ENTERPRISE DATA MANAGEMENT

EDM COUNCIL

OMG FDTF / EDM Council

Financial Industry Business Ontology

Background

OMG Ontology PSIG • June 23, 2011

Outline

- EDM Council Semantics Repository initiative
  - History, development, principles
- OMG Finance Domain Task Force partnership
  - Proposal for Standard
    - Financial Industry Business Ontology
- FIBO standardization activities
  - Disposition of Standard Proposals
  - ODM alignment
  - Shared Semantics

Semantics Repository History

- Why a Semantics Repository?
- Development of an Industry Ontology
  - Content
  - Presentation
  - Theory of Meaning
  - Implementation
- Scope
- History and Usage
- OMG Partnership – current activities
- Derivatives Proof of Concept project

History: Financial Standards

- Messaging: MDDL
  - XML schema for market data
- ISO 20022 FIBIM (ISO TC68/SC4)
  - Logical Data Model Design via UML profile
- FpML (ISDA)
  - Derivatives message models
- What the industry really needed

Industry Conclusions

- Good design is weak semantics
- Business knowledge gained during reviews is either
  - Lost
  - Buried in meeting minutes
  - Kept in uncontrolled spreadsheets in a variety of structures
- Data Dictionaries try to link business definitions to data elements
  - but data elements are reused across business meanings and usage contexts (good design again)

- Industry conclusion
  - "We need a semantics standard"

Semantics in Context

- A mature technology development process has the following distinct artifacts:

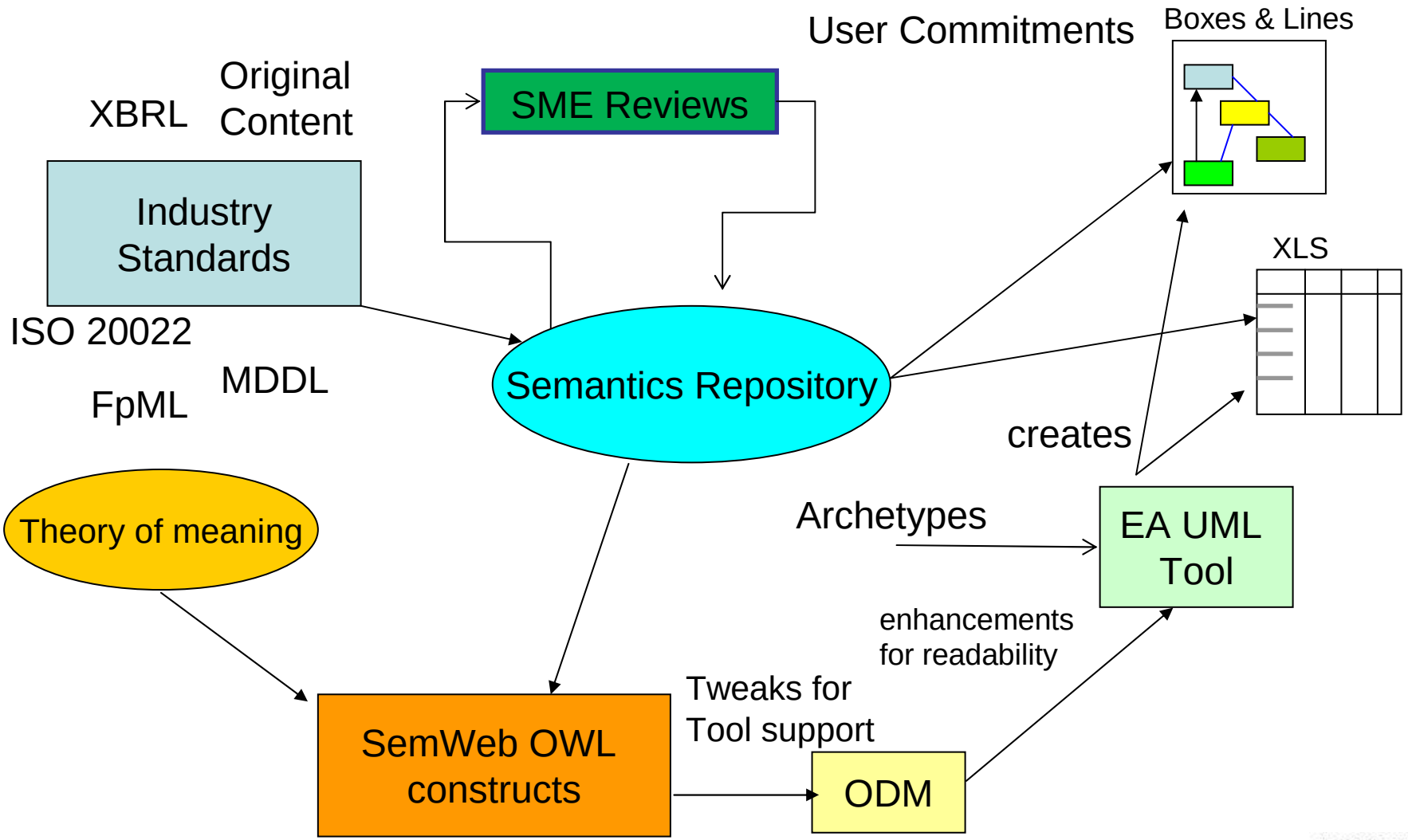
Conceptual Model	Business requirements Expressed in technology neutral terms Contains no design information
Logical Model	Logical design Expressed in technical terms Independent of specific implementation
Physical Model	Physical design Expressed in terms of a specific implementation of that design

- For data model and message design, the Conceptual Model is a record of the business semantics

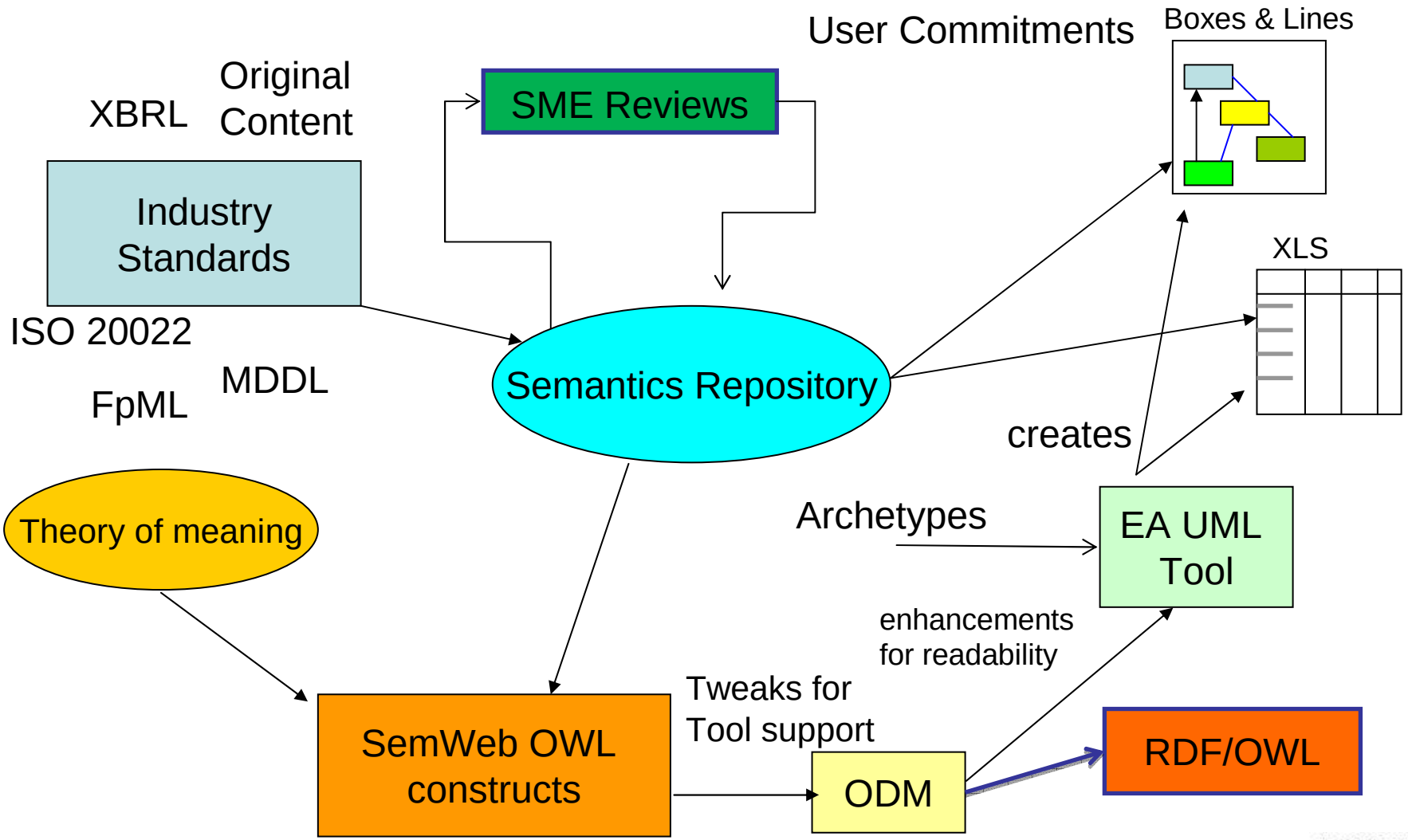
History

- Three year project sponsored by the Enterprise Data Management Council
- Initial draft material subjected to business subject matter expert reviews
- As of mid 2010, reference data for principal instrument classes is in “Beta”
  - This means it is stable enough to refer to but we expect changes as we come up against real data and real projects
  - Proof of Concept projects and early adopters ongoing
- Dec 2010: Teamed up with OMG Finance domain Task Force to create an RFC proposal for the Repository to become a formal standard

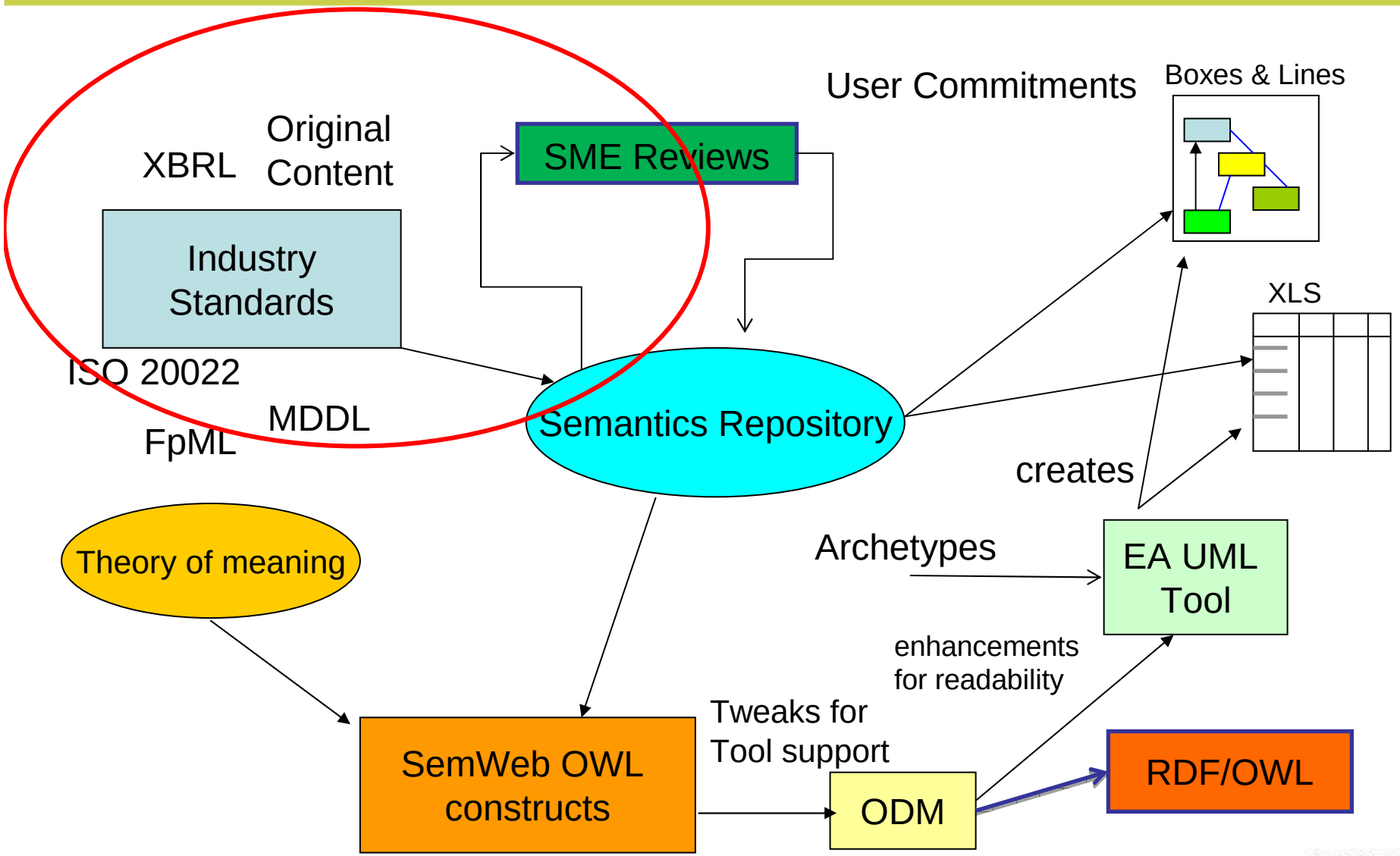
Semantics Repository Mind Map



Financial Industry Business Ontology



FIBO Content



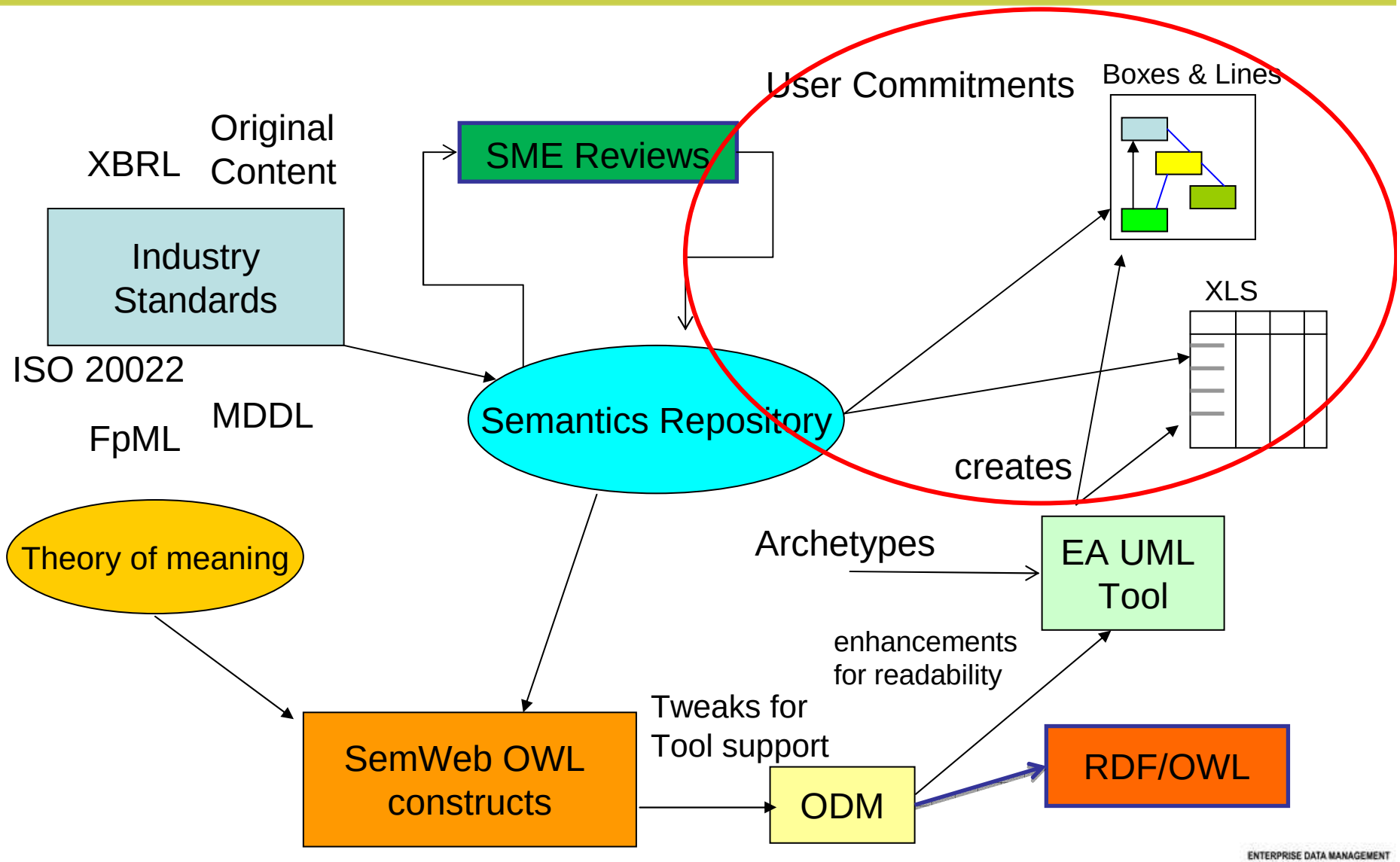
Content

- Initial population of the model derived from the most appropriate standards in each area:
  - ISO 20022 FIBIM
  - MDDL
  - FpML
  - Member firms
- Domain expert reviews introduced considerable new material
  - Structured finance, complex derivatives

FIBO Scope

- Tradable Securities
  - Reference Data terms (Beta)
  - Date and time sensitive terms (Draft)
- Over the Counter Derivatives (Draft)
- Corporate Actions (in process)
- Securities Transactions Processing (to do)
- **NEW:** Loans section
  - Added as part of recent MBS Proof of Concept
- Business Entity / Legal Entity
  - Part of mid level ontology material

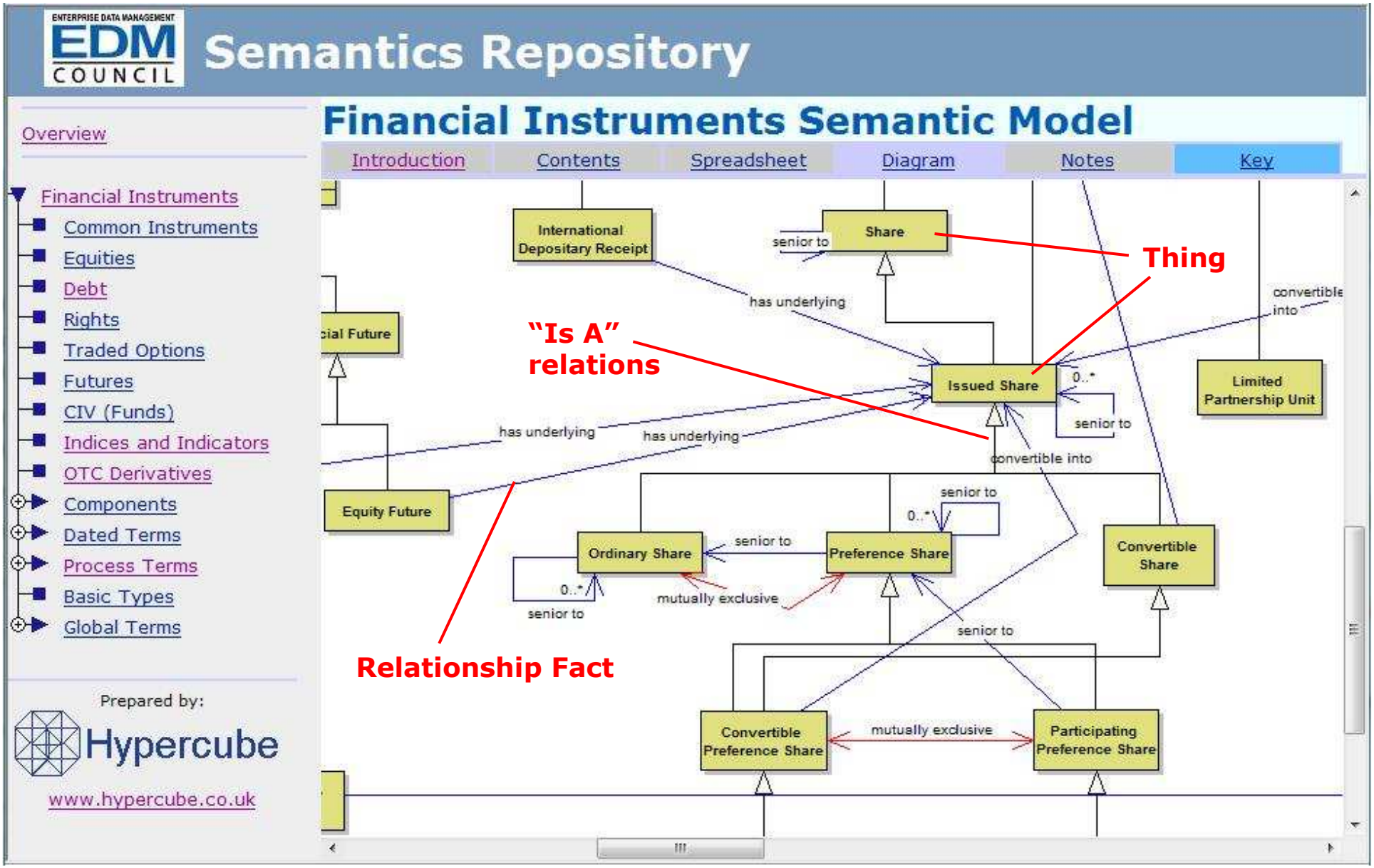
FIBO Presentation



Business Presentation

- No “Language”
  - Spreadsheets and/or “boxes and lines”
  - Explainable in logic not tech
- Business must own / review / validate
  - This is a business level, “conceptual” artifact
    - Physical models, logical models, business conceptual model
- Thereby:
  - We created an industry resource that subject matter experts could validate

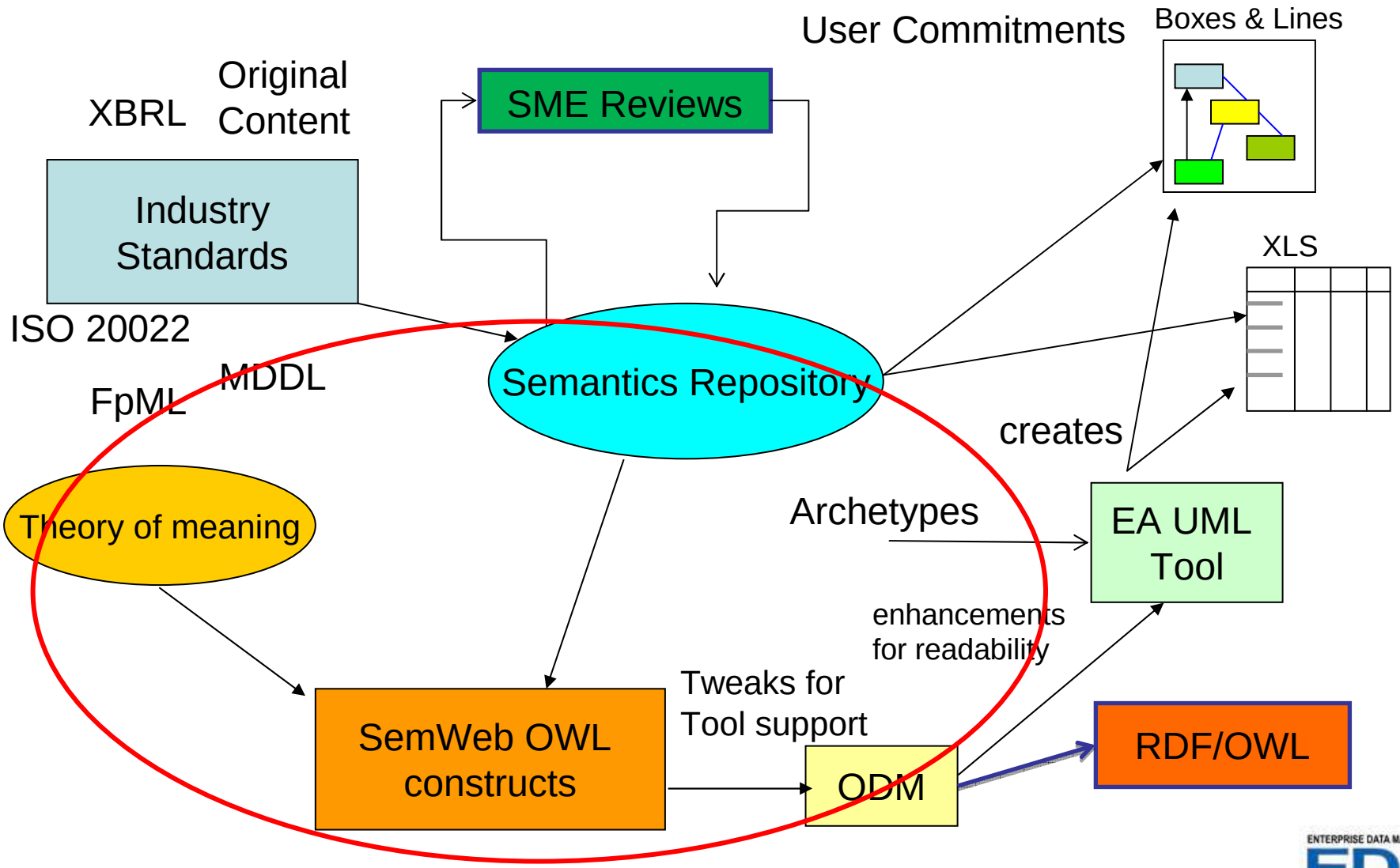
Sample Screenshot



Spreadsheet Output

Line	Term type	Term	Definition	Synonym	Simple Type	Related Thing	Multiples
65	Thing	**Issued Share**	A publicly traded security that signifies ownership in a corporation and represents a claim on part of the corporation's assets and earnings.	Publicly Issued Share.			
66	Parent	Is a				Share	
67	Parent	Is a				Exchange Traded Security	
68	Union	Classified as Equity				Equity Instrument	
69	Relationship fact	senior to	The share has a higher seniority than the related share, meaning that it gives the holder a higher claim on the assets of the issuing entity in the event of the winding up of that entity.			Issued Share	0..*,
70	Relationship fact	has holder	A party which holds the publicly issued share.			Public Shareholder	1..*,
71	Relationship fact	confers ownership of	Equity represented by the Publicly Issued Share and owned by the Holder of that share in proportion to the amount of the issue that they hold.			Issued Equity	
72	Relationship fact	has issuance information	Issuance Information specific to this Equity Instrument			Equity Instrument Issue Information	
73	Relationship fact	has listing	A listing of the share on an exchange or multilateral trading facility.			Equity Listing	
74	Relationship fact	confers	The right of a stockholder to vote on matters of corporate policy as well as on who is to compose the board of directors. Rights can be of junior or senior rank (precedence of ranks).			Voting Right	0..1,
75	Relationship fact	has price	The price of the share on some exchange at some time.			Share Price	
76	Relationship fact	has priority terms	Terms setting out the priority rights attached to the Issued Share.			Issued Equity Priority Terms	
77	Relationship fact	has status	The status of the shares at a given point in time.			Current Share Status	
78							
79	Simple fact	Free Float	The total number of shares publicly owned and available for trading. The float is calculated by subtracting restricted shares from outstanding shares.		whole number		

FIBO Semantics



Theory of Meaning – in English

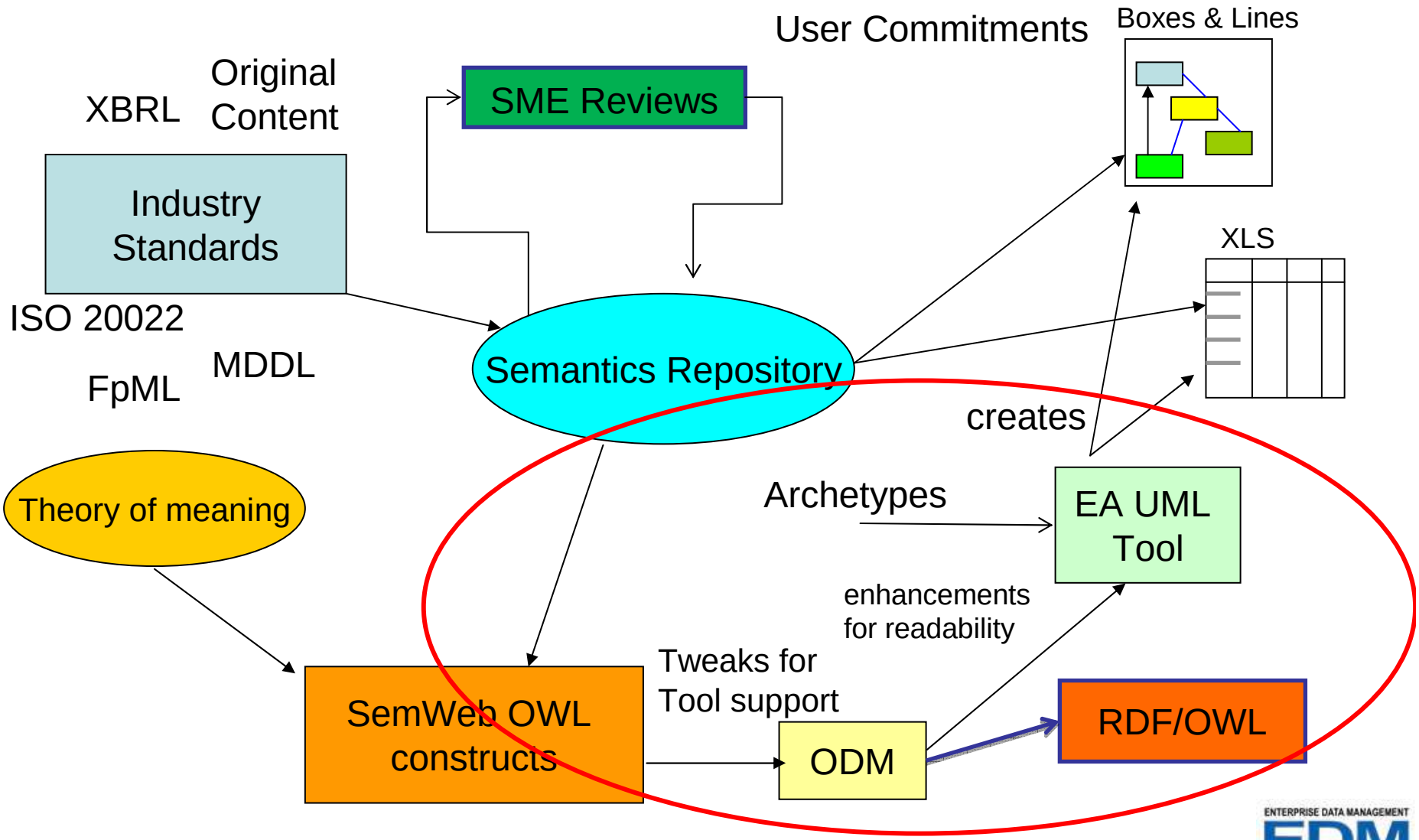
- The model consists of:
  - Things
    - A Thing is a set theory construct
    - Arranged in a hierarchy called a “Taxonomy”
      - Like taxonomy of species
  - Facts
    - Simple facts (names, dates etc.)
      - e.g. “Issue Date” is a date
    - Relationship Facts (relate one thing to another thing)
      - e.g. “Share confers Voting Rights”
      - Things so referenced are also in taxonomic hierarchies
  - Other set theory concepts
    - Disjoints, Unions

Theory of Meaning – in English

- Taxonomy: Like Taxonomy of Species
  - Animal v Plant
  - Vertebrate v invertebrate
  - Mammals, fish etc.
- Each thing is defined by what facts distinguish it
- For each new thing:
  - What sort of thing is it?
  - What facts distinguish it from other things?

- If it walks like a duck, swims like a duck and quacks like a duck, it belongs to the set of all things that are a duck

FIBO Implementation



Current Implementation

- Used early draft of OMG's Ontology Definition Metamodel (ODM) specification
- Made tweaks to ODM for readability
  - Meeting our commitment to "Boxes and lines" notation
  - Do not want business viewers to see a single repurposed punctuation mark
    - "Keep the philosophy out of sight!"
- Implemented as UML profiles in Sparx Enterprise Architect
  - OWL and RDF toolbars
- Extended with business profiles for common semantic patterns
  - Archetypes

Current Implementation

- Diagrams are saved in a variety of levels of detail and posted to Semantics Repository website
- Reports from EA are converted into spreadsheets and HTML tables
- Both spreadsheets and tables reflect the model content and relationships
- The EA model is also made available (with Sparx free viewer)
- Website is open to all, with facilities for comments
- SME Reviews are carried out via live webcast using the EA tool

Use Cases

- Common business language in the organization
- Integration
  - Hub in a hub and spoke mapping
  - Semantics not data is the best point of reference for terms in different systems, feeds
- Model driven development (MDA)
- Metadata Repositories
- Semantic Web Applications
  - Querying, search etc.

Semantic Web applications

- The use of OWL (via ODM) makes semantic web apps possible
- New Use Case
  - The existing use cases don't go away
  - The existing model formats, displays, user commitments don't go away
- Requires generation of OWL models
  - Part of the FIBO work is to enable this
- Business use cases
  - Unlikely to replace their existing data resources
  - This is not a "green field"
  - Likely use is in risk, compliance (internal and external)

What Next?

- Existing arrangement is labor intensive and difficult to maintain
- People are referring to the model but need to see a mature governance process before they depend on it
- Also some industry folks asking for OWL version for Semantic Web applications
- In the long run, we needed a home and a maintenance / hosting facility
- We had always recognized the need to bring the underlying metamodel into line with the latest version of ODM once this had stabilized

The EDM Council / OMG FDTC Partnership

- EDM Council partnered with the OMG partnership to develop Semantics Repository as a formal standard submission (RFC)
- Reasons
  - Bring in line with latest ODM spec
  - Benefit from OMG standards process and ecosystem
- Additional Benefits
  - ODM Compliance means canonical OWL can be generated
- Financial Industry Business Ontology will then be adopted by the industry
  - Many of our members are impatient to get their hands on the standard
  - Don’t want to wait for ODM2 and OWL2

What is the FIBO?

- UML based editing environment
  - To be moved to a hosting solution
  - Content should be tool independent
- Business Presentation
- OWL ontologies generated from this
  - Once ODM implemented in full
- Common semantics framework
  - Socializes semantic standards
  - Semantic granularity and precision

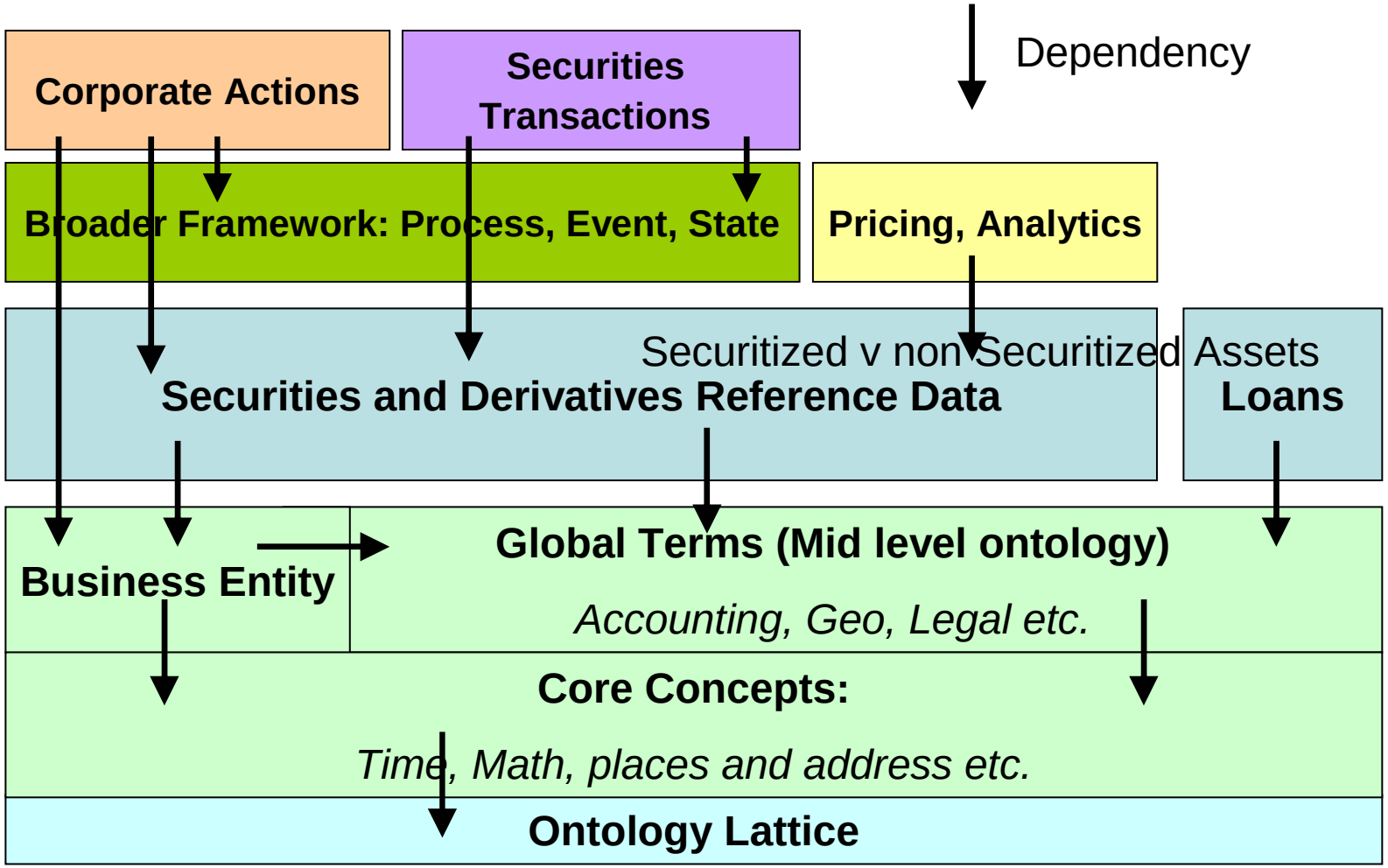
Core Commitments

- Business Readability
  - Spreadsheet/tables
  - Diagrams with no UML punctuation
  - Business friendly edit would be a bonus
- Capture meaning as understood by business
  - No limitations per OWL applications
  - Not limited to decidable sub-set
  - Multiple inheritance
    - (different classification facets)
- These do not go away!

Semantic Web Additional Use Cases

- Use of OWL opens up new possibilities
  - Validation of Semantics Repository content
  - Semantic Querying
  - Reasoning
- Business Use Cases
  - Classification of trades e.g. derivatives
  - Risk and exposures
- Populate OWL ontologies with individuals
- Ability to navigate and query across business domains

FIBO RFC Disposition



Joint Workstreams

- Workstream 1: Content Disposition
  - What goes in what standard submission
  - Modularity requirements within these
- Workstream 2: Technical Modell Framework
  - Metamodel
  - Long term standards integration
    - Rules, Terminology, Process etc.
- Workstream 3: Shared Semantics
  - Reuse of well attested semantics standards
  - Commitment to replace mid level ontology terms
  - Semantics Provenance

Financial Industry Business Ontology Status

- Joint workstreams managed by the OMG FDTF and the EDM Council
  - Content and RFC disposition
  - Technical Model Framework (metamodel)
  - Shared Semantics
- Decisions made on how to configure the content as a set of proposed standards
- Promising results in the metamodeling (ODM alignment) works
- Shared Semantics – Namespace etc. ongoing
- Derivatives Proof of Concept (fast track)
- Considering how to formally manage fast changing content and ontology within OMG quality

Technical Modeling Workstream

- Update in line with current ODM
  - ODM 1.0
  - Upcoming ODM RFP
  - OWL2
- Identify what's left over
  - Anything to propose into ODM?
  - Changes to base types in model
    - Impact analysis on content
- Archetypes
  - Not an OWL construct therefore not in ODM
  - OWL rendition somehow?

Technical Modeling Workstream

- Longer Term Activities
  - Business Rules application
- Terminology, Vocabulary, Ontology
  - Relation to ISO 1087 Terminology
  - Cross reference to SBVR
- Process
  - We have a dumb notation for this
  - Integration with process tools
    - for CAE work etc.

Other Ambitions

- Common relationship types
- Archetypes mechanization
- Business context markers
  - Can we use BIAN to define ontology sub-sets per application area and extract these?
  - Do we add something to the metamodel for these?
- Extrication of OWL dialect sub-sets
- SKOS, DC – where do you put these terms
- Ecosystem / URI considerations
- Business friendly editing

Shared Semantics Workstream

- Activities / Decision Points
  - Standards selection procedure
  - Grid of candidate standards
  - Disposition
    - Packages, ontologies
  - application to external terms of:
    - Archetypes
    - Lattice

Shared Semantics Activities

- Standards Selection
  - Defined a set of criteria:
    - E.g. standards body, type of semantics
- Grid of standards semantics
  - Will maintain on Wiki
  - Need to determine precedence / policy

Shared Semantics Status

- Will do an initial case study in formally referencing these standards:
  - Resource, Events, Agents (REA)
  - XBRL (financial reporting)
- These cover aspects of accounting
- Differ in many of the criteria of interest
  - Semantic format, industry attestation etc.
- Will define mechanics of the process

Derivatives Proof of Concept

- Joint project with the EDMC/OMG FDTF and ISDA
- Demonstrate what can be done with semantic technology
  - As business domain models
  - As Semantic Web applications
- Presentation to regulators June 30
- Using OWL models of the FIBO content developed by Sandpiper
- Show what can be done with reasoners, semantic querying

Derivatives Proof of Concept

- Findings:
  - Difference between domain model and semantics of message content
  - Use a “Hub and Spoke” arrangement
    - OWL models of FpML content
    - Mapping OWL Ontologies into FIBO hub
- Capabilities of different tools
- Navigation across business concepts
  - Legal entities, underlying
- Demonstration:
  - exposures to counterparties, parent

Questions?