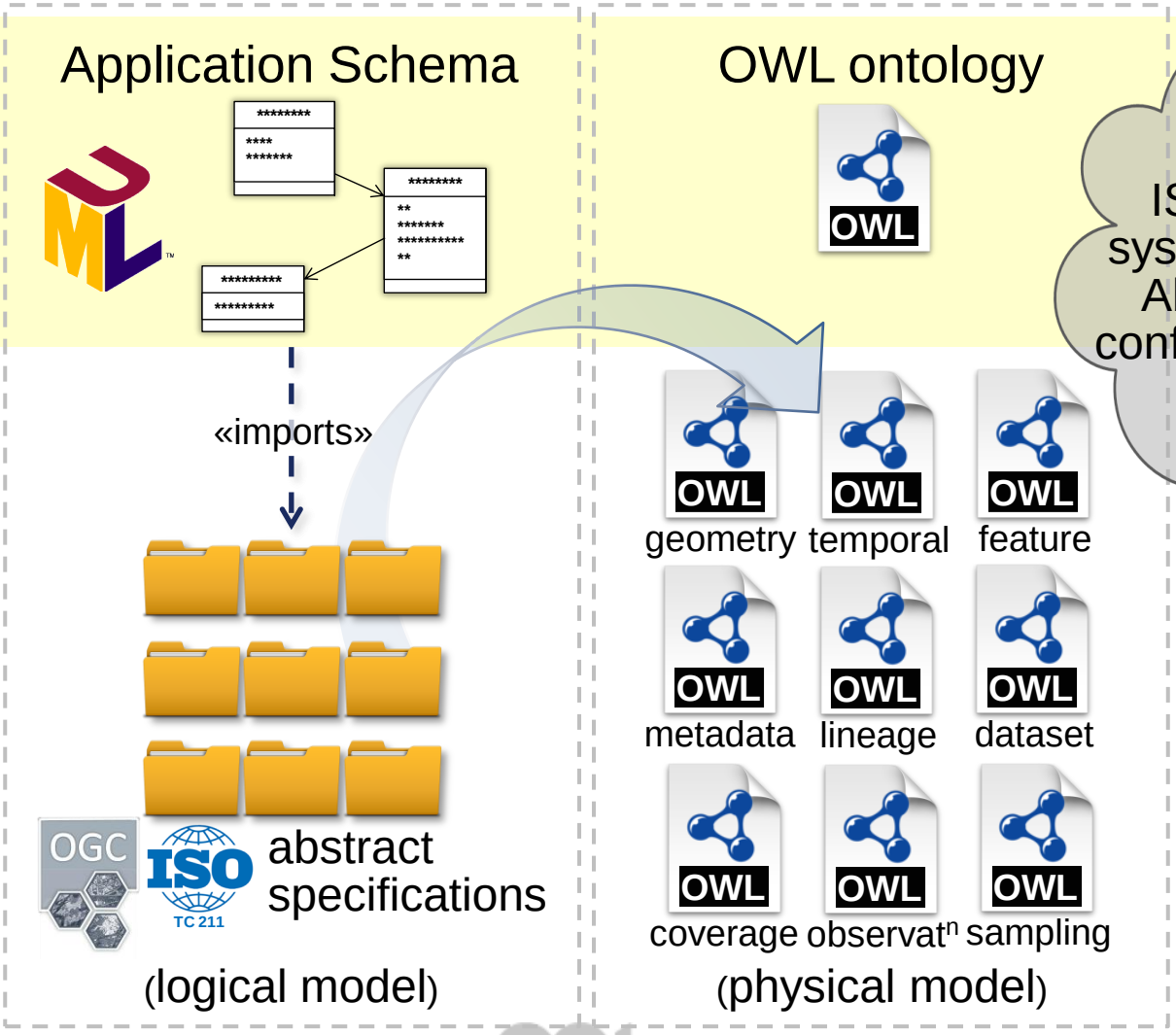
technology independent description of content and structure of information to be exchanged for a given application:

semantic model

ISO/DIS 19150-2 Geographic information – Ontology – Part 2: Rules for developing ontologies in the Web Ontology Language (OWL)



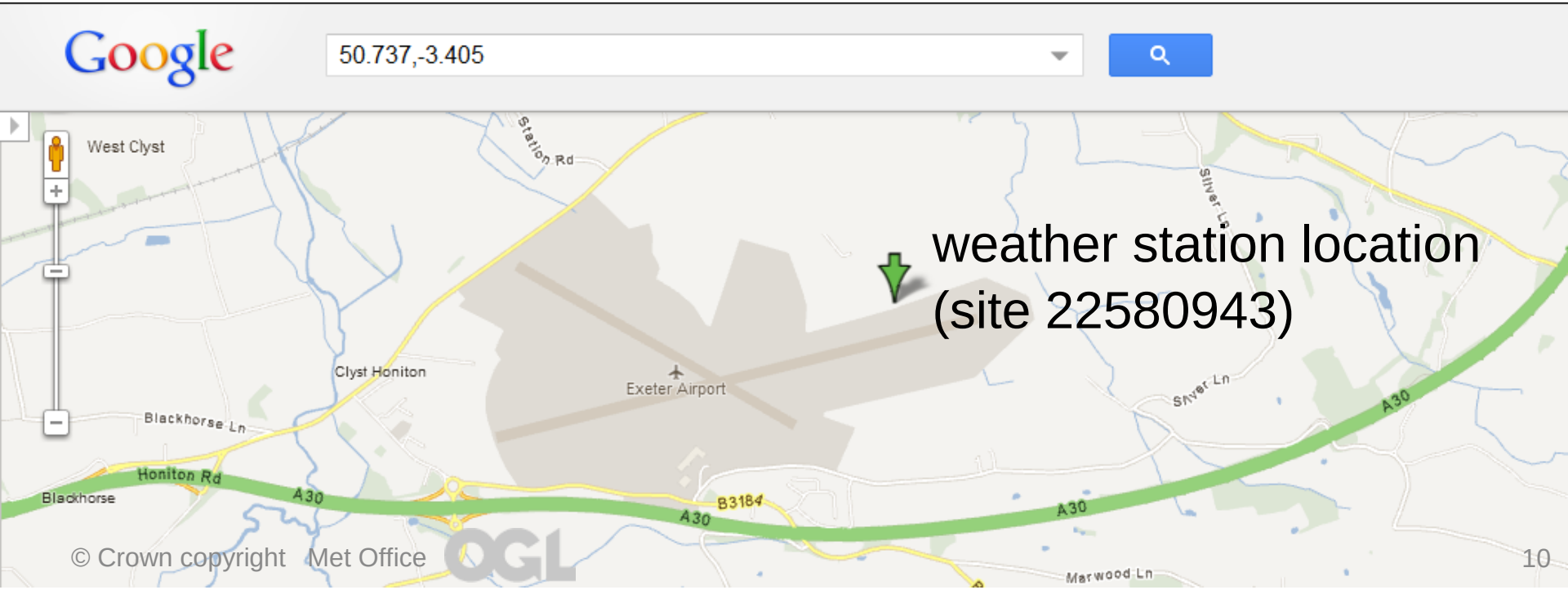
ISO/DIS 19150-2 provides systematic rules for converting Abstract Specifications and conformant Application Schema into OWL ontologies …

… as a result, we can use the semantic model defined in the Application Schema when publishing linked data

Example: simple weather observation

data from Met Office Weather Observation Website (WOW)

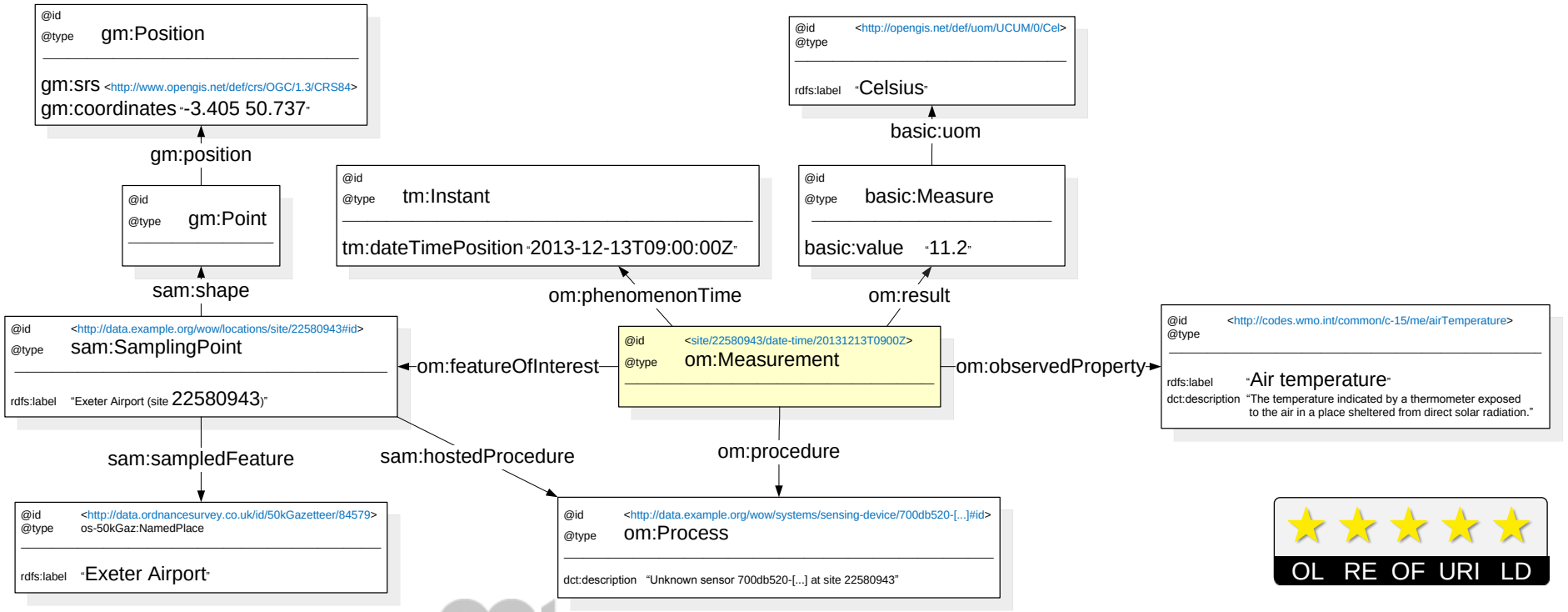
Air temperature of 11.2 °C measured at 09:00 13-Dec-2013 using a sensor hosted on a weather station deployed at Exeter Airport



Example: simple weather observation

RDF encoding using draft ontologies from def.seegrid

@prefix **basic**: <http://def.seegrid.csiro.au/isotc211/iso19103/2005/basic#> .
@prefix **gm**: <http://def.seegrid.csiro.au/isotc211/iso19107/2003/geometry#> .
@prefix **tm**: <http://def.seegrid.csiro.au/isotc211/iso19108/2002/temporal#> .
@prefix **om**: <http://def.seegrid.csiro.au/isotc211/iso19156/2011/observation#> .
@prefix **sam**: <http://def.seegrid.csiro.au/isotc211/iso19156/2011/sampling#> .



@base <http://data.example.org/wow/data/weather-observations/>

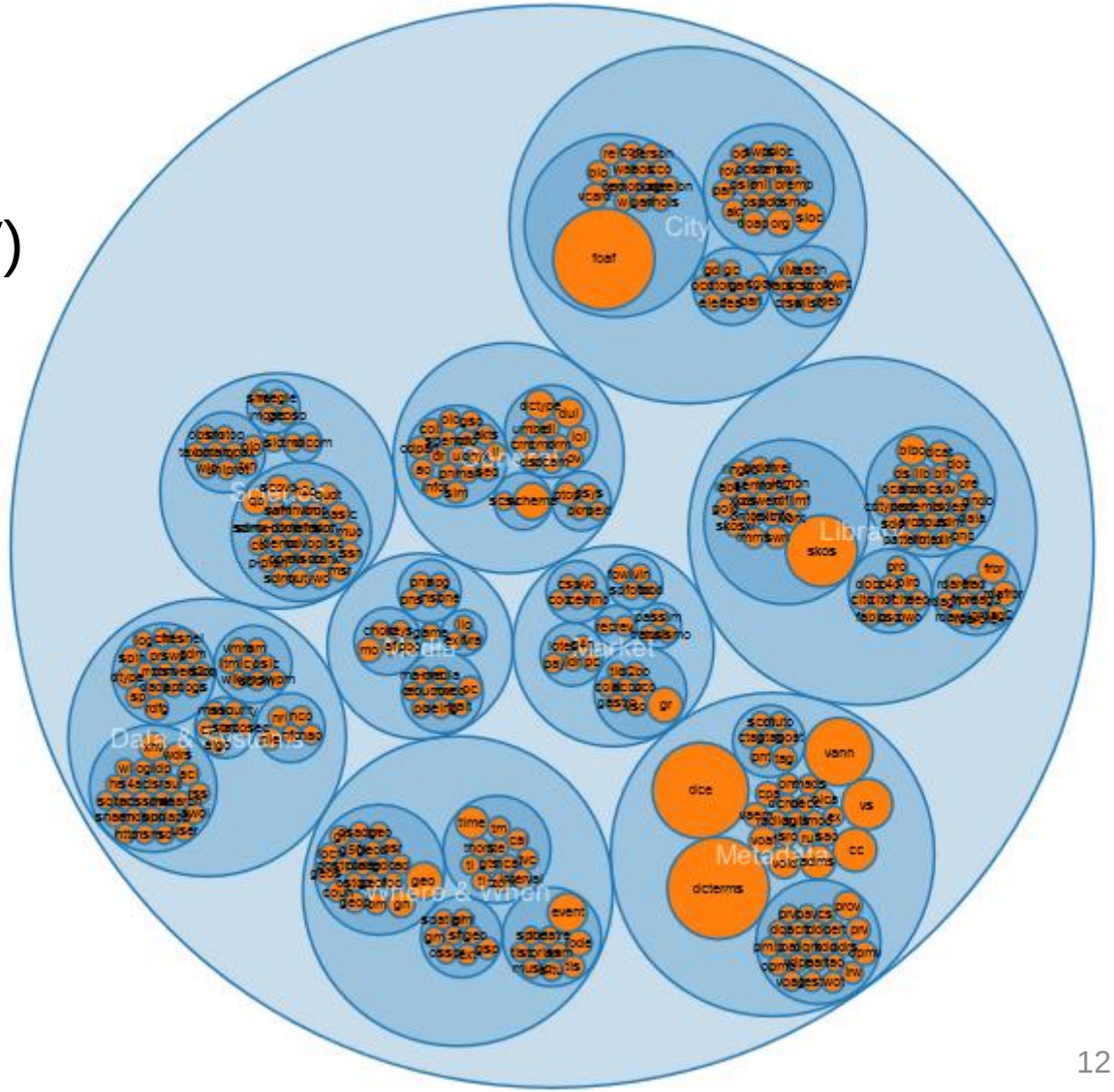
Existing open vocabularies …

not a green-field site

Linked Open Vocabularies (LOV)

LOV provides an entry point into the growing ecosystem of linked open vocabularies (RDFS or OWL ontologies) used in the Linked Data Cloud

410 “vocabulary spaces” (as of March 2014)



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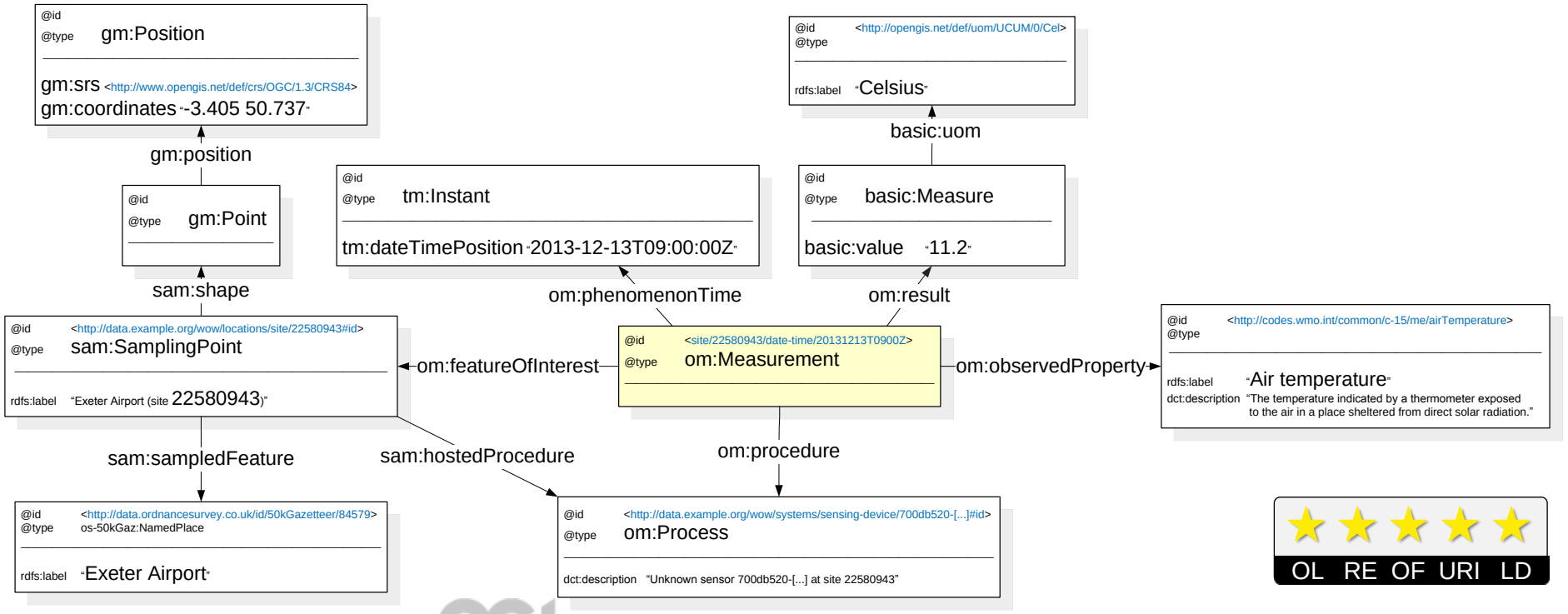

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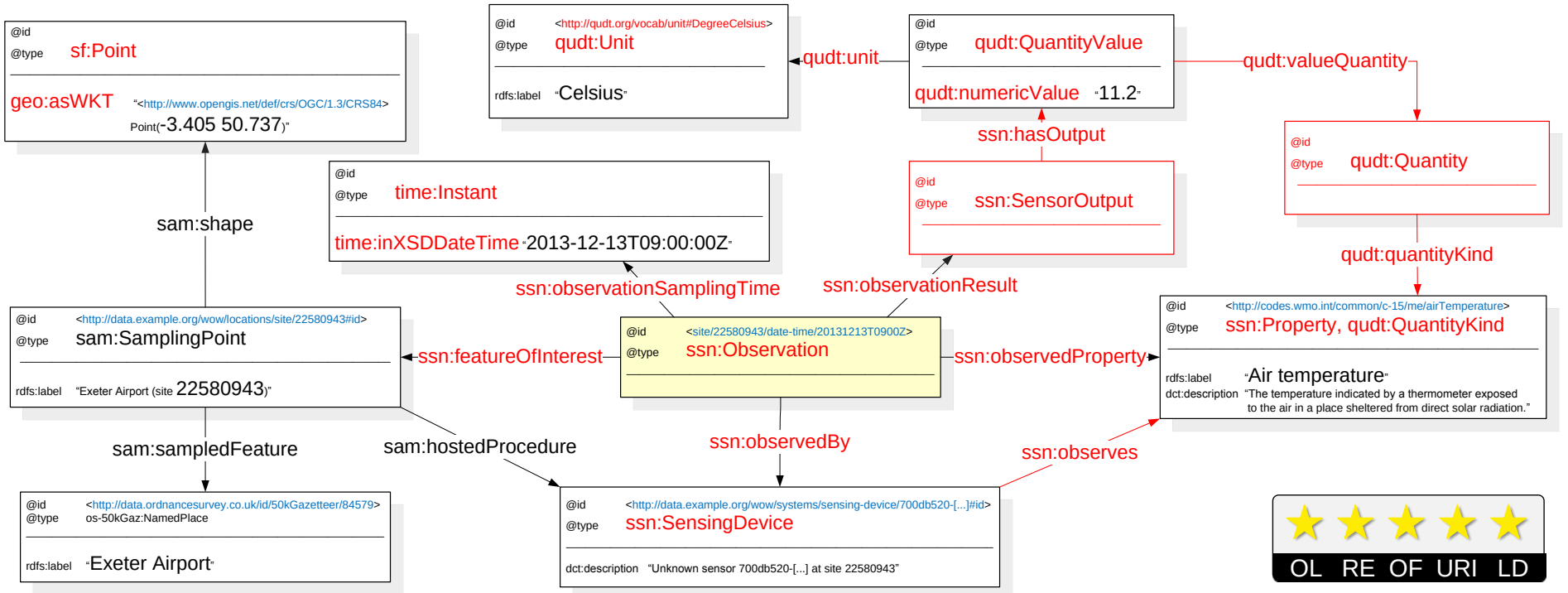
Example: simple weather observation

RDF encoding using ontologies in common usage

@prefix **qudt**: <http://qudt.org/1.1/schema/qudt#> . # Quantities, units, dimensions
@prefix **sf**: <http://www.opengis.net/ont/sf#> . # Simple Features
@prefix **time**: <http://www.w3.org/2006/time#> . # Time
@prefix **ssn**: <http://purl.oclc.org/NET/ssnx/ssn#> . # Semantic Sensor Network
@prefix **sam**: <http://def.seegrid.csiro.au/isotc211/iso19156/2011/sampling#> .



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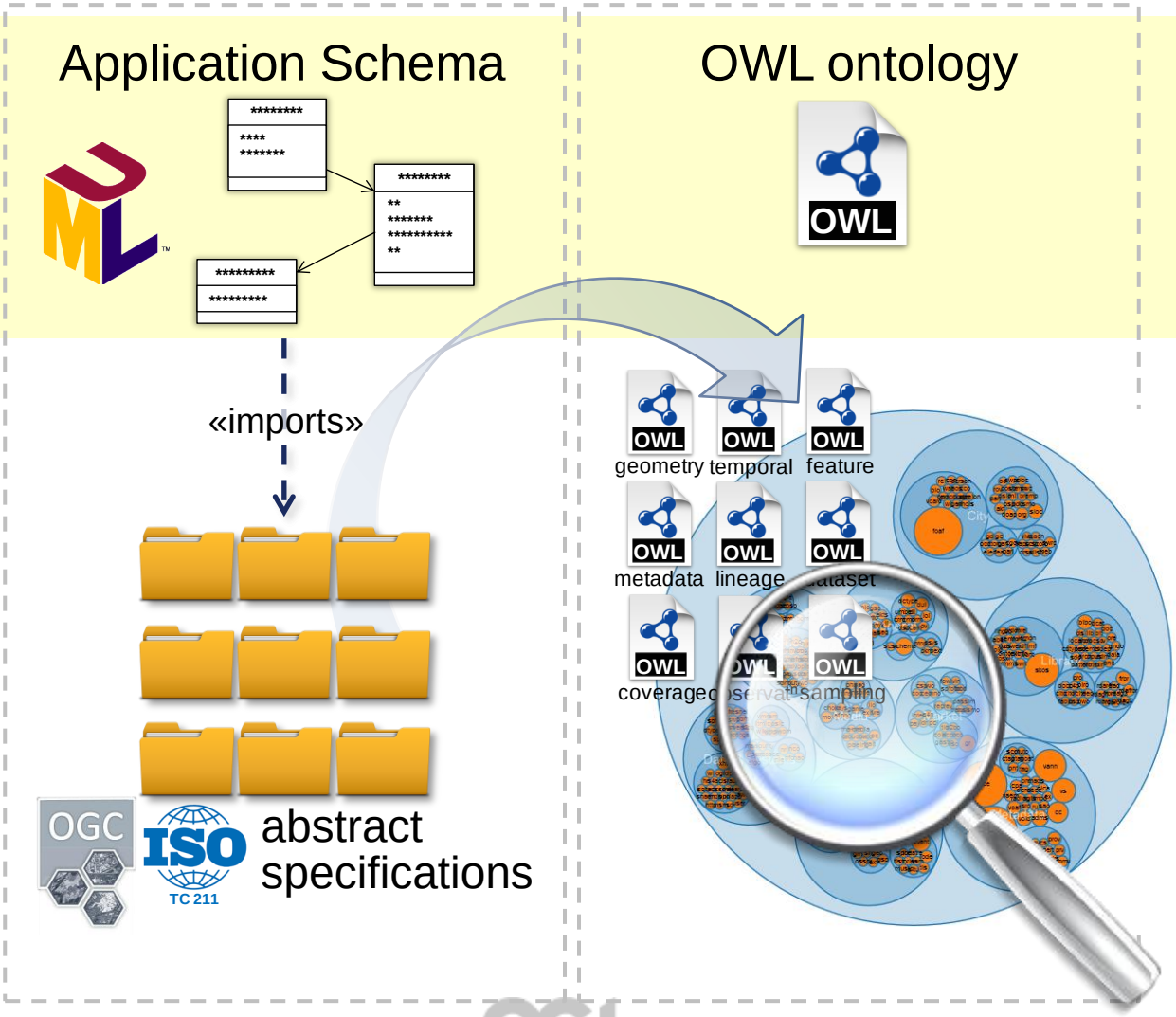
Ontology harmonisation activity?

community effort to make the vocabulary space less confusing …



To further align the geographic information and Linked Data communities it is important that vocabularies in common usage are recognised and mapped to the Abstract Specifications

Thank you.