Semantics in the Financial Industry:
The EDM Council Semantics Repository Progress Report

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Summary

- The Challenge
- The Framework
- Extending the Framework
- History of the Project
- Current Activities
- The Future

EDM Council Repository requirements

- The EDM Council

  "A non-profit trade association focussed on managing and leveraging enterprise data as a strategic asset to enable financial institutions to increase efficiency, minimize risk, and create competitive advantage"

- Industry Requirements
  - Consistent terminology
  - Mapping of terms in disparate systems
  - Standard agreed set of terms
  - Focus on meaning not words

- Business management of data

  = business ownership of data semantics

Ontology modeling Framework

- UML Tool: Enterprise Architect from Sparx Systems
  - Reports - processed into spreadsheets
  - Diagrams direct from tool
- ODM (early draft)
  - Adapted to natural language
  - Some tool specific adaptations
- Spreadsheet framework
  - Features for (most) OWL concepts
  - But in English
    - owl:ObjectProperty = Relationship Fact
    - owl:DatatypeProperty = Simple Fact
- Diagrams
  - "Boxes and lines" (no visible language)
  - Various levels of detail

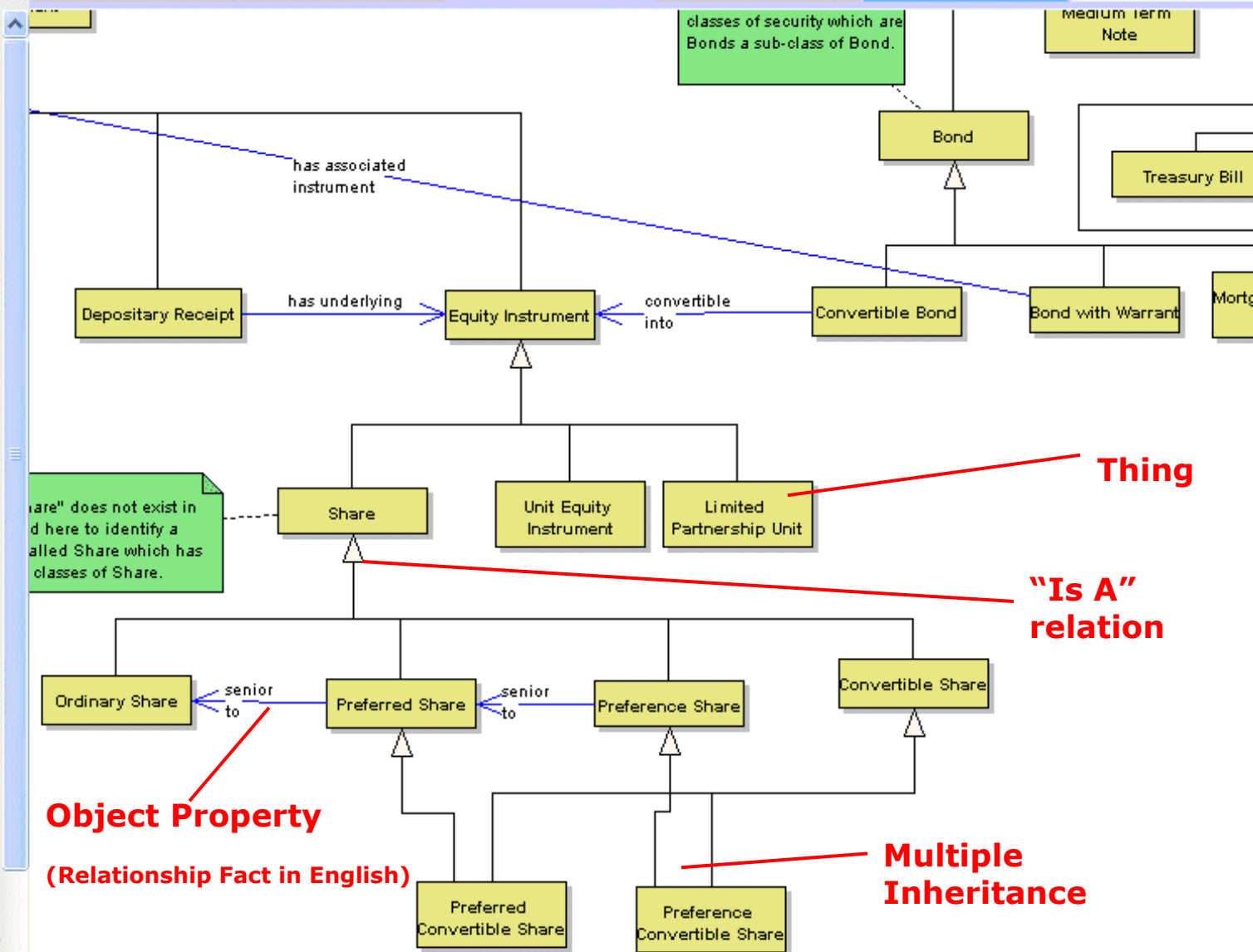# Financial Instruments Semantic Model

Introduction | Spreadsheet | Diagram | Notes | Key

Overview

- **Financial Instruments**
  - Common Instruments
  - Equities
  - Debt
  - Rights
  - Traded Options
  - Futures
  - OTC Derivatives
  - CIV (Funds)
  - Indices and Indicators
  - Components
  - Dated Terms
  - Process Terms
  - Basic Types
  - Global Terms
    - Time
    - Geographical
    - Mathematical
    - Information
    - Business
    - Financial
    - Legal
    - Activity
    - Risk

Prepared by:

Diagram labels:

classes of security which are Bonds a sub-class of Bond.

Medium Term Note

Bond

Treasury Bill

has associated instrument

Depositary Receipt — has underlying → Equity Instrument ← convertible into — Convertible Bond

Bond with Warrant

Mortg...

"...are" does not exist in ...d here to identify a ...alled Share which has ...classes of Share.

Share

Unit Equity Instrument

Limited Partnership Unit

Ordinary Share — senior to — Preferred Share — senior to — Preference Share

Convertible Share

Preferred Convertible Share

Preference Convertible Share

Thing

"Is A" relation

Object Property

(Relationship Fact in English)

Multiple Inheritance

The Semantics Repository

Top level: KR Lattice hierarchy
    philosophical order
    continuant v occurrent
    concrete v abstract

    Mid level: Global terms
        Accounting
        Legal
        Math etc.

EDMC: Financial Instruments
Semantics
    Securities
    Components
    Market data
    Processes

KR Lattice

Global terms

Instruments | Date Varying Terms | process etc.

Common types and selection lists
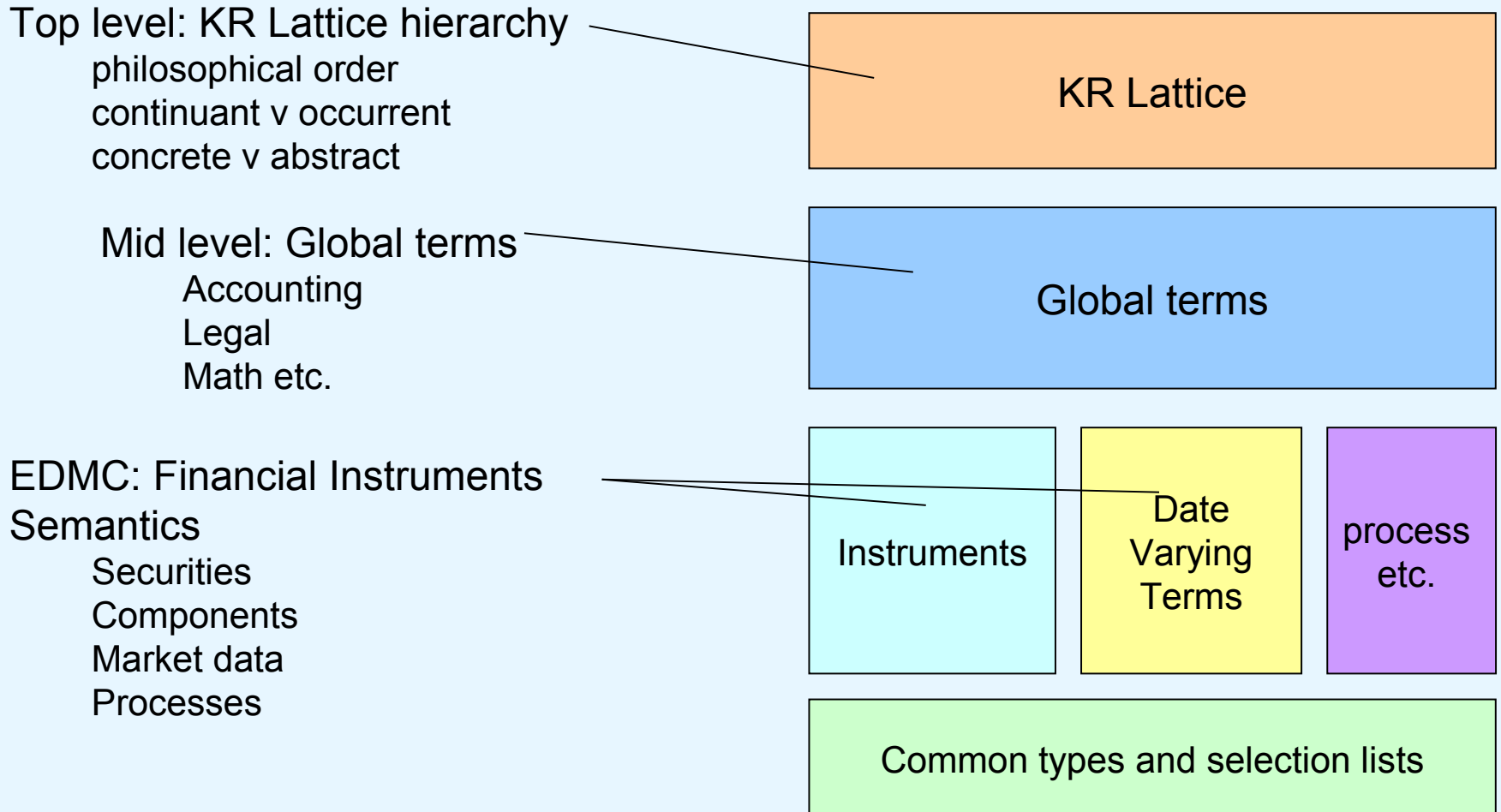
How the meaning gets in

- Written definitions against each term
  - Reviewed and agreed by domain SMEs
- Hierarchy (AKA taxonomy) showing where each thing fits into the world
  - What kind of thing is it?
- Relationships and other facts about those things
  - What facts distinguish this from other things?
- Explained to SMEs in set theory terms

Archetypes

- The simplest of kind of thing that each financial securities concept is a specialized type of
  - Contracts, Events, Accounting constructs
  - These have common necessary facts
- Represented using UML stereotypes
  - Color coded
  - Graphics for some
- These form common models such as accounting, legal, countries
  - Ultimately these would be replaced with industry-derived sets of standard terms
  - Accounting: XBRL

The Story So Far

- Initial design: May '08 – Sept '08
- Format review panel –finalized formats of spreadsheets, diagrams and web layout
- Roadshow
- Initial draft: Jan '09 based on ISO terms
  - Tradable Securities: Static reference terms
  - Weekly SME Reviews to July '09
- Draft released July '09
  - Terms marked up with review status
  - Out for further review and validation

Current Status

- Static Terms Draft
  - Need final validation / QA of model
  - validate in a real world context
- Proof of Concept Exercises
  - Securitization (MBS issuance)
  - Data Vendor
  - Risk analytics
  - Banks etc.
- Date-dependent terms
  - SME Reviews ongoing since July '09
- OTC Derivatives, corporate events to follow

Proof of Concept Findings

- Securitization (MBS Issuance) PoC
  - ECB, NY Fed, IBM Research
  - Demonstrate ability to tag new instruments semantically at issue
    - Plans to make this mandatory
    - Basis for systemic risk regulation
- Findings
  - The domain experts get it
  - Many terms not in ISO standards
    - Will feed these into ISO 20022
    - Refining these with domain experts
  - Complete view of poorly understood securities and missing data linkages (sub prime etc.)

Possible Applications

- Exploring in Proof of Concept exercises
- Simplest: Replace "ad hoc" business spreadsheets in business conceptual "layer"
- Model driven development
  - In UML
  - Can we derive semantic LDM equivalent?
  - How to relate to database models?
- Derive native OWL/RDFS
  - Not included in project
  - Would enable OWL apps / SPARQL etc.
- Metadata repository deployment?

Ontology Format Extension

- – Things that are not in scope of OWL itself
  - Synonym
  - Archetypes
  - Classification facets
- – Hope to collaborate on standardized use of OWL Annotation Properties
- – Can classification facets be used to derive single-taxonomy data models?

The Future

- Finalize content and release formal version
- Formalize governance
- Track semantics standards evolution (OWL, ODM)
- Align upper ontology with semantics industry standards
- ISO Alignment
  - Alignment of content with ISO 20022 Logical Data Model
  - ISO 20022 version 2 semantics layer
    - work with WG4 on model standard
    - update the core modeling concepts in line with this

- **Objective:** Move from a working prototype model framework to something more standard while contributing our model concepts to industry

Thanks

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EDM Council:

www.edmcouncil.org

Semantics Repository:

www.hypercube.co.uk/edmcouncil