Exploratory Development of a UBL Validation Tool

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Premise

- When business terms are defined in a formal ontology, what is entailed by those terms becomes known.

  - An investigation into how an ontology serve the UBL message assembly and validation processes

Outline

- Where might using an ontology make sense?
    - Codes
    - UBL Common Components
- Exploratory Software
- Future

Q: Use an ontology where?
A: Codes

- Codes vary with respect to information content:
  - "Type 1" : relate an identifier with a natural language term
    - Currency codes (ISO 4217), Country Codes (ISO 3166).
    - XSD schema checkers can ensure the identifier is in the code list
    - Ontology just links identifier to equivalent concept

Q: Use an ontology where? A: Codes

- Codes vary with respect to information content:
  - "Type 2" : each codelist item populates a small information model:
    - UN Rec 20 LOCODES (location codes).
    - Each entry indicates whether the location contains a port, airport, rail terminal, or road terminal
    - Ontology might embody each such fact:
      - USBAL = Baltimore
      - Baltimore has a port
      - Baltimore has a rail terminal...

Q: Use an ontology where? A: Codes

- Codes vary with respect to information content:
  - "Type 3" : like Type 1 (identifier = term) but the term has significant meaning in business transactions:
    - Incoterms 2000 (ICC trade terms: FOB, EXW…)
    - Each entry concerns particular obligations, risks and logistical concerns on part of buyer and seller
    - Ontology might embody each such fact:
      - FOB = "Free On Board"
      - Buyer responsible for nominating a Carrier
      - Buyer pays for Carriage, assumes Risk when "crosses ships rail"
      - Place named is a Port, not a Land Terminal
      - Buyer pays import/export duties...

Q: Use an ontology where? A: UBL Common Components

- 100's of terms that could be described in an ontology:
    - TransportContract
        - It is a Contract
        - Contracts describe Obligations of Parties
        - It is related to the Transport of something….
    - FlashpointTemperature
        - It is a Temperature Measurement
        - It is a Property used to describe some Hazardous Materials….

Suppose these things are in the ontology. Then what?

- Ontology-aware message assembly and validation tools
  - Assist in discriminating the meaning of business terms in the various UBL contexts
  - Assist in validating message types
  - Assist in validating message instances
  - Assist in developing transaction choreography

Using the ontology

- [Under construction, examples discriminating term meaning, validating message type, instance document, 2003 BPSS planning experiment.]

Software tool

- One-month feasibility and development study
  - Use UBL-Order-1.0.xsd, and related Common Components
  - Use SUMO (Suggested Upper Merged Ontology)
    - Use it with Sigma (Articulate Software, Inc.)
    - Use it stand-alone too, with Vampire (also part of Sigma)
    - Model a few Incoterms and use Rec 20 Locodes
  - Use Components from 2004 AMIS Project "AMIS-1" experiment (OAGIS .xsd code).

Development Challenges

- Tool ought to "speak the language" of the message designer.
  - But linking to SUMO ontology requires relating such terms to the language of SUMO.
    - Otherwise it is just another expert system-style tool (checking for this and that without regard to the bigger picture, and without ability to validate the ontology itself).

- Answer?
  - "Mediating axioms" in an interlingua
  - More work on SUMO validation

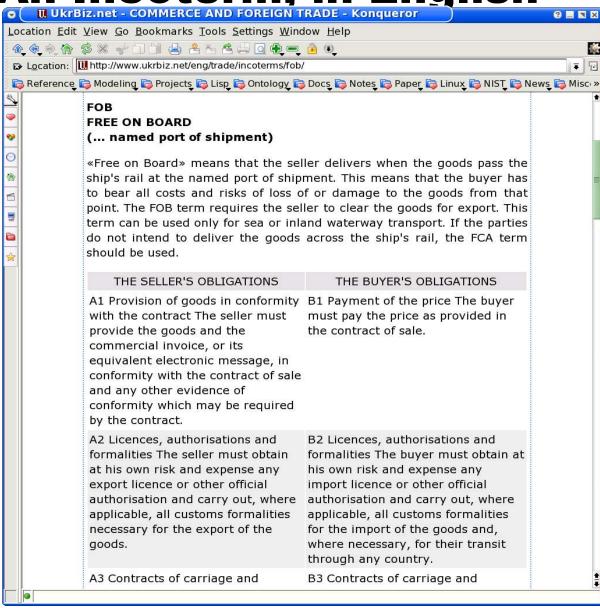# Development Challenges

- Linking items in the UBL XML Schema "Occurrence Tree" to the user's "UBL-based Axioms"
  - Unlike AMIS-1 work, no XML Linkbase.
  - Instead, use a (Schematron-like?) XML file that records the user's rule, its documentation, etc. as well as an index into the "Occurrence Tree"
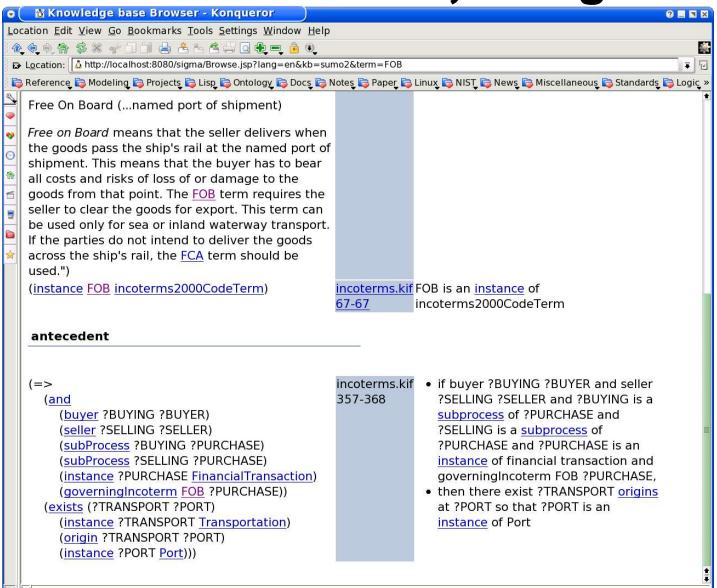
2004-11-23 Tool Screenshot

An Incoterm, in English

FOB
FREE ON BOARD
(… named port of shipment)

«Free on Board» means that the seller delivers when the goods pass the ship's rail at the named port of shipment. This means that the buyer has to bear all costs and risks of loss of or damage to the goods from that point. The FOB term requires the seller to clear the goods for export. This term can be used only for sea or inland waterway transport. If the parties do not intend to deliver the goods across the ship's rail, the FCA term should be used.

THE SELLER'S OBLIGATIONS	THE BUYER'S OBLIGATIONS
A1 Provision of goods in conformity with the contract The seller must provide the goods and the commercial invoice, or its equivalent electronic message, in conformity with the contract of sale and any other evidence of conformity which may be required by the contract.	B1 Payment of the price The buyer must pay the price as provided in the contract of sale.
A2 Licences, authorisations and formalities The seller must obtain at his own risk and expense any export licence or other official authorisation and carry out, where applicable, all customs formalities necessary for the export of the goods.	B2 Licences, authorisations and formalities The buyer must obtain at his own risk and expense any import licence or other official authorisation and carry out, where applicable, all customs formalities for the import of the goods and, where necessary, for their transit through any country.
A3 Contracts of carriage and	B3 Contracts of carriage and

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An Incoterm axiom, in Sigma

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Development Challenges

- Some codes are huge
  - Rec 20 LOCODES: 40,000 entries, each requiring a few formulas in the KB
  - Ancillary tools to generate the KB instances.
  - Load parts on demand
    - I break the code up by country, still thousands in US.

Development Challenges

- Pulling it all together:
  - How some terms used in the user's rules are known (e.g. in the screenshot, how "FOB" and "incoterms2000" are known, needs work.)
  - [Much more to be discussed as I "pull it all together."]

Conclusion

- With an ontology-aware tool…

  - Effects that cut across a wide space of concerns are revealed

  - [More work here.]

- Project Feasibility

  - [More work here.]