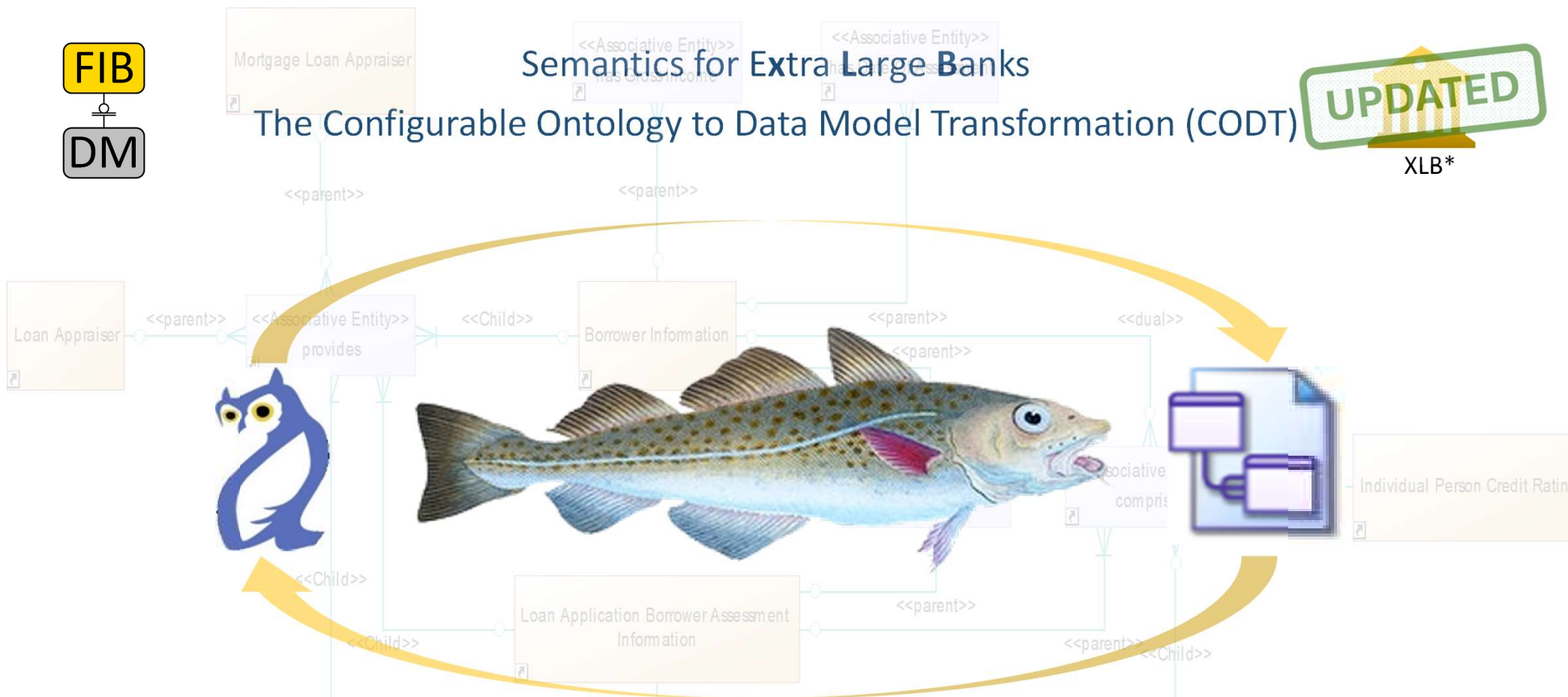# Semantics for Extra Large Banks

The Configurable Ontology to Data Model Transformation (CODT)

UPDATED

XLB*

An overview and introduction to Semantic Enterprise Information Architecture and Model-Driven Development with the industry-standard ontology at the apex.

"XLB" is a generic placeholder for an EDMC Tier A bank. You can replace it with your institution's name and logo and edit the slides.
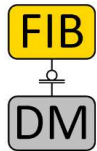
XLB embraces RDF/OWL and the FIBO

XLB has a Semantic Technologies Center of Excellence (COE) and RDF (Triple) Stores in Production

XLB uses and supports the development of the industry-standard ontology.

XLB downloaded and evaluated the FIBO data model.

The CODT patent (US12038939) enables full disclosure of the transformation technology.
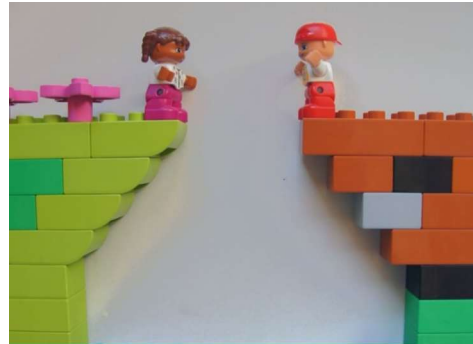
Finance key point

Semantic Center of Excellence (COE) challenges

XLB already implemented, extended, and customized industry-standard ontology.

XLB has highly qualified ontologists and data scientists.

However, 95% of the bank still runs on relational databases, using data models

Data Architects have the FIBO Data Model but can't leverage the work of their Semantic CEO colleagues.
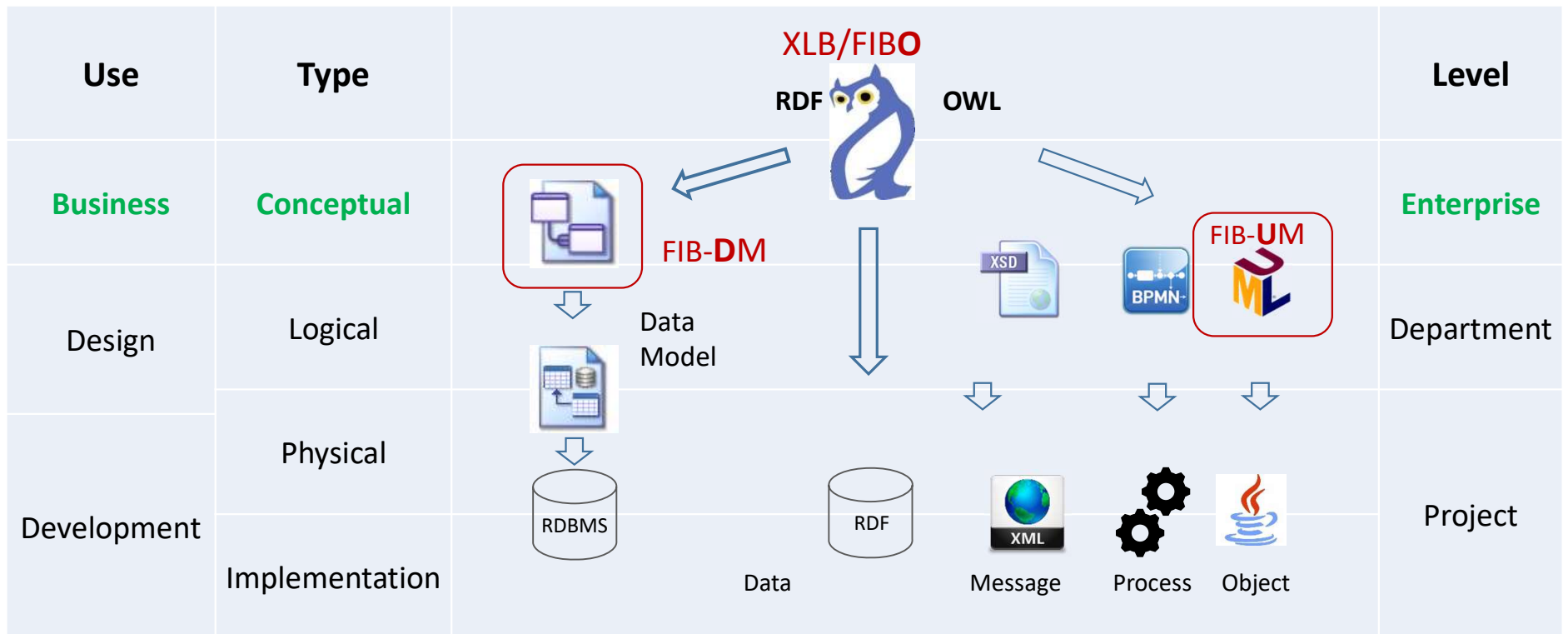
The risk is that Semantic implementations become yet another data silo, using a different language than the rest of the organization, impeding integration.

The Vision:

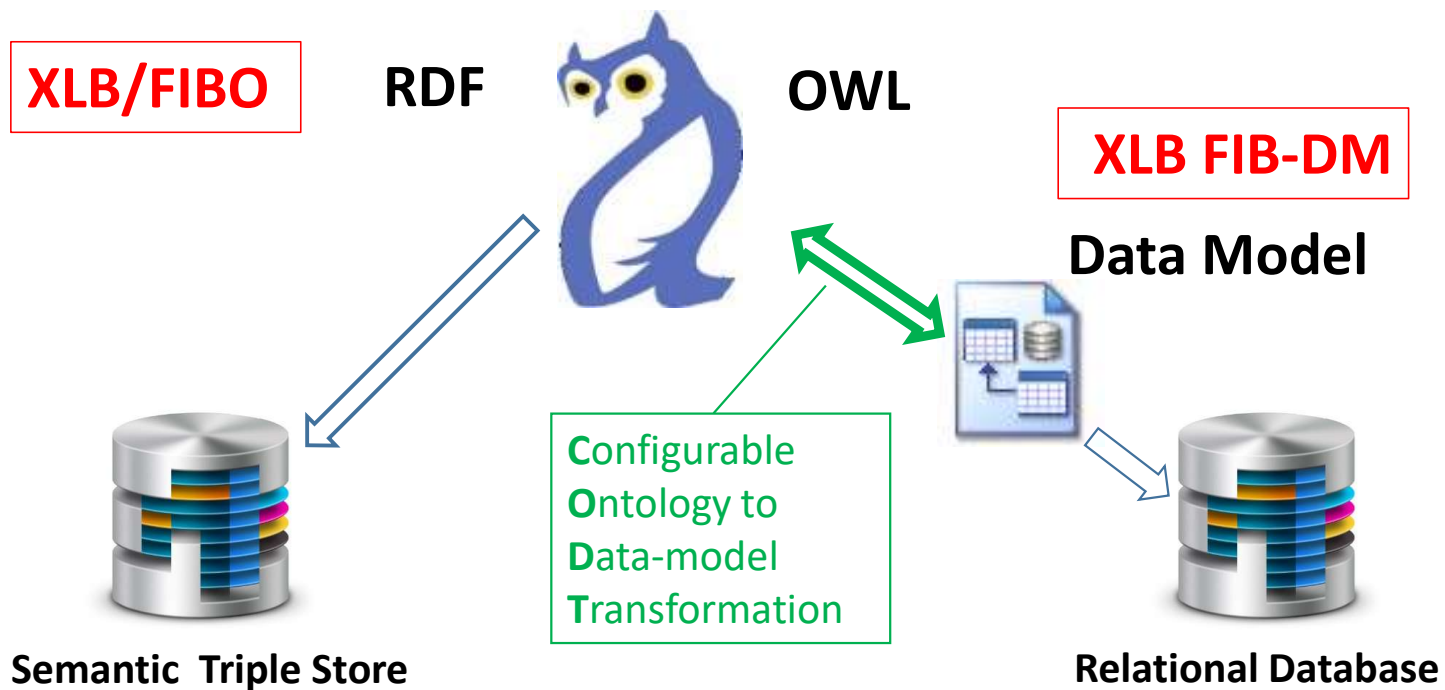# Semantic Enterprise Information Architecture (SEIA)

Use	Type						Level
		XLB/FIBO					
		RDF **OWL**					
Business	**Conceptual**	FIB-**DM**				FIB-**UM**	**Enterprise**
Design	Logical	Data Model		XSD BPMN-			Department
Physical							
Development		RDBMS	RDF	XML			Project
	Implementation		Data	Message	Process	Object	

The way:

Semantic Model-Driven Development (SMMD)

XLB/FIBO   **RDF**   **OWL**

XLB FIB-DM

Data Model

Configurable
Ontology to
Data-model
Transformation

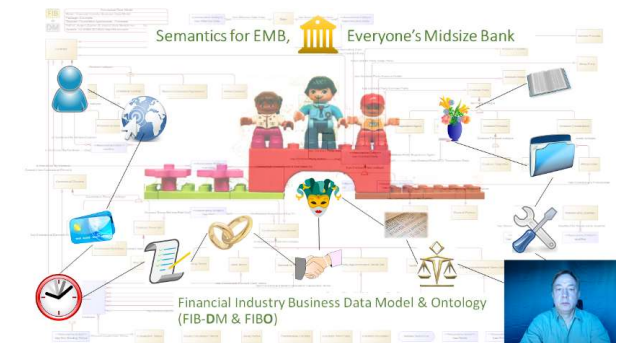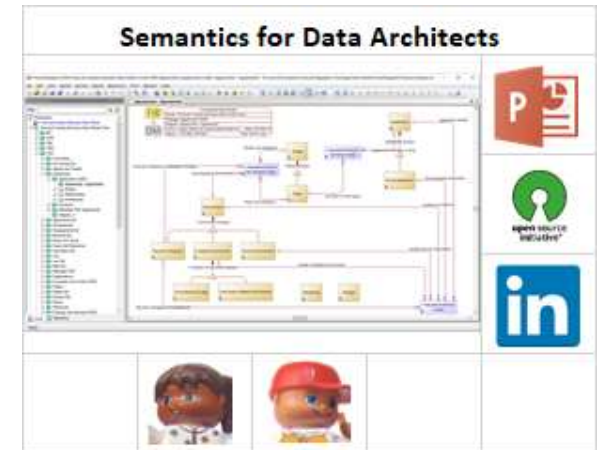**Semantic Triple Store**

Relational Database

Asset size is a poor proxy for semantic sophistication

Semantics for Data Architects, the name of the first FIB-DM educations resource, became a catchphrase.

FIB-DM on the EDMC website was for financial institutions with less than $200 billion in assets, hence Semantics for Midsize Banks.

However, some financial institutions, hedge funds, for example, are very advanced. Many midsize banks on FIB-DM are now building out ontology capabilities.

CODT is for Financial Institutions who are using and extending the FIBO, many but not all are extra-large banks.

Semantics for Data Architects

Semantics for EMB, Everyone's Midsize Bank

Financial Industry Business Data Model & Ontology (FIB-DM & FIBO)

Intended Audience & POC Team

Finance, management, or business stakeholder who has a working knowledge of Entity-Relationship and Ontology diagrams. You are authorized to sign non-disclosure and license agreements.

Ontologist with an in-depth understanding of the FIBO and in-house ontologies. You want to spread adaptation across your enterprise. You are well-versed in RDF/OWL and SPARQL.

Data Architect, with experience in Enterprise Reference models. You evaluated and want the industry-standard, FIB-DM. You are an expert in your Data Modeling Tool and its import functionality.

Developer / MS-Excel Power User experienced in VBA, Power Query, and the M-Language.

Finance key point

Inventor and Presenter

Jurgen Ziemer has 20 years of industry experience as a data architect and ontologist at leading Financial Institutions and service providers.

- Seven years as an IBM Software Group Consultant for the Banking and Financial Markets Data Warehouse (BFMDW) model at 45 banks in North America, Europe, and Asia.
- Four years were implementing BFMDW at Citi and Deutsche Bank.
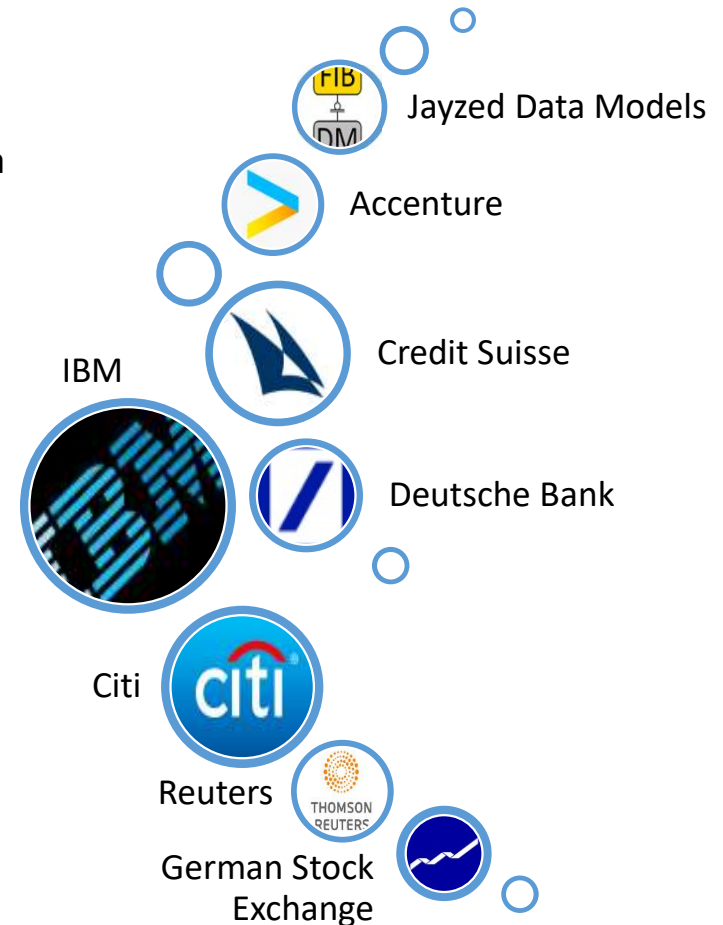- Contributor, reviewer, and speaker at FIBO conferences
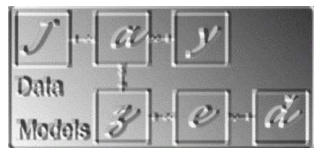
Jayzed Data Models Inc. is a US consulting company incorporated in 1999.

Jayzed holds the FIB-DM copyrights and is the designated assignee of the CODT Patent.

Jayzed Data Models

Accenture

Credit Suisse

IBM

Deutsche Bank

Citi

Reuters

German Stock Exchange

Finance key point

Origins of CODT and FIB-DM

NY Bank needs Schema for a new Security Master System, trying to leverage FIBO for Logical Data Model.

Challenge: Data Architects are not familiar with RDF/OWL and have no experience in Protégé or Topbraid
Workaround: Ontologist writes SPARQL queries to extract metadata into MS-Excel spreadsheets.

CT AIM with Hedge Fund Ontology SEC Form PF assessments needs a relational platform

Challenge: Converting operational ontology of some 200 FIBO and hedge fund specific classes
Workaround: Manual transcription of graphs into ERWin diagrams. Some metadata extract and import.

Existing tooling chokes on very large ontologies and does not derive a useful Data Model.

Ontologies and Data Architects copy and paste manually.

So, I developed a better transformation and FIBO data model.

Data Architect   Ontologist

Atlantic is the way to Semantic EIA and MDD

FIB
DM
Full
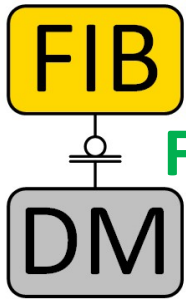
2024/Q2

release

3,074 entities
The world's largest data model.

ATLANTIC CODT

Configurable Ontology to Data model
Transformation (CODT)

Finance key point

FIBO is more than a Knowledge Graph

"The Financial Industry Business Ontology (FIBO) is a **business conceptual model** developed by our members of how all financial instruments, business entities, and processes work in the financial industry." (https://edmcouncil.org/general/custom.asp?page=aboutfiboreview)

The Council and its members correctly decided to define the business conceptual model in Ontology Web Language (OWL), because of the superior semantics of the notation.

FIBO Conceptualization and Relations are **fully applicable for** lower-semantic taxonomies, concept maps, object-, and **data models**. FIB-DM is a perfect conceptual data model.
(https://fib-dm.com/ontology-class-and-data-model-entity-hierarchy/ and https://fib-dm.com/ontology-object-property-data-model-associative-entities/)

The FIBO is superior to vendor data models

The Involred Party is dead,
Long live the Autonomous Agent
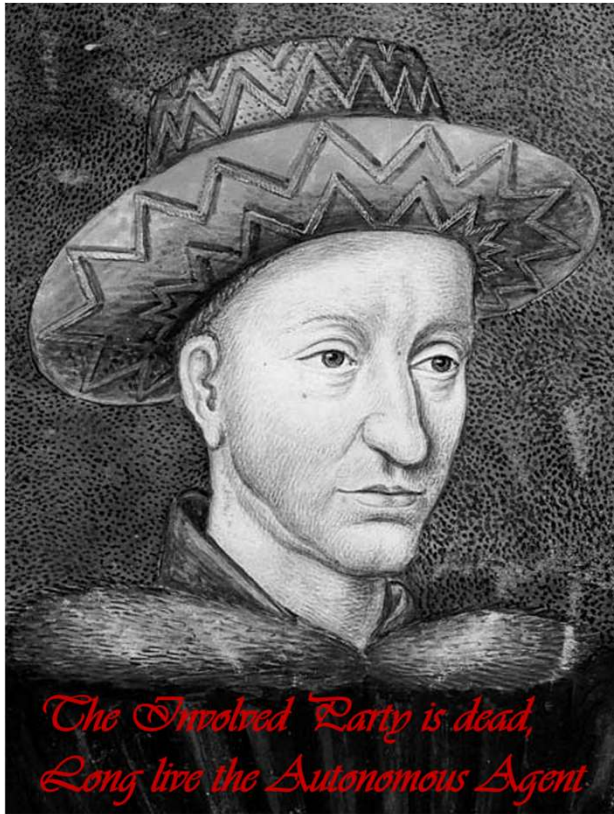
Almost six hundred years ago, Robert II d'Uzès proclaimed Charles VII King of France. Yet the *Involved Party* is still an ultimate supertype in numerous reference models and databases.

The FIBO breaks up that comingled entity into two fundamental concepts, the *Autonomous Agent* (person, legal entity) and *Thing in Role* (customer, employee, broker).

The 15 fundamental business concepts

AA Autonomous Agent	**TIR** Thing in Role	**REF** Reference	**ARR** Arrangement	**LOC** Location
PRD Product	**SVC** Service	**AGR** Agreement	**DOC** Document	**COM** Commitment
CE Contractual Element	**LC** Legal Construct	**AC** Account	**TI** Time	**OCC** Occurrence
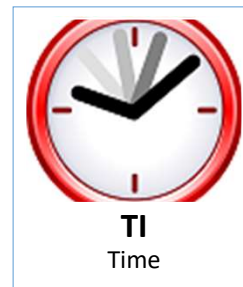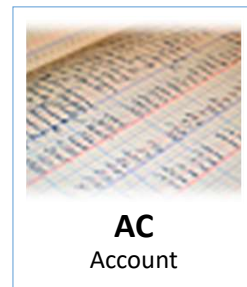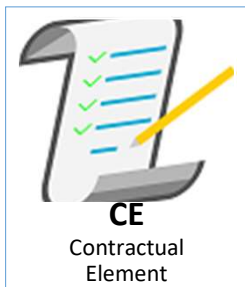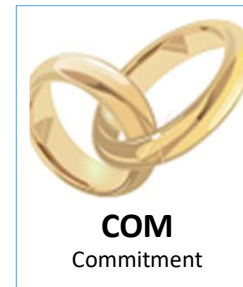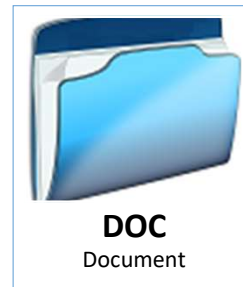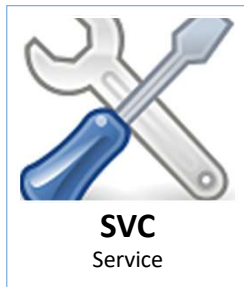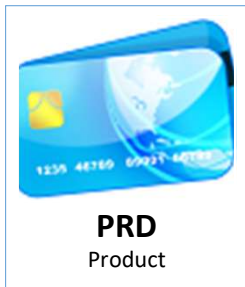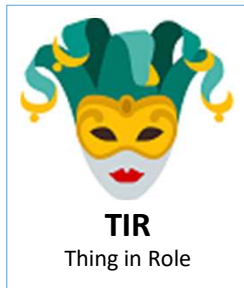
The fifteen Fundamental Business Concepts are ultimate supertypes in the FIBO Data model.

80% of FIB-DM entities are subtypes of the 15 concepts.

EDMC support and 3,500 data model downloads

"Many midsize EDMC members want to leverage the industry standard, but don't have ontology tooling, databases, and the human expertise inhouse yet."
(https://spec.edmcouncil.org/fibo/FIB-DM)

With FIB-DM, Data Architects no longer manually transcribe ontology graphs and copy and paste definitions. Three thousand five hundred users downloaded the Open-Source version of the FIBO Data Model.

However, even with FIB-DM, Architects at larger Financial Institutions must still c&p their FIBO customizations and extensions manually.
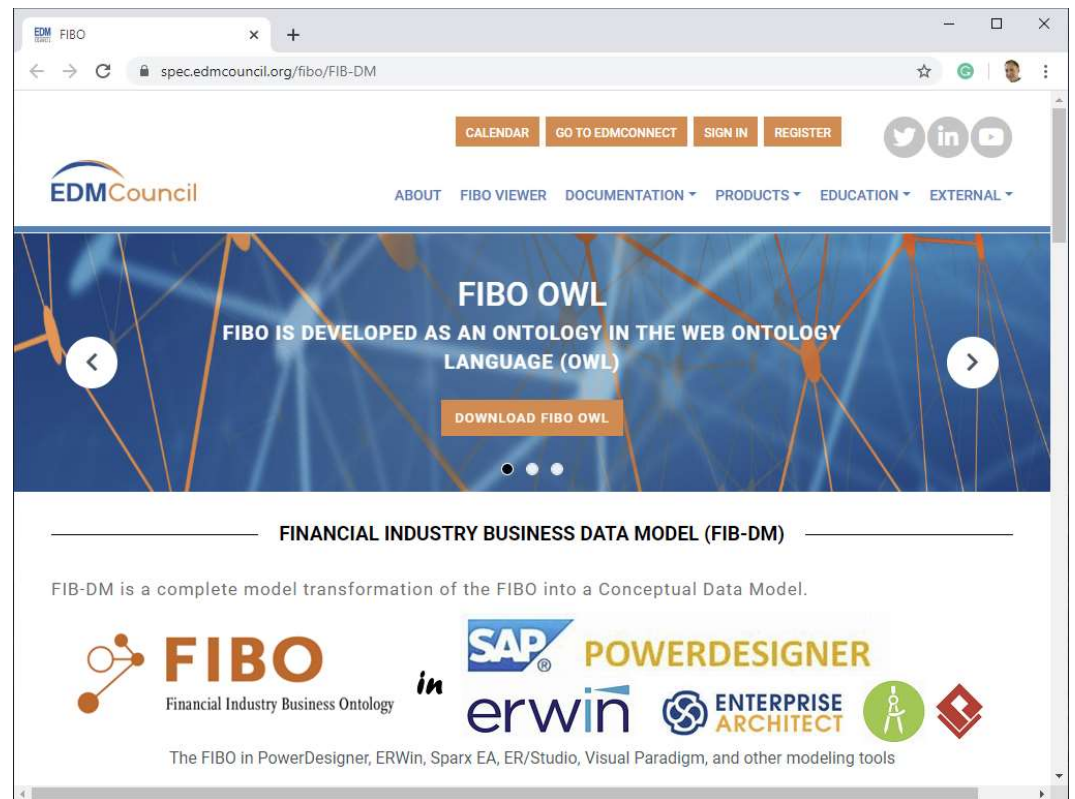
Finance key point

https://fib-dm.com   © Jayzed Data Models Inc. 2024

Ontology-derived Data Model

Ontology graph
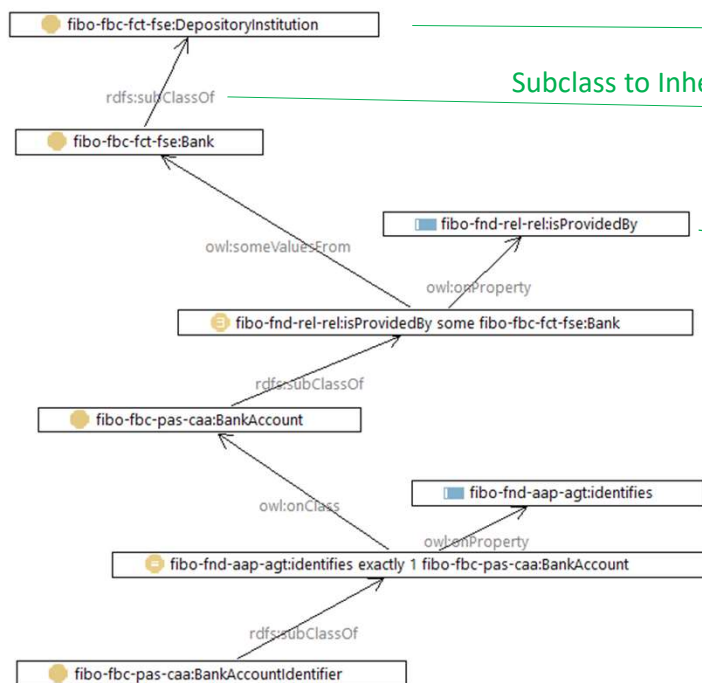
Transformation/mapping

Conceptual Data Model

Class to Entity

fibo-fbc-fct-fse:DepositoryInstitution

Depository Institution

rdfs:subClassOf

Subclass to Inheritance (subtype)

Depository Institution subtype

fibo-fbc-fct-fse:Bank

Bank

fibo-fnd-rel-rel:isProvidedBy

Object Property to Associative Entity

owl:someValuesFrom

owl:onProperty

fibo-fnd-rel-rel:isProvidedBy some fibo-fbc-fct-fse:Bank

<<Associative Entity>> provides

rdfs:subClassOf

fibo-fbc-pas-caa:BankAccount

Bank Account

fibo-fnd-aap-agt:identifies

Object Property to Association

owl:onClass

owl:onProperty

fibo-fnd-aap-agt:identifies exactly 1 fibo-fbc-pas-caa:BankAccount

<<Associative Entity>> identifies

rdfs:subClassOf

Class Restrictions, domain and range determine Relationships and cardinalities

fibo-fbc-pas-caa:BankAccountIdentifier

Bank Account Identifier
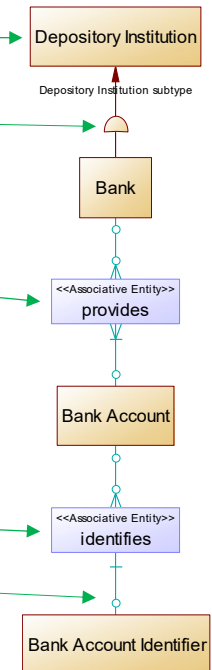
CODT patent drawing FIG.1 System (removed numerals and added colors)

Data Architect

Ontologist

Current tooling imports are not fit for purpose

Data Modeling tolls, Sparx EA and IBM IDA have a rudimentary import for RDF/OWL files. The imports are one-click blackbox without options and diagnostics.

URIs as entity names

Datatype properties become classes

Class restrictions become anonymous pseudo classes

No import of annotation properties
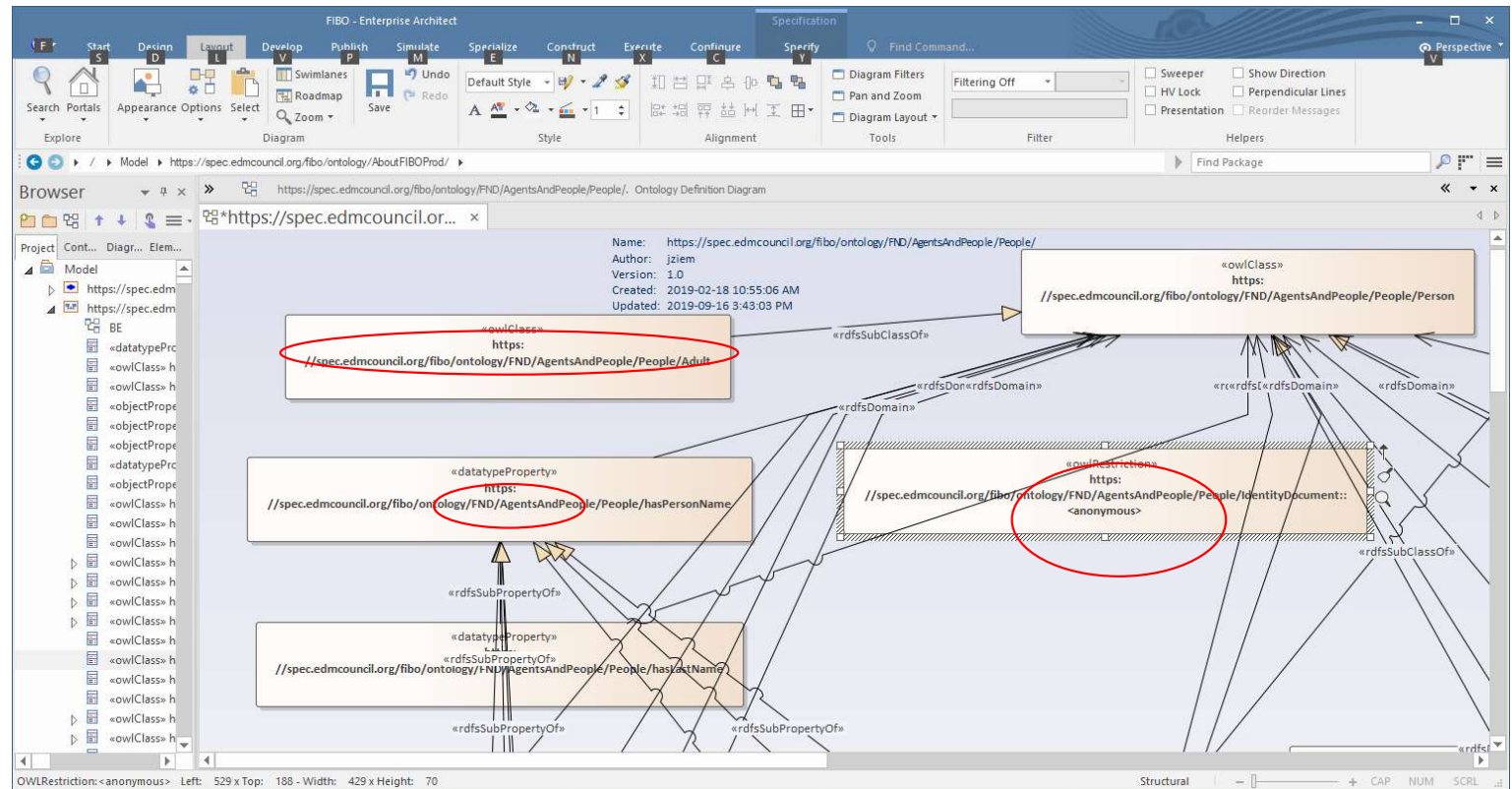
Data Architect

Ontologist

The parsing approach is not scalable

Traditional transformations parse ontology files. They encounter elements of the ontology and create elements of the data model as they process the source files. The parsing approach reaches its limits with very large ontologies like the FIBO.

Per default, ontology object properties transform into data model relationships. This transformation loses Metadata for object properties with particular design patterns.

XLB and other large Financial Institution developed rudimentary transformations.

Compare FIB-DM to a vendor or in-house transformations of the FIBO and see the difference!

License the technology that created the industry-standard rather than DIY!

Outcome of the transformation: Package Properties

The Package Name is the rightmost string in the ontology namespace.

CODT transforms the ontology prefix as the unique code of the package.

Note: All ontology classes, properties with the prefix `fibo-fnd-agr-agr` become model objects of the Agreements package.

The URI is the Uniform Resource Identifier of the ontology. It is a traceability link to the source of the model object.

The second part of this overview shows how CODT extracts properties, transforms and add them to the data model.

Data Architect   Ontologist

Package extended attributes
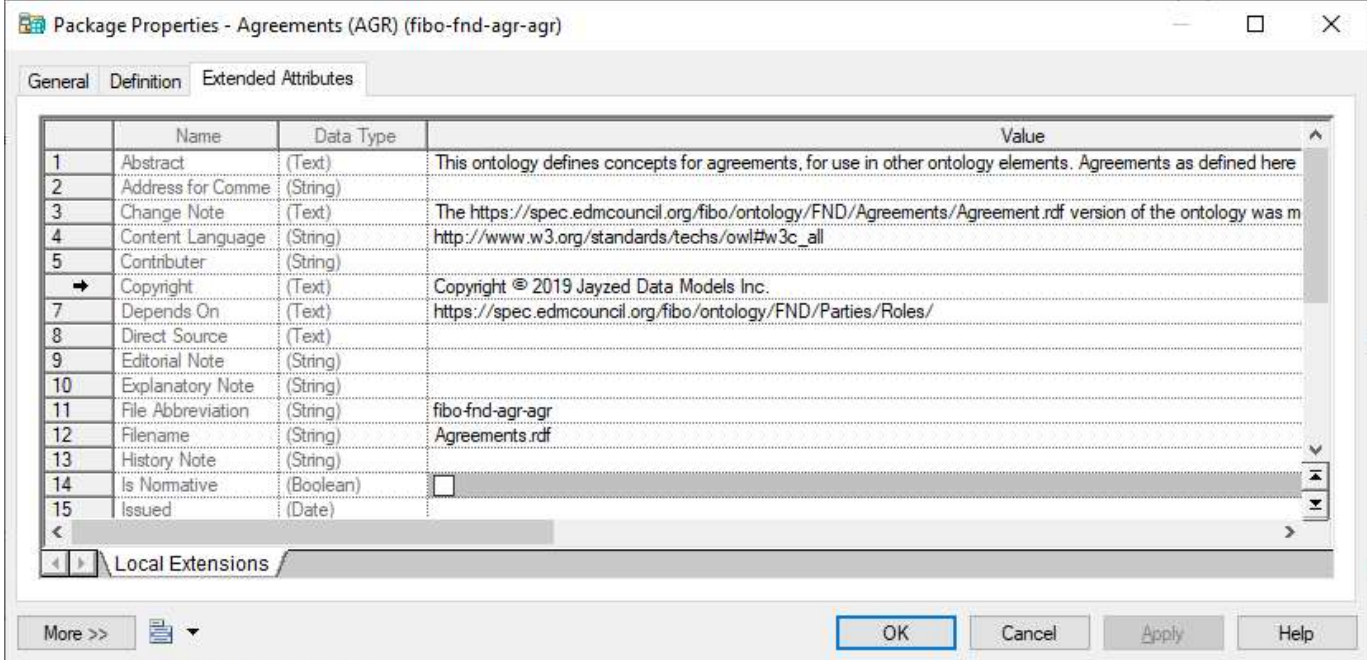
The Extended Attributes tab has a list of ontology annotations.

The default transformation configuration uses the Abstract to populate the Package Comment.

Extended attributes of Data Type Text are multi-line.
For example, the Copyright attribute lists the Object Management Group and EDM Council copyrights.
The License attribute lists the FIBO MIT license besides Jayzed and GPL-3.0.
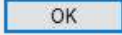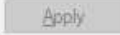
Package Properties - Agreements (AGR) (fibo-fnd-agr-agr)

General | Definition | Extended Attributes

	Name	Data Type	Value
1	Abstract	(Text)	This ontology defines concepts for agreements, for use in other ontology elements. Agreements as defined here
2	Address for Comme	(String)	
3	Change Note	(Text)	The https://spec.edmcouncil.org/fibo/ontology/FND/Agreements/Agreement.rdf version of the ontology was m
4	Content Language	(String)	http://www.w3.org/standards/techs/owl#w3c_all
5	Contributer	(String)	
→	Copyright	(Text)	Copyright © 2019 Jayzed Data Models Inc.
7	Depends On	(Text)	https://spec.edmcouncil.org/fibo/ontology/FND/Parties/Roles/
8	Direct Source	(Text)	
9	Editorial Note	(String)	
10	Explanatory Note	(String)	
11	File Abbreviation	(String)	fibo-fnd-agr-agr
12	Filename	(String)	Agreements.rdf
13	History Note	(String)	
14	Is Normative	(Boolean)	☐
15	Issued	(Date)	

Local Extensions

More >>   OK   Cancel   Apply   Help

Entity properties

The Name is the ontology class *Localname,* converted from Camel Case to LDM naming convention (capitalized with space between words).

The Code transforms from the ontology class *Prefix*: *Localname*.

The Comment populates from the class annotation RDFS comment and SKOS definition.

There are two particular tabs for ontology derived data models, Annotations and Lineage.

Entity Properties - Payment Obligation (fibo-fnd-pas-psch:PaymentObligation)

Related Diagrams | Extended Attributes | Dependencies | Traceability Links | Version Info

General | Attributes | Data Protection | Identifiers | Mapping | Annotations | Lineage | Definition | Rules

Name: Payment Obligation

Code: fibo-fnd-pas-psch:PaymentObligation

Comment: a legally enforceable duty to pay a sum of money, or agree to do something (or not to do something), according to the terms stated in a contract

Stereotype:

Number: ☑ Generate

Parent entity: Commitment

Keywords:

<< Less   OK   Cancel   Apply   Help

Data Architect   Ontologist   https://fib-dm.com   © Jayzed Data Models Inc. 2024

Entity annotations

FIBO has extensive documentation captured in annotation properties.

The chart shows the number of classes with annotated documentation.

https://fib-dm.com   © Jayzed Data Models Inc. 2024

Data Architect   Ontologist

Entity lineage

The Lineage tab captures ontology metadata of the source class. The extended attributes provide traceability into the ontology and preserve semantics beyond the entity-relationship model.

The Resource Name is class *Prefix* and *Localname*. FIB-DM uses the resource name as the entity code, but you can generate your codes in the modeling tool.

The Localname is the rightmost string in the Resource Name and URI.

The Prefix is an abbreviation of the URI defined in the ontology.

The Uniform Resource Identifier of the class is a link to the FIBO source ontology.

Restriction and Equivalent class axioms formulate OWL semantics.

Entity Properties - Obligor (fibo-fnd-agr-agr:Obligor)

| Related Diagrams | Extended Attributes | Dependencies | Traceability Links | Version Info |
| General | Attributes | Data Protection | Identifiers | Mapping | Annotations | Lineage | Definition | Rules |

Resource Name: fibo-fnd-agr-agr:Obligor

Local Name: Obligor

Prefix: fibo-fnd-agr-agr

Resource Type: owl:Class

URI: https://spec.edmcouncil.org/fibo/ontology/FND/Agreements/Agreements/Obligor

Equivalent:

Restriction: fibo-fnd-pty-rl:isPlayedBy some (fibo-fnd-pty-pty:isAPartyTo min 0 fibo-fnd-agr-agr:Agreement) fibo-fnd-agr-agr:hasObligation some fibo-fnd-agr-agr:Commitment

<< Less   OK   Cancel   Apply   Help

Complex FIBO patterns (e.g. sub-properties) …
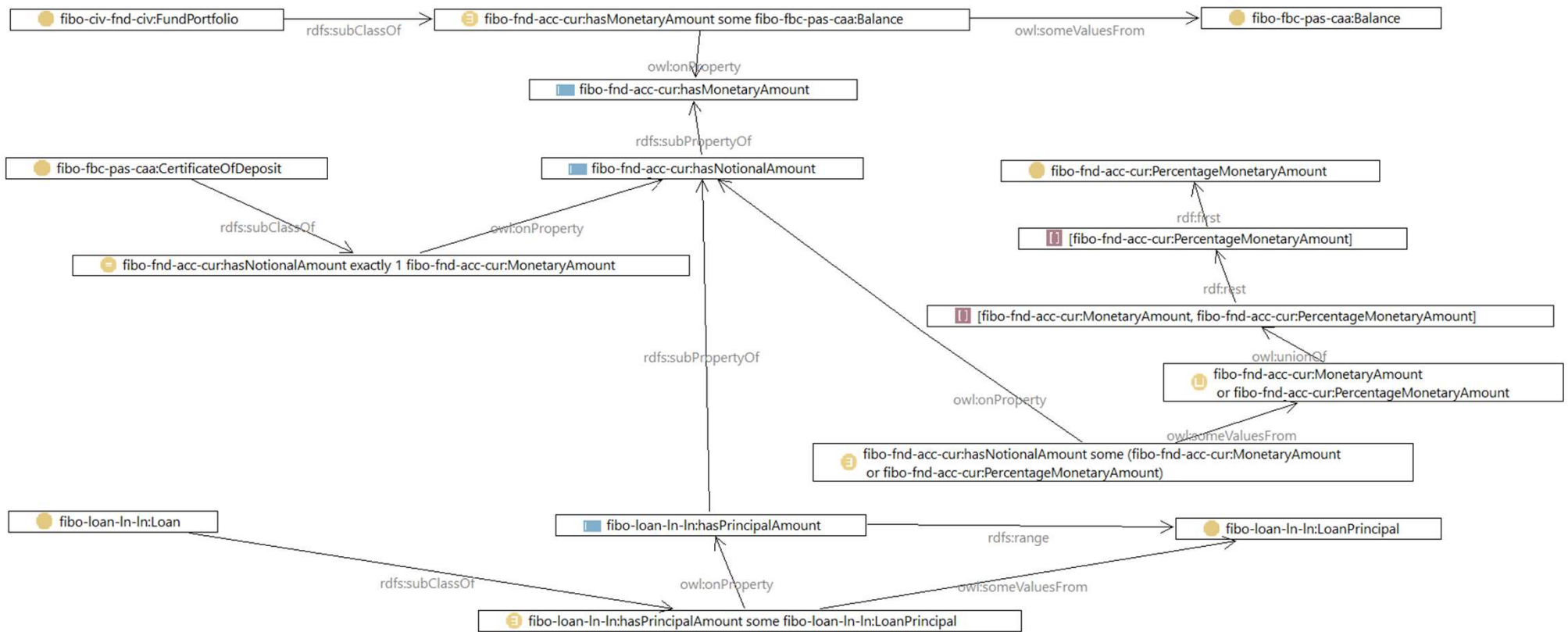
Require a sophisticated data model transformation
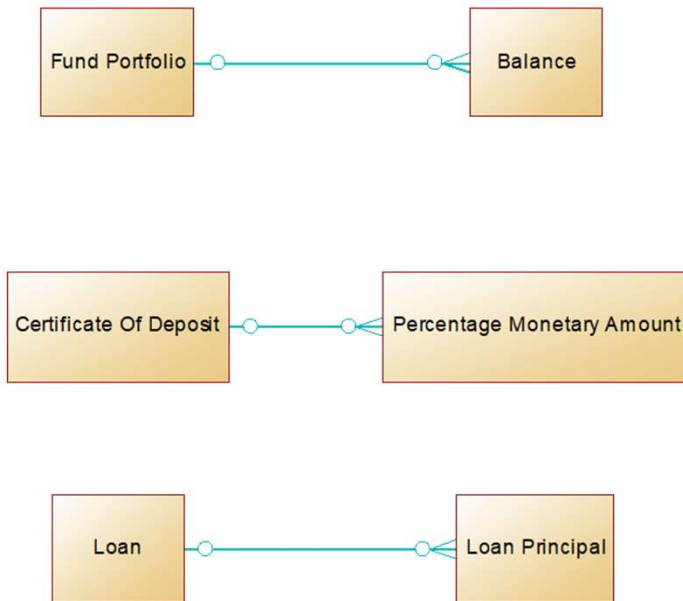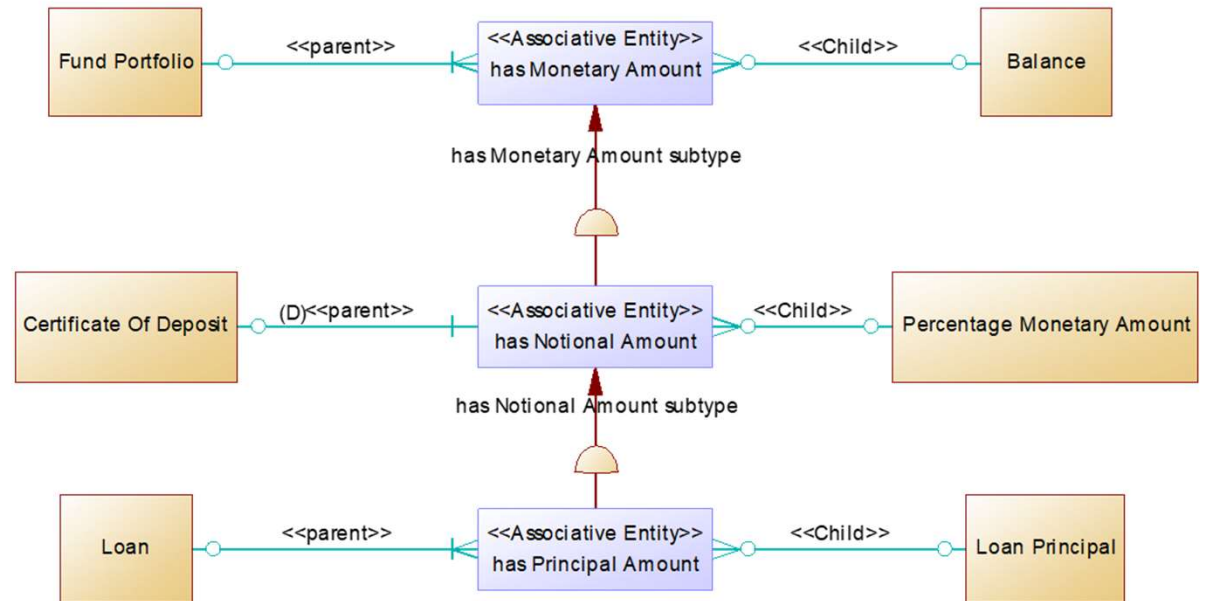
See the article of issues resolved for many-to-many relationships, closure axioms, hierarchies, incomplete and inverse object properties.
(https://fib-dm.com/ontology-object-property-data-model-associative-entities/)

FIBO, vendor and in-house models for SEIA

We adhere to the industry-standard
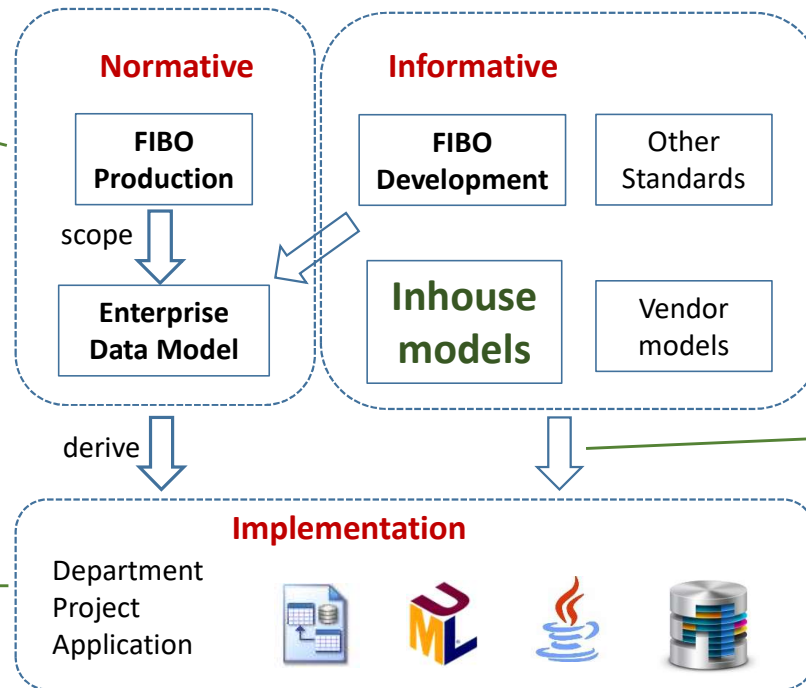
We consult FIBO development

Normative

FIBO Production

scope

Enterprise Data Model

Informative

FIBO Development	Other Standards
Inhouse models	Vendor models

Our method is to derive

derive

Implementation

Department
Project
Application

Our goal is leverage

DAs, merge in your vendor and inhouse models
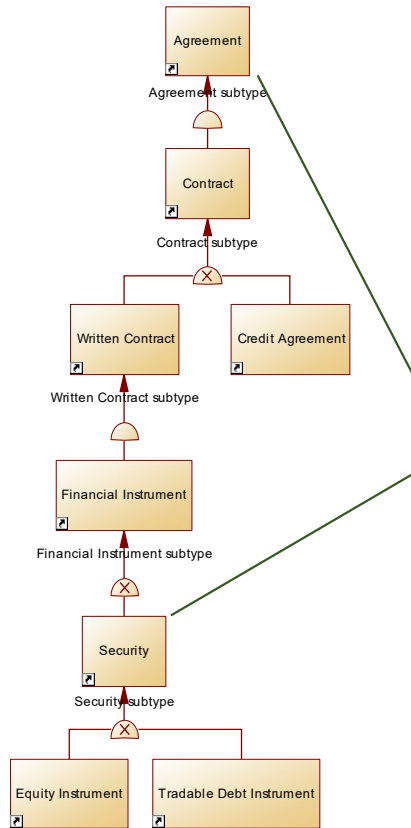
Your vendor model has excellent value. Keep it and harvest the content!

Adhere to the industry-standard 15 concepts and their subtype hierarchies
Adopt the FIBO/FIB-DM names and definitions

1. Identify indirect entity matches, synonyms

2. Identify direct entity matches, beware of homonyms

3. Merge entities that are not already in FIB-DM, identify the appropriate supertype.

4. Merge attributes from your vendor model.

Robert's advice

Note that the FIBO Data Model correctly defines Financial Instruments as a subtype of the Contract, an Agreement – not a Product as some Vendor model do.
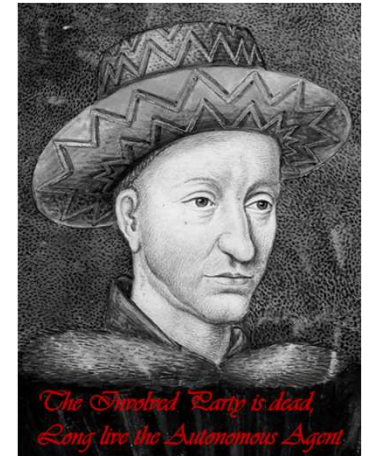
The concept maps, FIB-CM, link to the data model.

https://fib-dm.com/semantics-for-finance-users/
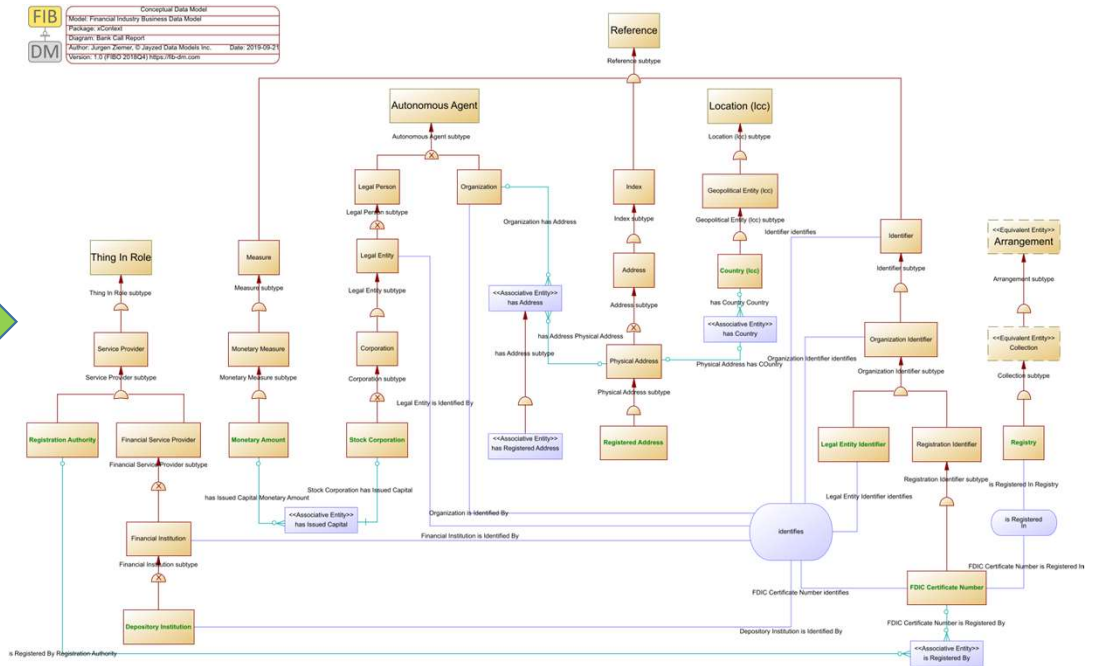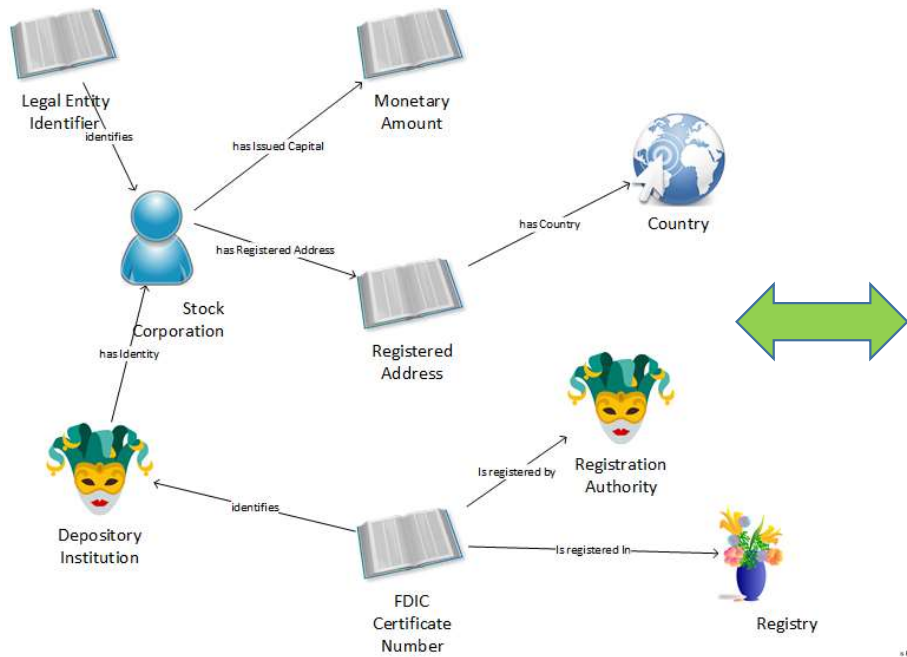
FIB-DM General Public 3.0 vs. Customer License

Topic	Detail	Your current General Public License 3.0	Your upgrade Jayzed Customer License
FIBO Release		2018/Q4	2024/Q2
Domain		Public	Private
Distribution	Original FIB-DM	encouraged	prohibited
	Your FIB-DM derived works	Open Source	Private, not applicable
Number of Entities		1029	3,074
Normative	Foundation	✓	✓
	Business Entities	✓	✓
	Finance, Business & Commerce	✓	✓
	Securities	X	✓
	Derivatives	X	✓
	Indexes & Indicators	X	✓
Informative	LOANS	X	✓
	Funds	X	✓
	Corporate Actions	X	✓
	Market Data	X	✓
	Business Processes	X	✓
Resources	PowerPoints	X	✓
	Videos	X	✓
	Whitepapers	X	✓

Open Source license requires you, to **copyleft**, that is to license your derived models to the **public**.

With a commercial license, you keep FIB-DM extensions **private**.

Likewise, for the public, **all Education materials are subject to copyright**

With a commercial license, you are **free to modify, translate, edit, and even lift off images and diagrams** as long as they remain within your organization.

Financial Industry Business Data Model - summary

- Most comprehensive Enterprise Reference model with 3,074 entities
- Superior Design of a Semantic Data Model
- Extensive documentation of the industry-standard ontology
- Full lineage to the ontology
- Semantic Enterprise Information Architecture
  - Same names, definitions, and design patterns across the enterprise
  - The ontology at the apex includes business-friendly concept maps, derived data, and object models.
  - Unifies semantic and conventional data management

Transparency for your FIB-DM evaluation
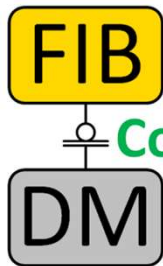
 Explore the PowerDesigner Model
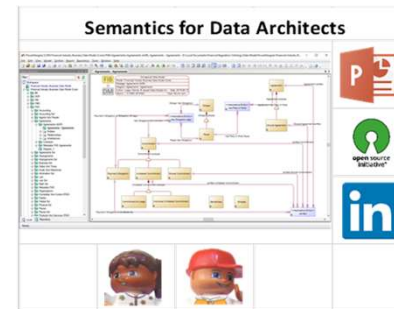
 Study the Education resources
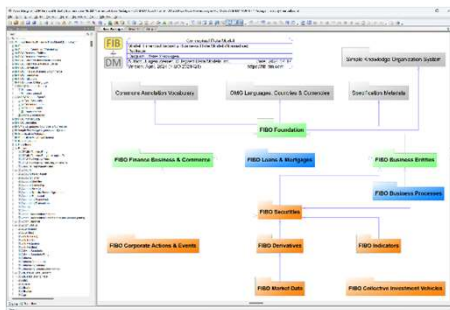
 Examine the 2024/Q2 Full Model content

 Review license, maintenance, and pricing

Version 1.0 Atlantic: CODT meets MS-PowerQuery
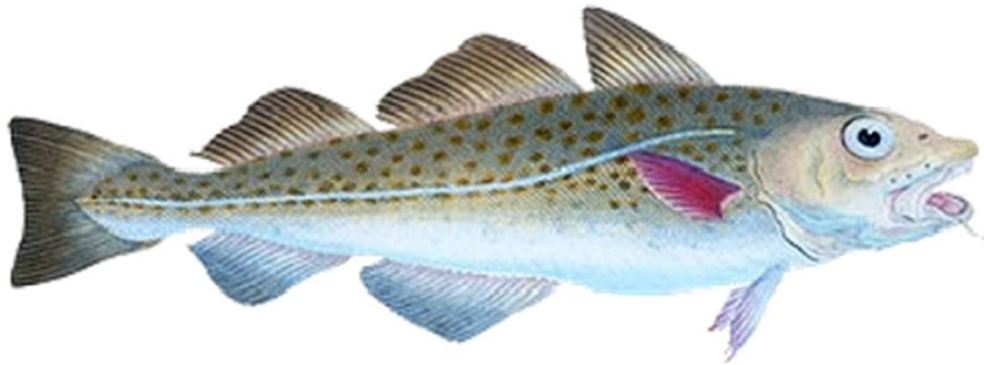
MS-Excel, PowerQuery, and the M-language

The patented technology that created the FIBO Data Model

The old OWL file-parsing-approach doesn't produce usable data models. It can't cope with very large ontologies.

The new ETL approach creates high-quality models. The technology is fully scalable and configurable.

Metadata-Sets (MDS) are keyed records holding properties for all objects in the model. (E.g.. all 4,568 entities)

- Ontology metadata sets hold the record **extracted** from the ontology platform
- Entity-Relationship metadata sets **transform** ontology into ER.
- PowerDesigner (or another tool) metadata sets are ready to **load** into the data modeling tool.

Metadata sets are the novel approach.

XLSX

PowerDesigner
Metadata Set

Step 1

Step 2

Step 2

CSV

Ontology
Metadata Set

Generic
Entity Relationship
Metadata Set

Sparx Enterprise Architect
Metadata Set

Metadata Sets are metadata stored in data sets.

Similar to system tables on a relational database, CODT metadata sets are isomorphic representations of ontology, entity-relationship, and data modeling tool-specific metadata.

The transformation is a two-step process:

Transform Ontology Metadata into generic Entity-Relationship metadata

Transform the Generic ER into Tool specific metadata.

The same generic ER Metadata Set is the source for both PowerDesigner and Sparx EA metadata sets.

Data Architect

Ontologist

Ontology class to data model entity – a journey

Data Architect   Ontologist   https://fib-dm.com   © Jayzed Data Models Inc. 2024

System overview

Microsoft Excel is the tool of choice to view and analyze tabular data, and every data architect has Excel and knows how to use it.

Hence, MS-Excel is not only a fast prototyping tool for the CODT Metadata Sets but also makes the transformation easy to deploy.

Component	Metadata Set	Excel Workbook	
Extraction	Ontology Metadata	Ontology MDS.xlsx	
Transformation	Generic ER Metadata	Entity Relationship MDS.xlsx	
Load	PowerDesigner	PowerDesigner MDS.xlsx	

Any platform and programming language can implement the system, metadata sets, and method.

Data Architect   Ontologist
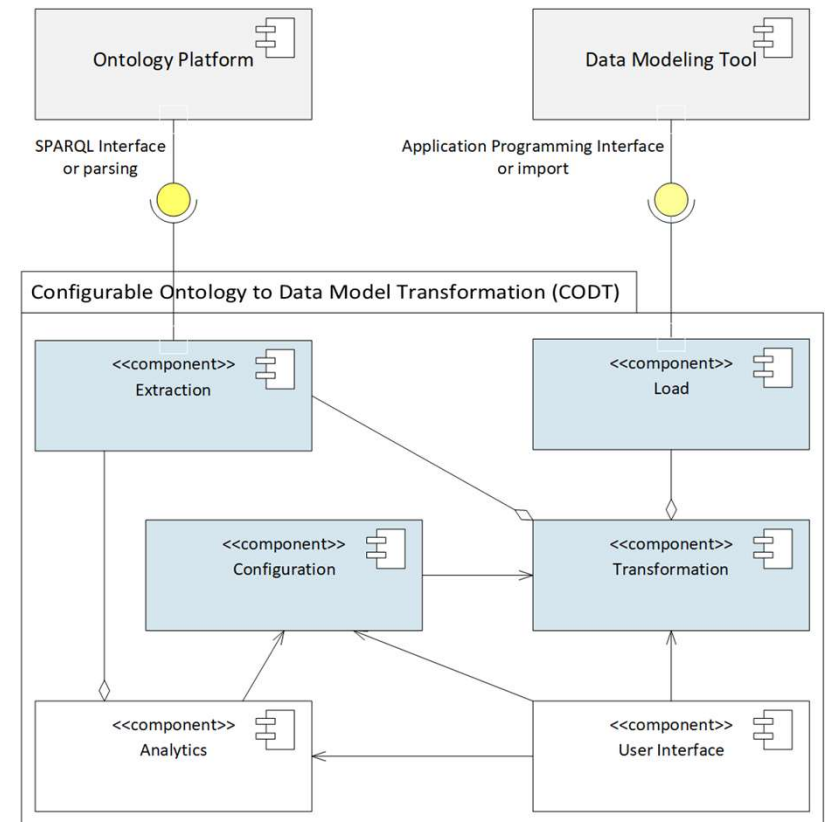
CODT patent drawing FIG.2, System
(in color, numerals removed for clarity)

Extraction with SPARQL queries

```
# Owl Classes.rq
SELECT ?class ?qname ?namespace ?skos_definition
WHERE {
        ?class a owl:Class .
        BIND(afn:namespace(?class) AS ?namespace) .
        FILTER (smf:isBound(?namespace) ).
        BIND (smf:qname(?class) AS ?qname ) .
        OPTIONAL { ?class skos:definition ?skos_definition}
        FILTER (?class NOT IN (owl:Nothing, owl:Thing))
}
```
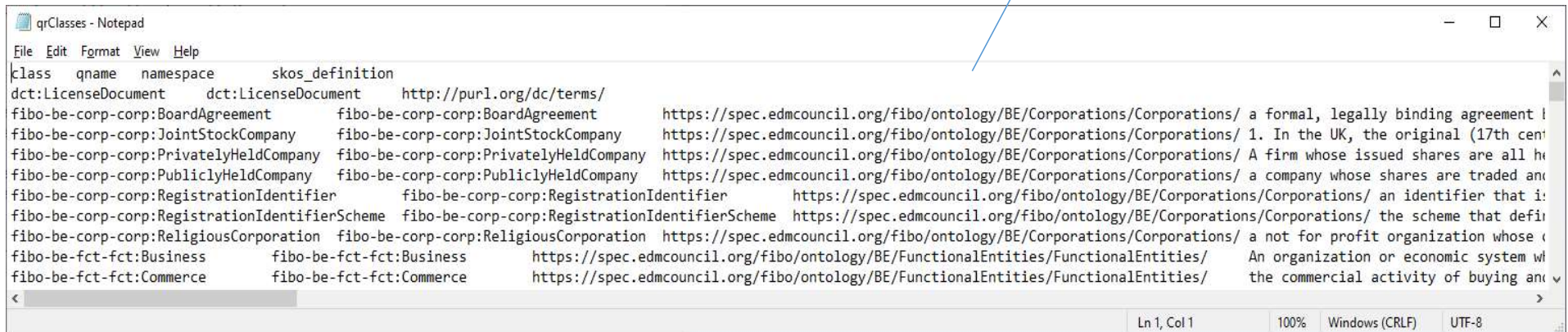
The SPARQL query selects Class, qualified name, namespace, and definition, filtering out unnamed classes.
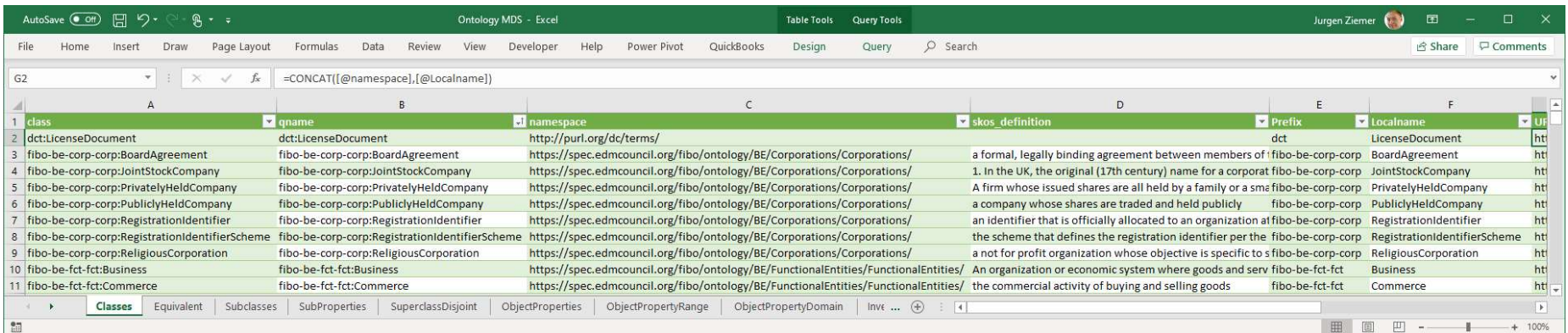
The result set is a CSV file..

qrClasses - Notepad

File Edit Format View Help

```
class    qname    namespace    skos_definition
dct:LicenseDocument      dct:LicenseDocument      http://purl.org/dc/terms/
fibo-be-corp-corp:BoardAgreement      fibo-be-corp-corp:BoardAgreement      https://spec.edmcouncil.org/fibo/ontology/BE/Corporations/Corporations/ a formal, legally binding agreement l
fibo-be-corp-corp:JointStockCompany      fibo-be-corp-corp:JointStockCompany      https://spec.edmcouncil.org/fibo/ontology/BE/Corporations/Corporations/ 1. In the UK, the original (17th cen
fibo-be-corp-corp:PrivatelyHeldCompany  fibo-be-corp-corp:PrivatelyHeldCompany  https://spec.edmcouncil.org/fibo/ontology/BE/Corporations/Corporations/ A firm whose issued shares are all he
fibo-be-corp-corp:PubliclyHeldCompany    fibo-be-corp-corp:PubliclyHeldCompany    https://spec.edmcouncil.org/fibo/ontology/BE/Corporations/Corporations/ a company whose shares are traded an
fibo-be-corp-corp:RegistrationIdentifier        fibo-be-corp-corp:RegistrationIdentifier        https://spec.edmcouncil.org/fibo/ontology/BE/Corporations/Corporations/ an identifier that i
fibo-be-corp-corp:RegistrationIdentifierScheme  fibo-be-corp-corp:RegistrationIdentifierScheme  https://spec.edmcouncil.org/fibo/ontology/BE/Corporations/Corporations/ the scheme that defi
fibo-be-corp-corp:ReligiousCorporation  fibo-be-corp-corp:ReligiousCorporation  https://spec.edmcouncil.org/fibo/ontology/BE/Corporations/Corporations/ a not for profit organization whose
fibo-be-fct-fct:Business        fibo-be-fct-fct:Business        https://spec.edmcouncil.org/fibo/ontology/BE/FunctionalEntities/FunctionalEntities/      An organization or economic system wh
fibo-be-fct-fct:Commerce        fibo-be-fct-fct:Commerce        https://spec.edmcouncil.org/fibo/ontology/BE/FunctionalEntities/FunctionalEntities/      the commercial activity of buying an
```

Ln 1, Col 1   100%   Windows (CRLF)   UTF-8

Extraction: CSV result set into Ontology MDS

The ontology metadata workbook imports the raw extract and performs simple format conversions from the raw result set.

We have the Class, Qualified Name, Namespace, the CODT configured main descriptive annotation property, Prefix, Localname, and FIBO URI. Other Excel tabs, ontology metadata sets for Object Properties, Domain, Range, Sub-class, and Sub-property.

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Excel Power Queries extract into the MDS

Get Data opens Excel Power Query Ribbon.

The Metadata Sets are self-populating - every worksheet has query.

We can refresh (=load) individual or all metadata sets.

The Queries & Connections pane shows the load status (any errors) and the number of records in the MDS.

Transparent transformation rules

Metadata preview

Transformation rules

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4GL Query and transformation language

The data source is the raw SPARQL query result set.

Advanced Editor

csvClass

Display Options ▾ ❓

```
let
    Source = Csv.Document(File.Contents(CODT_HOME & "\Ontology Source\qrClasses.txt"),[Delimiter="  ", Columns=4, Encoding=1252, QuoteStyle=QuoteStyle.None]),
    #"Changed Type" = Table.TransformColumnTypes(Source,{{"Column1", type text}, {"Column2", type text}, {"Column3", type text}, {"Column4", type text}}),
    #"Promoted Headers" = Table.PromoteHeaders(#"Changed Type", [PromoteAllScalars=true]),
    #"Renamed Columns" = Table.RenameColumns(#"Promoted Headers",{{"[class]", "class"}})
in
    #"Renamed Columns"
```

✔ No syntax errors have been detected.

Done   Cancel

Transformation (1): Entity-Relationship MDS

Entity Code is the Class QName

A Formulas transforms the Localname into an entity Name per the Naming convention:
`=UnCamel([@Localname])`

Prefix and Localname split the code

Code	Name	Comment	URI	Prefix	Localname
fibo-be-corp-corp:BoardAgreement	Board Agreement	A formal, legally binding agreement betw	https://spec.edmcouncil.org/fibo/ontolog	fibo-be-corp-corp	BoardAgreement
fibo-be-corp-corp:JointStockCompany	Joint Stock Company	1. In the UK, the original (17th century) na	https://spec.edmcouncil.org/fibo/ontolog	fibo-be-corp-corp	JointStockCompany
fibo-be-corp-corp:PrivatelyHeldCompany	Privately Held Company	A firm whose issued shares are all held by	https://spec.edmcouncil.org/fibo/ontolog	fibo-be-corp-corp	PrivatelyHeldCompany
fibo-be-corp-corp:PubliclyHeldCompany	Publicly Held Company	A company whose shares are traded and t	https://spec.edmcouncil.org/fibo/ontolog	fibo-be-corp-corp	PubliclyHeldCompany
fibo-be-corp-corp:RegistrationIdentifier	Registration Identifier	An identifier that is officially allocated to	https://spec.edmcouncil.org/fibo/ontolog	fibo-be-corp-corp	RegistrationIdentifier
fibo-be-corp-corp:RegistrationIdentifierScheme	Registration Identifier Scheme	The scheme that defines the registration	https://spec.edmcouncil.org/fibo/ontolog	fibo-be-corp-corp	RegistrationIdentifierScheme
fibo-be-corp-corp:ReligiousCorporation	Religious Corporation	A not for profit organization whose object	https://spec.edmcouncil.org/fibo/ontolog	fibo-be-corp-corp	ReligiousCorporation
fibo-be-fct-fct:Business	Business	An organization or economic system wher	https://spec.edmcouncil.org/fibo/ontolog	fibo-be-fct-fct	Business
fibo-be-fct-fct:Commerce	Commerce	The commercial activity of buying and sell	https://spec.edmcouncil.org/fibo/ontolog	fibo-be-fct-fct	Commerce

A Power Query with the Ontology MDS as its source populates metadata.
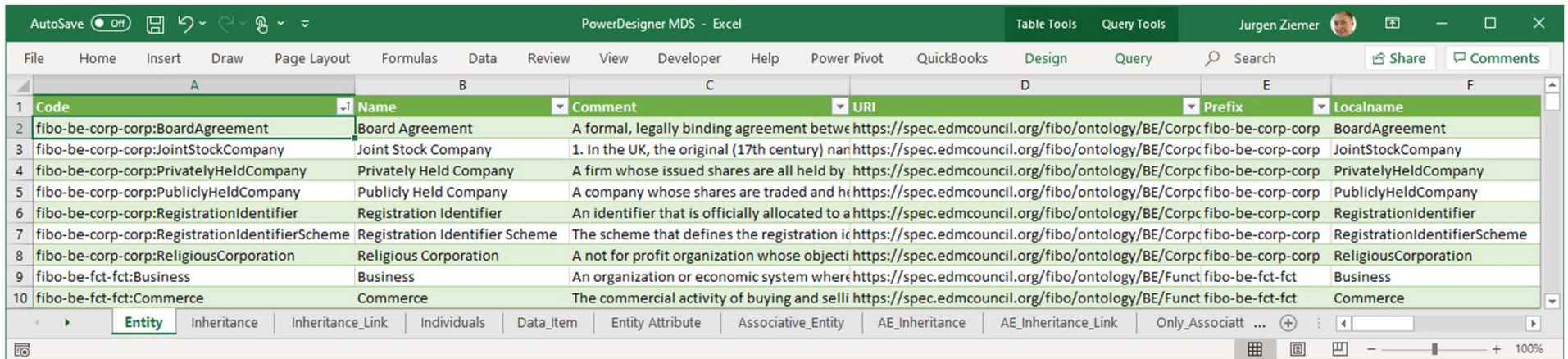
Transformation (2): Tool-specific MDS

The second transformation step converts the generic Entity-Relationship into a data modeling tool-specific metadata set. In this case, PowerDesigner can directly import this MDS.

For entities, the transformation is a simple copy of the Entity-Relationship MDS.

Load: The data modeling tool imports the MDS

There are 24 MDS for PowerDesigner Excel imports

MDS columns map to metamodel objects

Stacked queries and ETL master the complexity

Query Dependencies

Ontology Metadata Set

Entity-Relationship Metadata Set

CODT Metadata sets for Ontology and generic ER implemented in two Excel workbooks, Power Query data sources and tables.

Intermediate MDS

Interface MDS
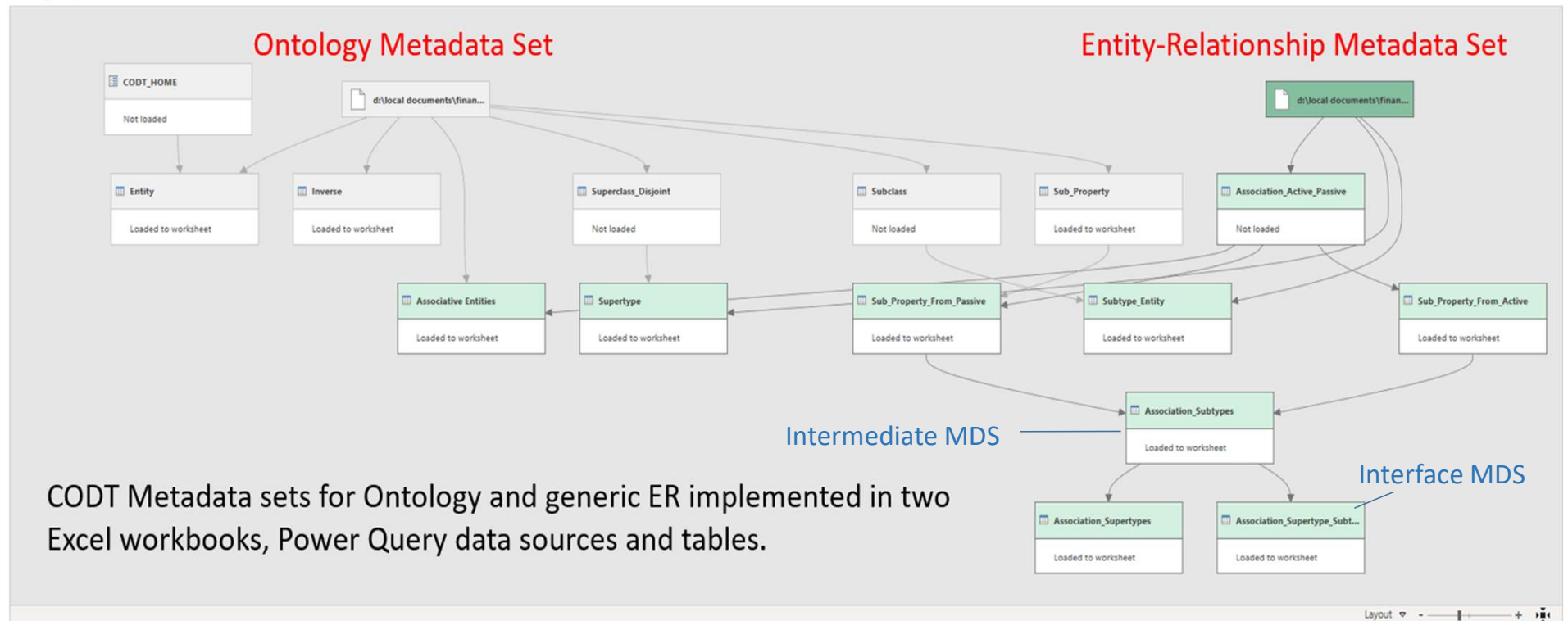
Data Architect   Ontologist   https://fib-dm.com   © Jayzed Data Models Inc. 2024

CODT Excel Power Query Statistics
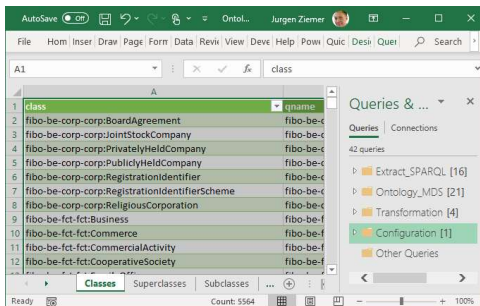
The MDS folder holds queries that provide the interface for metadata sets in the next transformation step.

	Interface	Intermediate	Total
Ontology	21	20	41
Entity-Relationship	24	58	82
Data Model	23	4	27
		Total	**150**

Plus 18 SPARQL query templates

CODT is a white box, an open book. The Excel version software fully discloses all worksheets, queries, and VBA code.

New users and operators can generate with a single click, using default configuration settings.
As a Data Architect, you use CODT as an ETL and development platform, diagnosing results and tweaking transformation rules for your modeling and naming standards.

VBA developers may secure the data sheets, fully automate Extract and Load, or port the application.

CODT Embodiments

The CODT license includes the right to use protected intellectual property, metadata sets, and algorithms. For full production SEIA, you can automate interfaces, and encode the patented embodiments below.

Implementation Embodiments								
Ontology Source			Transformation System			Data Model		
Type	Subtype	Extraction	OS	Application type	User Interface	Data Model Type	Modeling Tool	Tool Interface
Ontology platform	Development Platform	SPARQL	MS Windows	MS-Excel	White Box	Conceptual	Power Designer	Import
	RDF Store, Semantic Endpoint					Logical	Sparx EA	
RDF/OWL files	Local	Parser	Unix	ETL	Guided	Physical	Other	API
	World Wide Web			Program		Object		

CODT patent Table 14, Embodiments (color added for clarity)

Create a connection to your RDF Store and run the queries in a batch.

Move CODT server-side.

Hold the metadata sets on your RDBMS. Transform with your ETL tooling rather than M.

Create a UI for operators and configuration wizards

Generate other models

Load directly using your data modeling tool or repository API

Finance key point

Reverse mode embodiment, claims 10 & 16

The CODT Metadata Sets are bi-directional.
CODT can reverse-engineer ontologies from Data Models!

RDF   OWL

Extract → Transform → Load →

1. The Data Modeling generates List Reports matching the Data Modeling tool-specific MDS.
2. The Power Query populates the Metadata sets, performing basic data cleansing.

The Entity-Relationship Metadata Sets populate from tool-specific metadata set.

1. The Ontology MDS populates from the Entity-Relationship MDS.
2. Power Queries and formulas break the data set down into triples.
3. We load in triples into the ontology platform, using SPARQL CONSTRUCT or bulk insert.

Reverse example: Extract from PowerDesigner
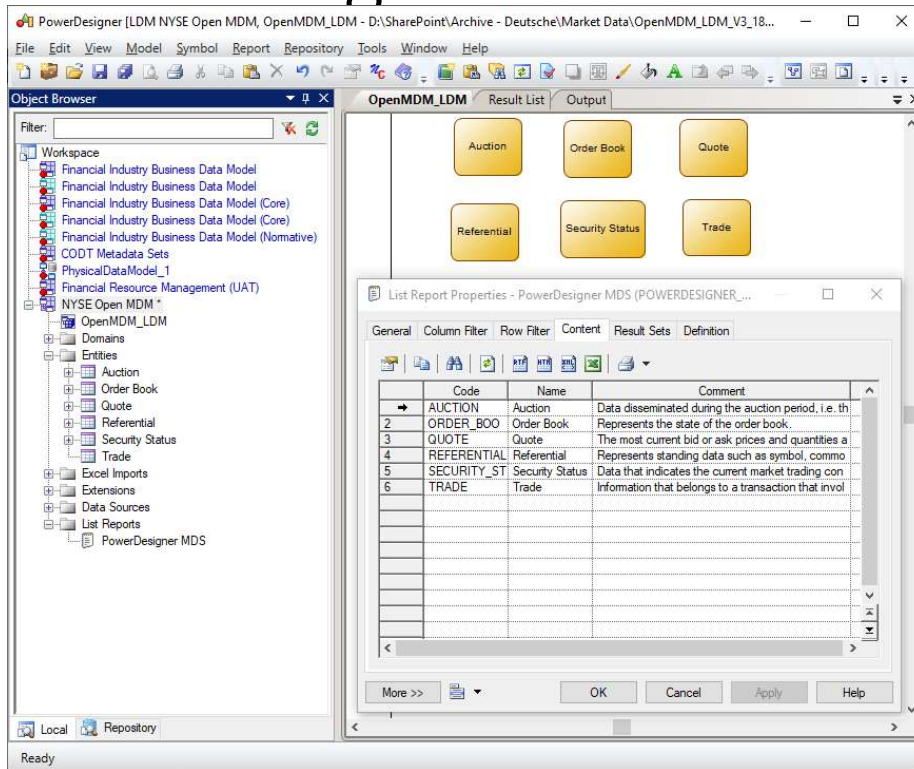
Our example is Logical Data Model created from the New York Stock Exchange's OpenMAMA messaging API.

The PowerDesigner Entity list report has Code, Name, and Comment. The PowerDesigner MDS sources the list report
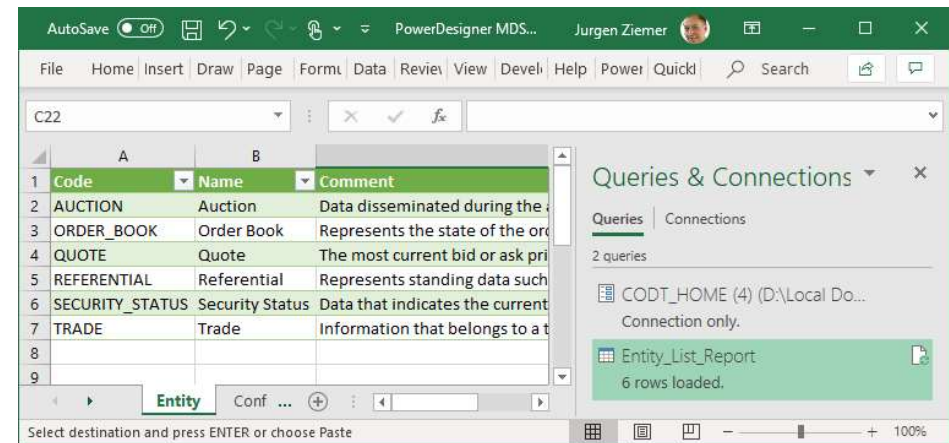
Transform in the Entity-Relationship MDS

The Metadata Set populates from the PowerDesigner Entity MDS

Prefix and URI are configuration settings matching the designated prefix and namespace of the ontology

The Entity Name transforms to Localname with a Camel Code string function

The Resource Name is a concatenation of Prefix, delimiter, and Localname

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Load into ontology

A query populates the Class metadata set from the Entity MDS

Triple, "T_" metadata sets break down the class record into subject, predicate, and object.

The triple match the SPARQL SELECT joins

subject	predicate	object
fib-omds:Auction	rdf:type	owl:Class
fib-omds:OrderBook	rdf:type	owl:Class
fib-omds:Quote	rdf:type	owl:Class
fib-omds:Referential	rdf:type	owl:Class
fib-omds:SecurityStatus	rdf:type	owl:Class
fib-omds:Trade	rdf:type	owl:Class

```
# Owl Classes.rq
SELECT ?class ?qname ?namespace
?skos_definition
WHERE {
    ?class a owl:Class .


OPTIONAL {
    ?class skos:definition ?skos_definition}

}
```

subject	predicate	skos_definition
fib-omds:Auction	skos:definition	Data disseminated during the auction period, i.e. the period of time when there is no automatic execution on an order book. This also includes indicative data and, where relevant, imbalance data sent during the process that matches orders at the end of an auction and determines the final auction price
fib-omds:OrderBook	skos:definition	Represents the state of the order book.
fib-omds:Quote	skos:definition	The most current bid or ask prices and quantities at which the instruments can be bought or sold. The bid quote shows the price and quantity at which a current buyer is willing to purchase the instruments, while the ask shows what a current participant is willing to sell the instruments for.
fib-omds:Referential	skos:definition	Represents standing data such as symbol, commodity, and exchange information and any pertinent information about the contract terms. Prior trading period closing/settlement prices can also be disseminated in this event type. Typically this represents static data.
fib-omds:SecurityStatus	skos:definition	Data that indicates the current market trading condition of an individual security, for example, if trading in the security is suspended. This identifies phase transitions in the venue's market model.
fib-omds:Trade	skos:definition	Information that belongs to a transaction that involves the selling and purchasing of a tradable instrument

Ontologist

Assert the triple in the Ontology Platform

Definitions

Loaded Classes

SPARQL CONSTRUCT

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Bi-directional model transformation enables SEIA

We **generate** data models from industry/domain and our proprietary ontologies. Design conceptual models in RDF/OWL.

ATLANTIC CODT

FIB**O**

Industry

In-house

FIB-**D**M

Enterprise

Project

We **reverse-engineer** our data models to extend the enterprise and project ontologies.
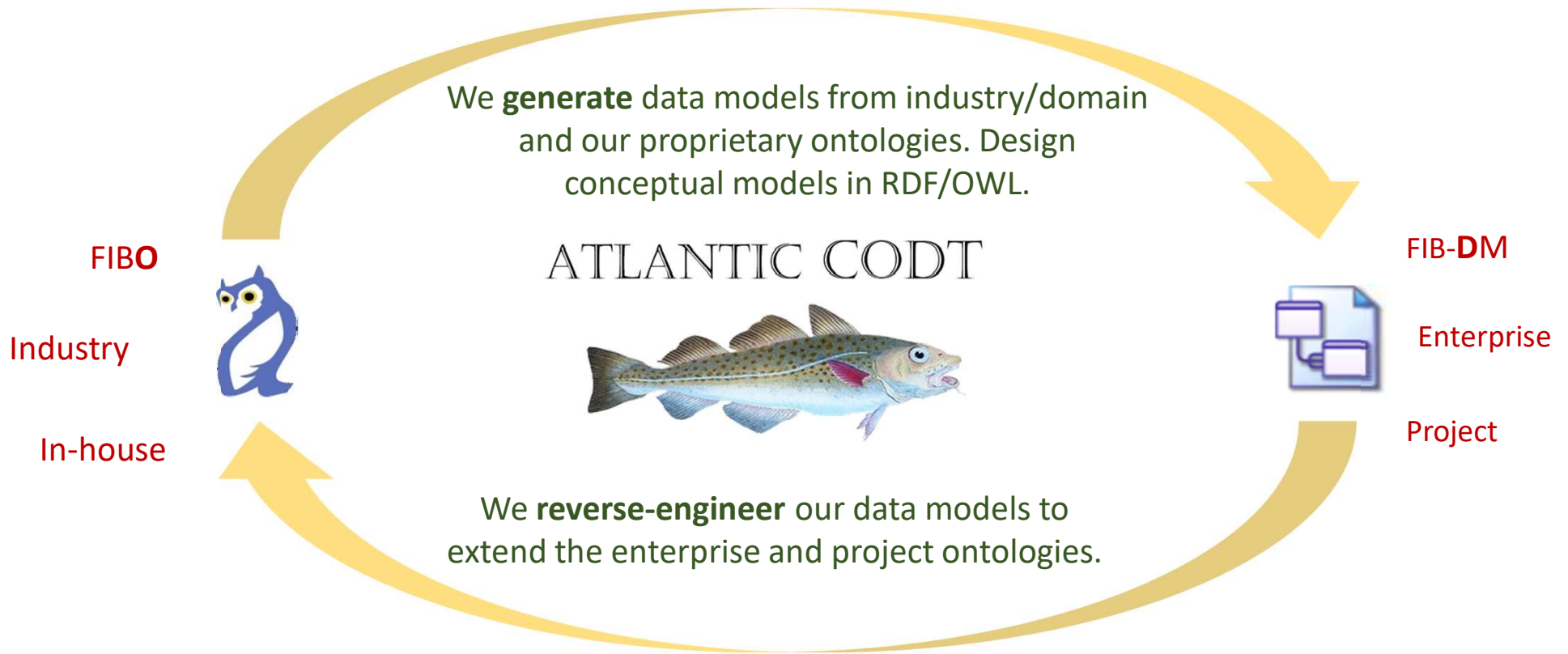
US Patent & Trademark Office publication

With 23 drawings, 19 tables, and 35 pages of specification, the patent fully discloses the invention.

Sixteen claims comprehensively cover the method, system, non-transitory storage medium, and all embodiments.

The patent protects CODT licensees and generated models, including FIB-DM.

United States of America

Configurable Ontology to Data model Transformation Patent

https://fib-dm.com/patent/

License Agreement

- FIB-DM licensees can purchase CODT as an **add-on.**
- New users can license **FIB-DM + CODT bundle**.

- (There is no standalone CODT license.)
- Jayzed already holds the copyright to the FIBO Data Model.

- **Educations Resources** are included.
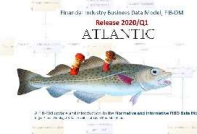
- You are free to modify, translate, edit, and even lift off images and diagrams as long as they remain within your organization.

- **Software** deliverable are the MS-Excel CODT Workbooks.
- The site license doesn't limit the number of users.

  - You are free to modify the software and to create new models for internal use.
  - Just like your FIB-DM license, you must keep derived models confidential.

- The license covers the **intellectual property**.

- You are free to leverage metadata sets, queries, formulas and algorithms disclosed in source code, and the specification for internal development.
- You must not share CODT embodiments.

Pricing

Licenses are priced for institution size, using your EDM Council membership tier as a segment.

Line of Business	Metric	Tier A	Tier B	Tier C
Sell Side	Consolidated Capital	$10B+	$500M-$10B	<$500M
Buy Side	Assets under Management	$200B+	$50B-$200B	<$50B
Custody	Assets under Custody	$1,000B+	$100B-$1,000B	<$100B

https://fib-dm.com/full-data-model-upgrade/

The add-on price for existing FIB-DM licensees is two-thirds of your data model license. E.g. $10,000 for a Tier C bank. The bundle price for new users is 1.5 times the standalone FIB-DM.

Central Banks, Multilateral Lenders, and other qualifying financial institutions get the Tier C price (without further discounts, irrespective of asset size.

Large commercial lenders and investment companies can get the *early adaptor* or *stimulus* discount.

Finance key point

Proof of Concept (POC) - overview

The Proof of Concept is an offer to try, test, and evaluate CODT free of charge.

Scope	SEIA is a huge enterprise transformation.
	FIB-DM already proves that CODT creates the superior data model.
Objective	Prove that CODT works for your FIBO extensions.
	Test the application
	Evaluate the Intellectual Property
Materials	MS-Excel Workbooks
	Education materials
	Patent (for Legal and Compliance to assess)
Training & Support	Two Days Training (online video conference)
	Three Days support (emails)

Finance key point

Assemble your Proof of Concept Team

Management, Finance, or business sponsor. You are authorized to sign non-disclosure and license agreements.

Ontologist with an in-depth understanding of the FIBO and in-house ontologies. You adapt the queries to your SPARQL dialect and produce the raw ontology metadata .

Data Architect, with experience in Enterprise Reference models. You configure CODT to match your naming standards, and load metadata sets into the data modeling tool

Developer / MS-Excel Power User experienced in VBA, Power Query, and the M-Language. You can troubleshoot complex formulas and queries, and explore technical embodiments.

Finance key point

Proof of Concept – technical preparation

Financial Industry Business Ontology

- Power PC (32 GB Ram), Windows 10 (64 bit), MS Excel, and MS PowerQuery
- Ontology Platform with SPARQL Query User interface: Topbraid Composer, Protégé, or RDF-Store/Semantic Endpoint.
- SAP PowerDesigner (PD) data modeling tool. If you have ERWin or other modeling tools, use PD trial first and import the data model. Later, you may customize CODT to import into your tool.

- The FIBO loaded in you Ontology Platform. Before the POC try the Entity Query and reproduce the raw metadata extract.
- Your proprietary ontology should be an extension of the FIBO. Make sure, to include FIBO modules and have a prefix defined for your namespaces. E.g.:
`@prefix br-bank-model: <http://bankontology.com/br/Bank_model.ttl#> .`
- The Entity Query must return FIBO alongside your classes with prefix.

Data Architect   Ontologist

Proof of Concept typical six-week timeline

ID	Task Name	Start	Finish	Duration	Sep 2020			Oct 2020				Nov 2020		
					9-13	9-20	9-27	10-4	10-11	10-18	10-25	11-1	11-8	11-15
1	CODT POC	2020-09-17	2020-11-04	34d										
2	Preparation	2020-09-17	2020-09-30	10d										
3	Lick-off	2020-10-01	2020-10-01	0d										
4	Hands-on training	2020-10-01	2020-10-09	7d										
5	Entity end-to-end	2020-10-01	2020-10-02	2d										
6	Associations	2020-10-05	2020-10-06	2d										
7	Data Property	2020-10-07	2020-10-07	1d										
8	Packages	2020-10-08	2020-10-08	1d										
9	Annotations	2020-10-09	2020-10-09	1d										
10	Transform FIBO	2020-10-12	2020-10-16	5d										
11	Extract Ontology Matadata	2020-10-12	2020-10-13	2d										
12	Transform E/R Metadata	2020-10-14	2020-10-15	2d										
13	Load into DM tool	2020-10-16	2020-10-16	1d										
14	Transform Your Extensions	2020-10-19	2020-10-22	4d										
15	Explore Configurations	2020-10-23	2020-10-27	3d										
16	Explore embodiments	2020-10-28	2020-10-30	3d										
17	Wrap-up	2020-11-02	2020-11-03	2d										
18	POC Complete	2020-11-04	2020-11-04	0d										

POCs are rolling with maximal two banks at a time.

Two weeks are for introduction into CODT and transforming the FIBO as a POC.

We repeat the transformation exercise with the addition of your proprietary ontologies.
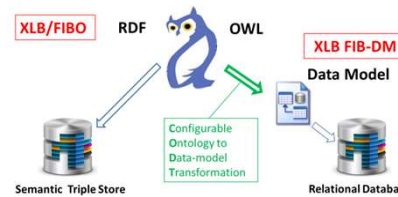
You can explore configuration changes and other embodiments
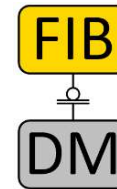
Finance key point

Summary and conclusion

The Semantic COE and Ontologies must not become another silo.

Our vision is Semantic Enterprise Information Architecture (SEIA).

The FIBO is the industry standard.

FIB-DM is the superior industry-standard Data Model.

CODT leverages the ontology for Data Management
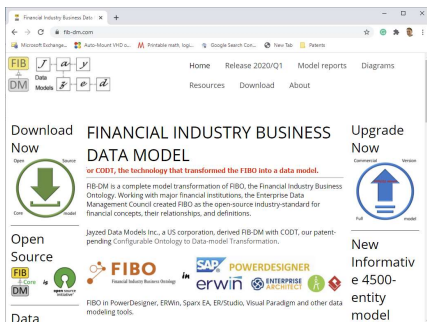
Copyrights and Patents protect your investment.
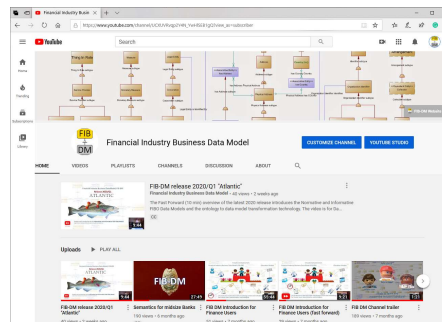
Next step: Discuss a CODT POC

Send an email to jziemer@jayzed.com, "CODT POC" to have an overview and discussion with your Q&A. You need a team and executive sponsor to sign off on NDAs.
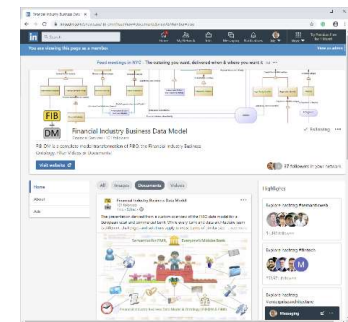
Find further resources on the FIB-DM website, the YouTube Education Channel and follow the LinkedIn showcase for news, updates, and discussion.

https://fib-dm.com/

https://www.youtube.com/c/fibdm

https://www.linkedin.com/showcase/fib-dm/

Finance key point