

Notes of Ontolog Units conference call

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JHD participated, having been alerted by Christoph Lange.

It appears there are a lot of efforts taking place, somewhat uncoordinated, inside OMG.

1 Frank Olken — LBL/NSF: Chair

Introduced himself and made organisational remarks.

2 Stan Huff — InterMountain Healthcare

Their units have worked for the last forty years! They are active in HL7, which used to use ISO, now uses UCUM (Unified Codes for Units of Measures)¹. There are syntactic issues (abbreviations, synonyms) as well as purely ontological issues.

3 David Price – OASIS Product Life Cycle Support Committee

Used for tasks like aviation maintenance. There's an OWL ontology on top of this. Hope to switch to OWL for data exchange (ultimately). Extensibility is key. As is cross-industry consensus. PLCS version 1 has passed its ballot, but several units-related issues came up.

4 Dave McComb – “The gist Unit of Measure Ontology”

Unit of Measure has just (last week) been pulled out as a separate object. It's OWL. Currency is a separate concept, not least because accountants do rounding differently. Must explain how units convert, with offsets for temperature.

¹JHD had never heard of it, but apparently it's at <http://unitsofmeasure.org/>.

Can introduce new units as long as they convert to a base unit. There are some conversions in Protege. Claims compound units are either ratios or products: the example he gave was “furlongs/fortnight”. The temporal aspect (necessary for currency)² is an extension.

5 Rob Raskin – “SWEET 2.0 Scientific Units Ontology”

A tool developed at NASA, about 100 ontologies for “earth system science”, using OWL-DL. There are 5 mathematics and four science ontologies: units is in science, but uses mathematics (time is a separate mathematics ontology).

In the OWL sense, there are two properties: `hasDefaultUnit` and `hasUnit`, but the overriding is *by convention*, since OWL has no support for this. In the OWL sense, the units are individuals. We started with NCAR’s UDUnits package. He gave examples.

```
<units:ComplexUnit rdf:ID="watt">
  <math2:productOf rdf:resource="#joule"/>
  <math2:productOf rdf:resource="#perSecond"/>
</units:ComplexUnit>

<owl:Class rdf:about="#Power">
  <rdfs:subClassOf>
    <owl:Restriction>
      <owl:hasValue rdf:resource="#units;#watt"/>
      <owl:onProperty rdf:resource="#units;#hasDefaultUnit"/>
    </owl:Restriction>
  </rdfs:subClassOf>
</owl:Class>
```

6 Pat Cassidy – “Aligning NASA SWEET sci-Units Ontology with COSMO”

NASA SWEET looks like a nice simple ontology. But, to align it with others, we need a base ontology.

Prefixes should be simple, but He pointed out that SWEET has the kilogram, whereas others, like UCUM, have the gram. This issue has to be resolved. In many NASA systems, prefixes are just strings, but these don’t have semantics, whereas in COSMO we can give them meanings. SUMO actually represents prefixes as functions. Claims that there are problems with abbreviations of prefixes.

His last quote was the following.

²During the chat, someone claimed that this was *all* that is necessary for currency. JHD pointed out that space is necessary as well, as seen in pound/guinea arbitrage in 17th century England.

It will be best to identify an open application that can use a Units of Measure ontology, and develop the ontology with that application as a test bed.

7 Howard Mason – “Units of Measure - How many standards?”

Works for BAE Aerospace, and chairs the ISO/IEC/... committee on business standards. Asked why there are multiple standards, why did Mountain move from ISO to UCUM?

8 Robert Dragoset – “Units Markup Language”

UnitsML is being developed in an OASIS Committee, the corresponding UnitsDB is being developed at NIST. They are pretty short of non-NIST participants, which is actually a problem with OASIS rules, and this is holding back a formal 1.0.

He seemed slightly unsure about the gram/kilogram question. We had to deviate from ISO/SI, in that we had to add ‘item’, as in electrons/second. See also `CountedItem`, which allows some treatment of currency. It appears (his slide 21) that the connection between the formula and the symbol of a unit, such as mm/sec^2 , is completely manual.

9 Pat Hayes – “Making Distinctions”

He actually quoted `cyc`, as having a rather different meaning of sodium than others, and therefore worried about the use of `owl:SameAs`. He agreed that ‘milli’ is an object, and therefore (?) the logic needs to be able to reason about its own names.

10 Discussion

It was asked whether dimensions were necessary. JHD pointed out that fuel efficiency can be in miles/gallon or litres/100km: reciprocal dimensions. Unless you have that functionality you can’t tell that we have a reciprocal conversion.

The distinction between energy and torque, which have the same dimension, was mentioned. Pat Hayes stated that ‘being the same dimension’ and ‘having the same base unit’ were equivalent, but JHD noted³ that “@PatHayes: that’s a consequence, not a property. Months and days are both time, but aren’t interconvertible”. Pat replied that months aren’t a unit (!).

Questions of “the way forward” were raised. JHD argued that any XML representation of the mathematics should be MathML. The feedback was:

³On the chat.

DavidLeal “I support the use of MathML too. We don’t want to reinvent things, and MathML has useful capabilities like lambda calculus.”

James Davenport (OpenMath) @PatH, JC: what I said was that the MATH-EMATICS should be in MathML, e.g. NIST’s $x:=a+b*(y+d)/c$

PatHayes @James: Ah, sorry, I missed that. Too much going on at once. That makes a lot more sense, I agree.

MartinSWeber @James Davenport: I agree and MathML and/or OpenMath will be supported in a near-future version (not the dreaded “1.0”) for that reason

Bob Dragoset @JamesD: there is a strong possibility that UnitsML will adopt MathML to represent mathematical expressions.

11 Frank Olken — LBL/NSF: Chair

More organisational remarks. A mailing list is being set up by peter.yim@cim3.com⁴. There is hope to have a face-to-face meeting on the suburbs of the October (ontology?) meeting.

12 Codicil

One of the other participants in the telco was Mark Linehan of IBM, whom JHD knows of old. He pointed out <http://www.omg.org/cgi-bin/doc?bmi/08-03-02>, which is actually listed as still open on the OMG website.

⁴JHD has subscribed.