

Examples subset of: “Semantic Web Rules for Financial Risk Management”

Benjamin Grosf*

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Sr. Research Program Manager, Vulcan Inc.; and
Principal Consultant, Benjamin Grosf & Associates, LLC
<http://www.mit.edu/~bgrosf/>

** <http://2010.ruleml.org>

Ex.: Simple Collateralized Loan, e.g., Mortgage

- If it's date X , then lender must pay borrower the principal and gets lien on the collateral asset of the borrower
- If it's date $X+k*M$, then borrower must pay interest and principal slice for latest period of length M

Exception/override case rule:

- If borrower does not pay on time, then lender has 2 options:
 1. Impose additional penalty payments on a particular schedule
 2. Foreclose the loan: seize the collateral (which is a whole process)

Nested exception/override case rule:

- If borrower is in bankruptcy, then in foreclosure the lender claims, rather than seizes

Examples of Ontological Mapping for Info Integration

- **Your vs. my ontology, generally**
 - Reformulate \Rightarrow higher-order as expressive feature is very useful
 - Context usually partly implicit \rightarrow must often make explicit to map
 - E.g., use a typical definition of revenue.
- **Financial reporting**
 - Profit with vs. without depreciation
 - Earnings last 4 qtrs vs. {last 3 qtrs + forecast next qtr}
 - Historicals when statutory treatment (definition) changes over time
 - Footnotes – “where the real action is”: revenue includes sale of HQ building
 - \Rightarrow Defeasibility as expressive feature is very useful, for exceptions/overrides
- **Your vs. my pro-forma or analytic view**
 - Between companies, governmental jurisdictions

Example: Exception in Ontology Translation (in Rulelog)

/* Company BB reports operating earnings using R&D operating cost which includes price of a small company acquired for its intellectual property. Organization GG wants to view operating cost more conventionally which excludes that acquisition amount. We use rules to specify the contextual ontological mapping. */

@normallyBringOver ?categ(GG)(?item) :- ?categ(BB)(?item).

@acquisitionsAreNotOperating neg ?categ(GG)(?item) :-

acquisition(GG)(?item) and (?categ(GG) ## operating(GG)).

\overrides(acquisitionsAreNotOperating, normallyBringOver). /* exceptional */

acquisition(GG)(?item) :- price_of_acquired_R_and_D_companies(BB)(?item).

R_and_D_salaries(BB)(p1001). p1001[amount -> \$25,000,000].

R_and_D_overhead(BB)(p1002). p1002[amount -> \$15,000,000].

price_of_acquired_R_and_D_companies(BB)(p1003). p1003[amount -> \$30,000,000].

R_and_D_operating_cost(BB)(p1003). /* BB counts the acquisition price item in this category */

R_and_D_operating_cost(GG) :: operating(GG).

Total(R_and_D_operating_cost)(BB)[amount -> \$70,000,000]. /* rolled up by BB cf. BB's definitions */

Total(R_and_D_operating_cost)(GG)[amount -> ?x] :- ... ; /* roll up the items for GG cf. GG's definitions */

As desired: |= R_and_D_salaries(GG)(p1001), ...,

neg R_and_D_operating_cost(GG)(p1003), /* GG doesn't count it */

Total(R_and_D_operating_cost)(GG)[amount -> \$40,000,000]

Notation: @... declares a rule tag ? prefixes a variable. :- means if. X :: Y means X is a subclass of Y. \overrides(X,Y) means X is higher priority than Y.

Representing Trust/Confidentiality Policies

- Access to info by and from various players
- Authorization of transactions and other actions
- Well represented by rules
- Many exceptions/overrides \Rightarrow need defeasibility.
- **Example:**
 - Regulator not permitted to see trading info of type X from a broker-dealer
 - But: Regulator is permitted to access it “on-site” at the broker if a (declared) Investigation of type Y is in progress.