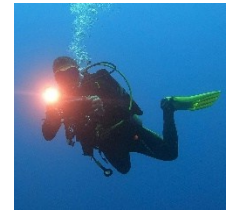
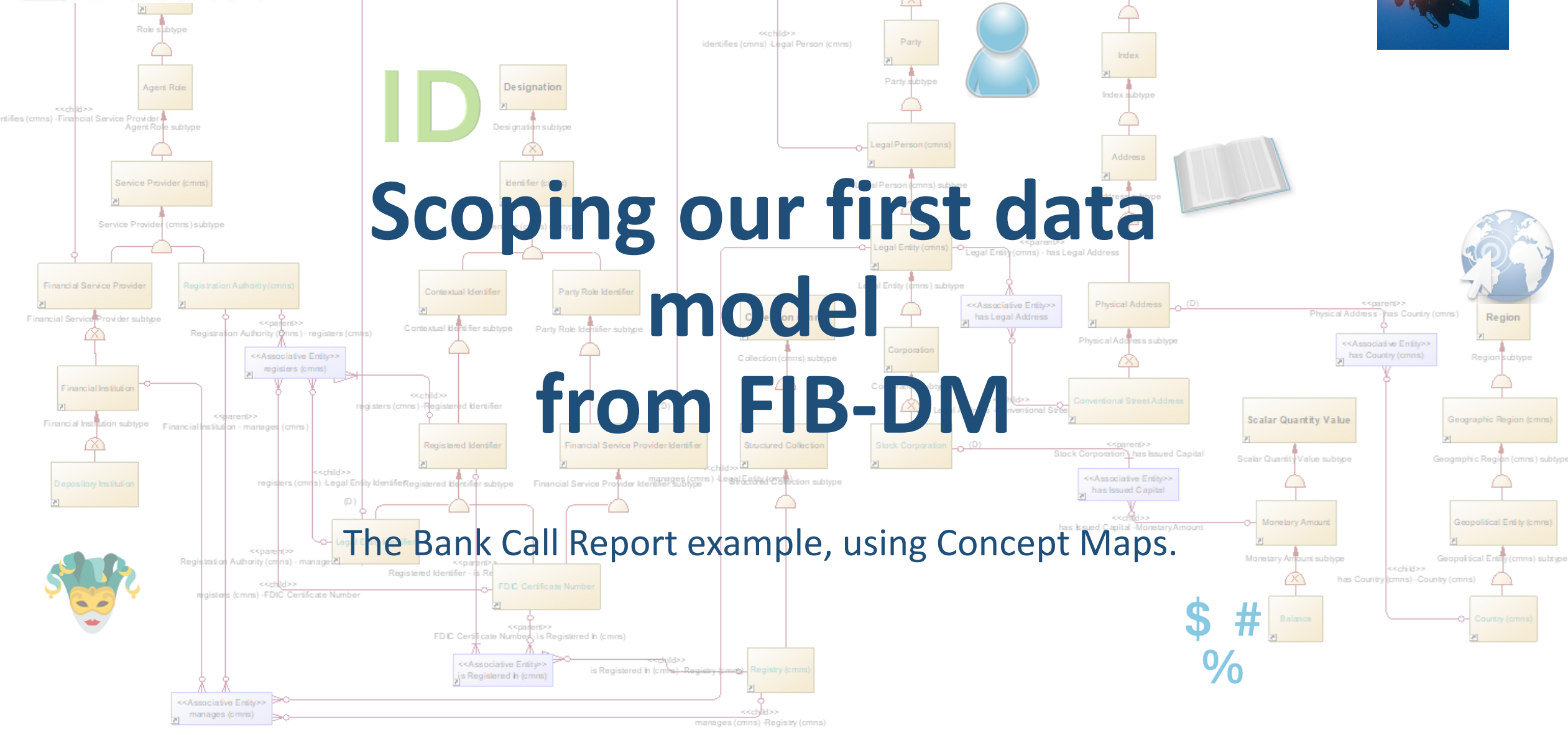


Financial Industry Business Data Model (FIB-DM)

ID

Scoping our first data model from FIB-DM

The Bank Call Report example, using Concept Maps.



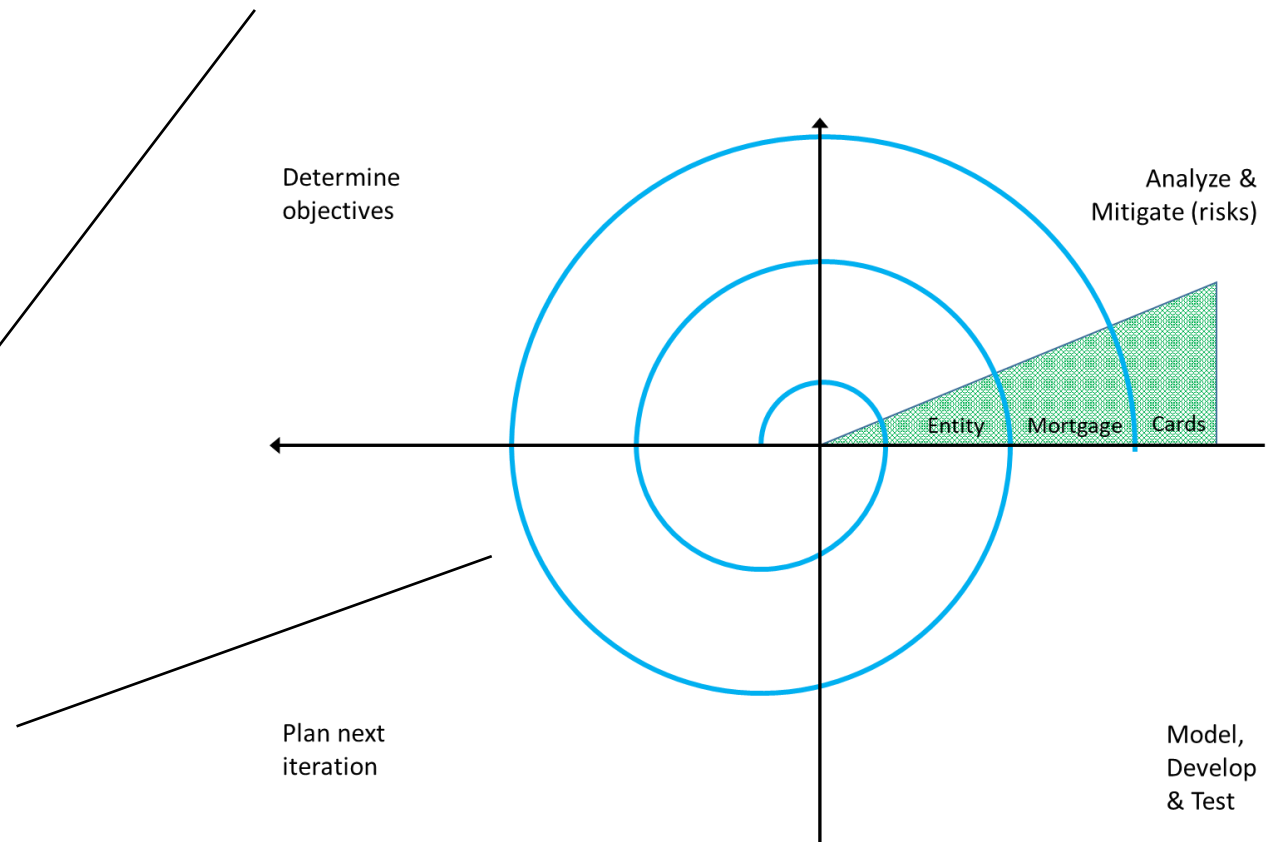
\$ # %

Solution Architecture is middle-out



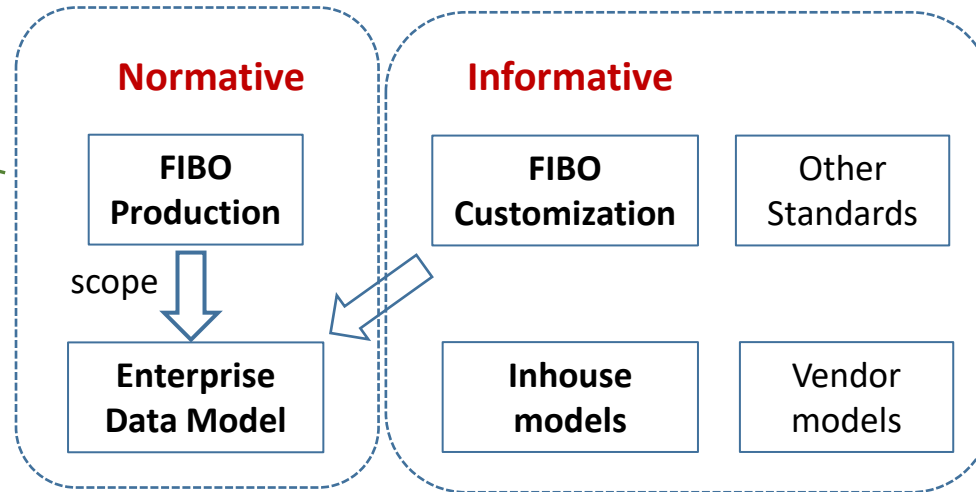
Focus on FIB-DM packages (FIBO modules) for the project – not the whole model.

Implementation is iterative, not a waterfall.



Departments and projects leverage and derive

We adhere to the industry-standard

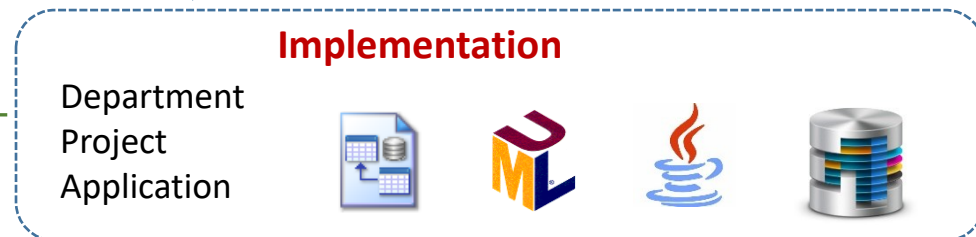


We consult other models

derive

Our method is to derive

Our goal is leverage



To derive a project model means scoping

FIB-DM has more than 3,000 entities.

We don't need a giant model for our project or even department.

We certainly won't create 3,000 tables (most of them empty) on our RDBMS.

So, we “cut,” we extract a subset model from FIB-DM that comprises only the required entities.



In PowerDesigner, we create a new Package for our project, and add required (=scoped) entities to it and its diagram.



In ERWin, we create a new Subject Area.

In both cases, we generate a new Project Logical Data Model (LDM) from our scope. Subsequent iterations scope additional content and merge into the Project LDM.



FIB-DM training

Scoping is an advanced class for Data Architects.

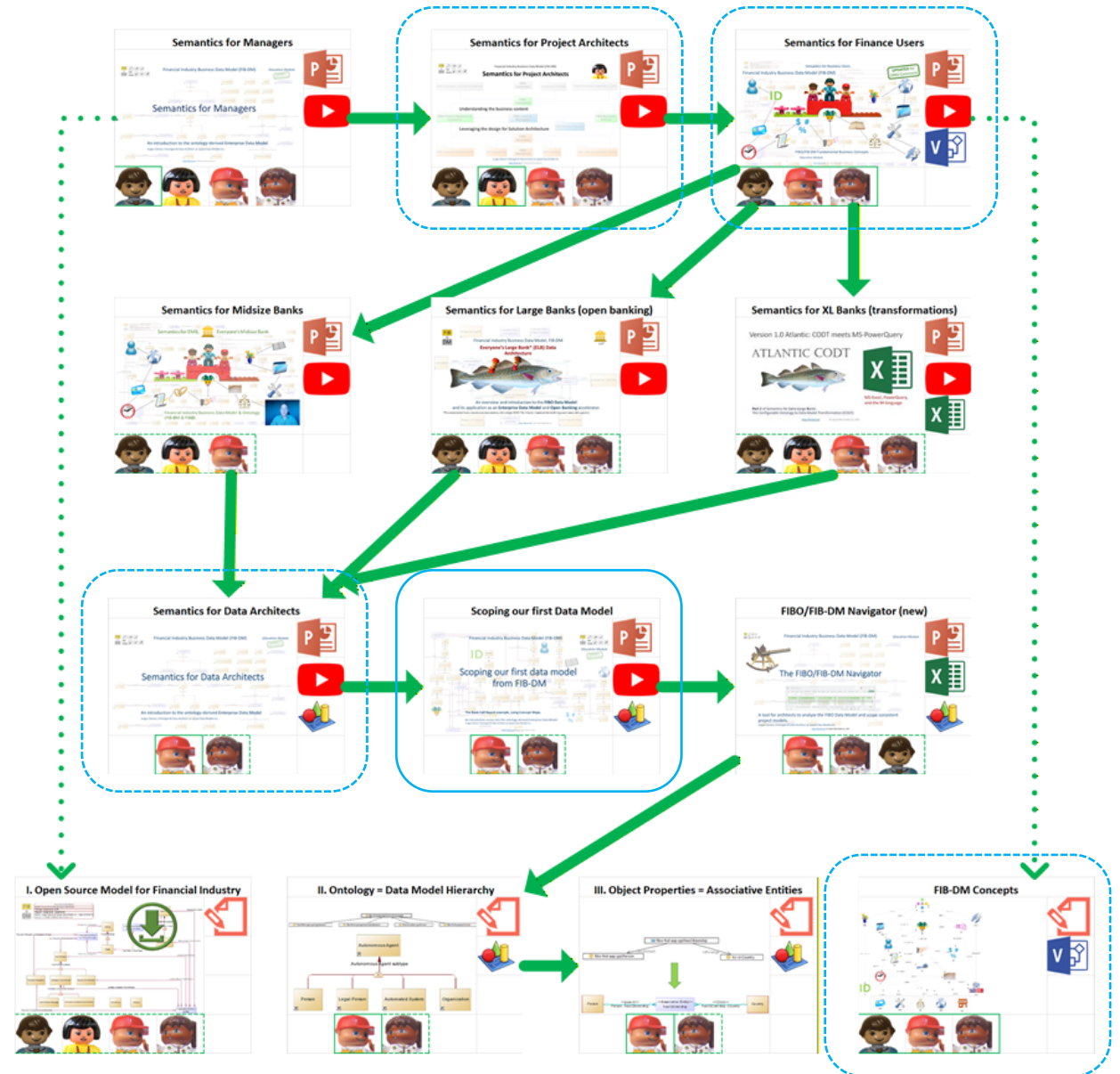
Semantics for Project Architects sets the stage.

The previous deep-dive classes are prerequisites for understanding this lecture:

Semantics for Finance Users explains FIB Concept Maps.

Semantics for Data Architects teaches the structure of the FIBO Data Models.

The FIB-DM concepts article is a reference.



Finance key point

Audience and content



Project Data Architect/Modeler experienced in Enterprise Reference models. You may have used FIBO design patterns and definitions.



Finance users and subject matter experts define the scope. **Project Managers** want to understand the process.



Ontologists follow the same approach when scoping an operational ontology from the FIBO. Ontology and data model are in sync - the project scope is the same.

This class is a hands-on exercise. You can follow the steps in PowerDesigner or your modeling tool.

- Example: FDIC Bank Call Report reference data
- We use eight of the FIB Fundamental Supertypes to create a concept map.
- Transpose the concept map to a Data Model subject area
- Review the conceptual data model and compare it to the ontology graph



US Bank Call Report

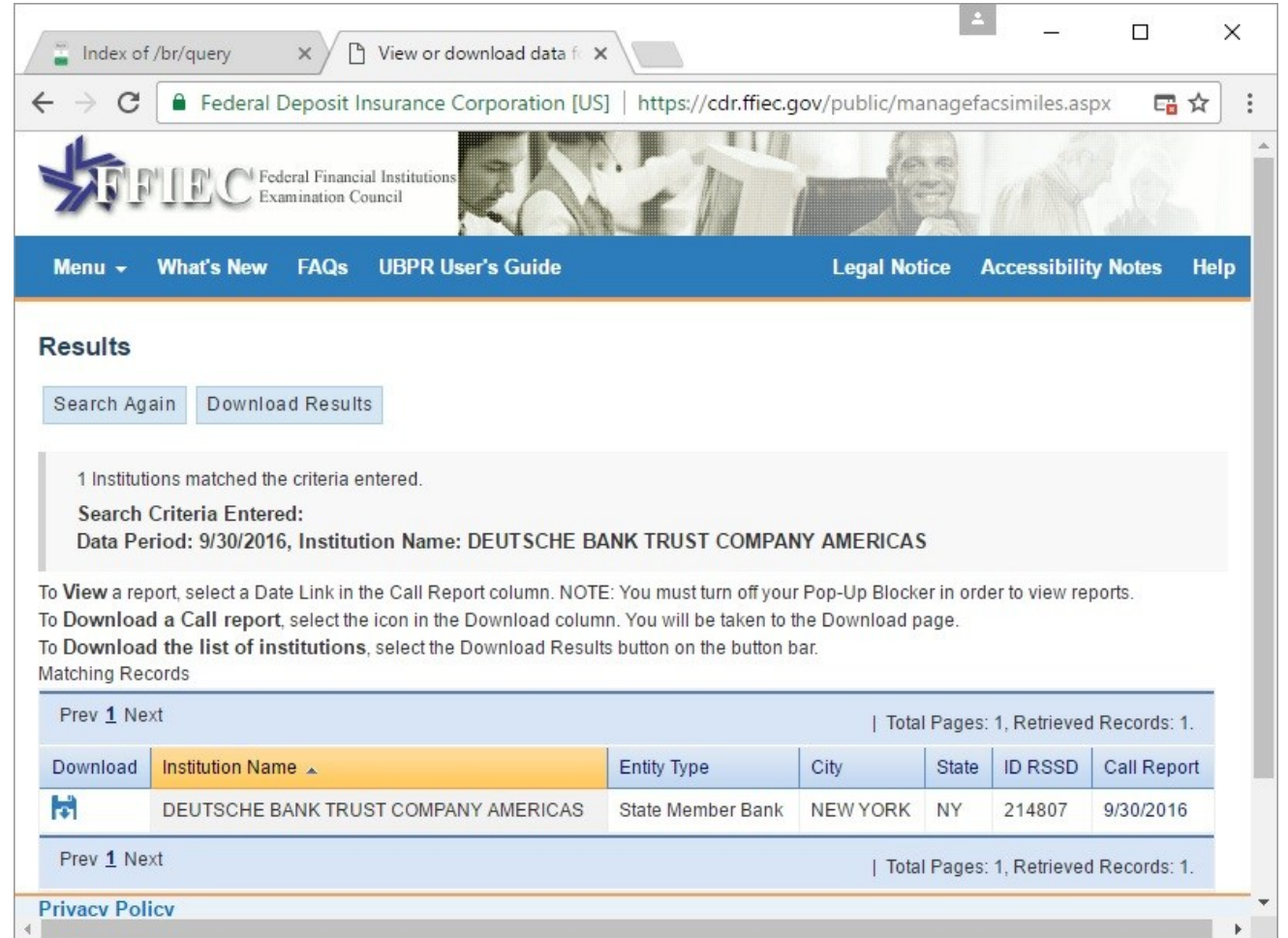
The Federal Deposit Insurance Corporation is a regulator of U.S. banks.

One of the key reports required for filing is the quarterly Consolidated Report of Condition and Income, commonly referred to as the call report or RC report.


The Federal Financial Institutions Examination Council (FFIEC) publishes the XBRL taxonomy and bank filings.

You can view and download Call Report submissions on the FFIEC website:

<https://cdr.ffiec.gov/public/>



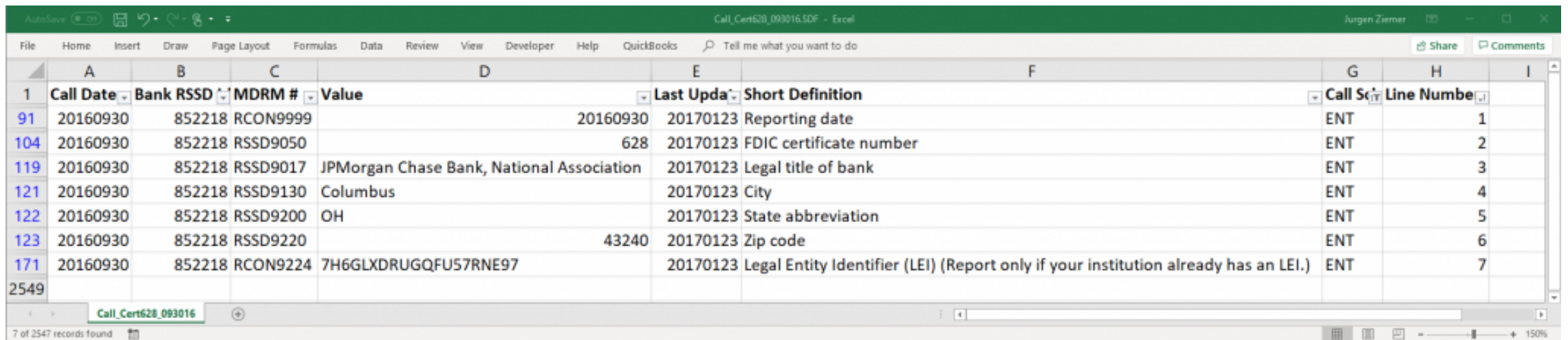
The screenshot shows a web browser window with the FFIEC website. The page title is "Index of /br/query" and the URL is "https://cdr.ffiec.gov/public/managefacsimiles.aspx". The FFIEC logo and name "Federal Financial Institutions Examination Council" are visible. A navigation menu includes "Menu", "What's New", "FAQs", "UBPR User's Guide", "Legal Notice", "Accessibility Notes", and "Help". The "Results" section shows "1 Institutions matched the criteria entered." and "Search Criteria Entered: Data Period: 9/30/2016, Institution Name: DEUTSCHE BANK TRUST COMPANY AMERICAS". Below this, there are instructions for viewing and downloading reports. A table of "Matching Records" is displayed with the following data:

Download	Institution Name	Entity Type	City	State	ID RSSD	Call Report
	DEUTSCHE BANK TRUST COMPANY AMERICAS	State Member Bank	NEW YORK	NY	214807	9/30/2016



Call Report Schedule ENT – reference data

The Entity Schedule (ENT) contains reference data for the reporting Bank. For this exercise, our data requirements are the Entity schedule data items, plus additional reference data about the FDIC, already in the FIBO.



	A	B	C	D	E	F	G	H	I
1	Call Date	Bank RSSD	MDRM #	Value	Last Update	Short Definition	Call Schedule	Line Number	
91	20160930	852218	RCON9999		20160930	20170123	Reporting date	ENT	1
104	20160930	852218	RSSD9050		628	20170123	FDIC certificate number	ENT	2
119	20160930	852218	RSSD9017	JPMorgan Chase Bank, National Association		20170123	Legal title of bank	ENT	3
121	20160930	852218	RSSD9130	Columbus		20170123	City	ENT	4
122	20160930	852218	RSSD9200	OH		20170123	State abbreviation	ENT	5
123	20160930	852218	RSSD9220		43240	20170123	Zip code	ENT	6
171	20160930	852218	RCON9224	7H6GLXDRUGQFU57RNE97		20170123	Legal Entity Identifier (LEI) (Report only if your institution already has an LEI.)	ENT	7
2549									

The example shows JPMorgan Chase Bank, NA submission with call date, ID, data item, value, definition, call schedule, and line number.



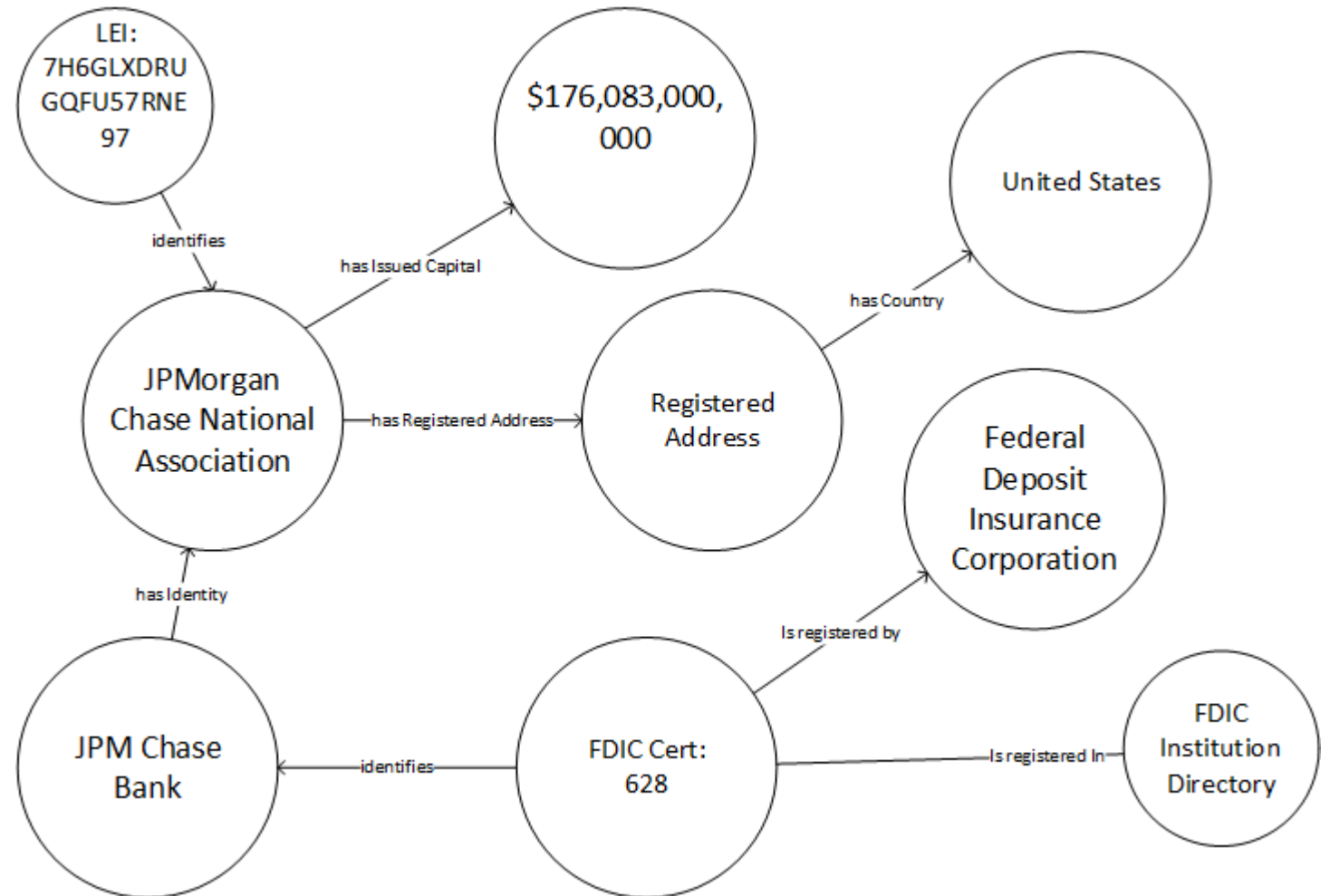
A simple diagram of our sample data

FDIC Certificate 628 identifies JPM Chase as a registered bank. The Certificate is registered in the FDIC Institution Directory.

The FDIC registers the Certificate. JPMC has the legal identity of JPMC NA. Note the distinction of what JPMC is – a legal entity, and what JPM Chase Bank does – taking deposits.

The Legal Entity has a registered address in the US.

JPMC NA has a Legal Entity Identifier (LEI). The corporation has \$176 billion in issued capital.



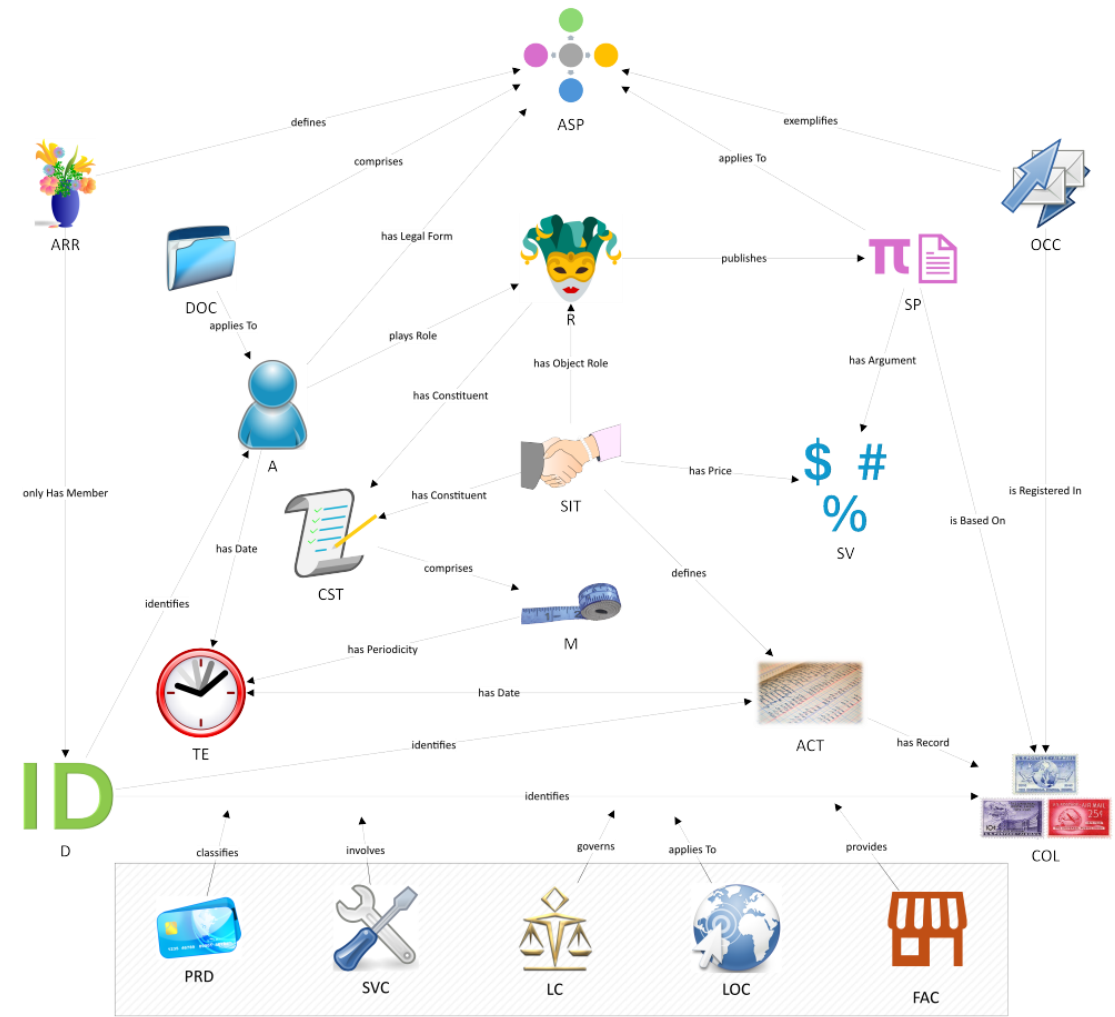
15 Fundamental Business Concepts

In our second step, we conceptualize our sample data items. That means to assign fundamental business concepts and their specializations.

The fifteen concepts are extensive ultimate supertypes in the Financial Industry Business Data Model. In other words, they have the most subtypes and the most relationships.

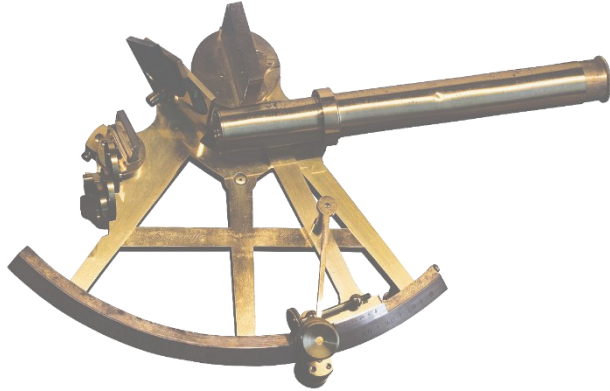
In the FIBO ontology, the fundamental fifteen concepts are direct subclasses of the Thing.

We use abbreviations and icons as mnemonics to teach the concepts to modelers and business users.

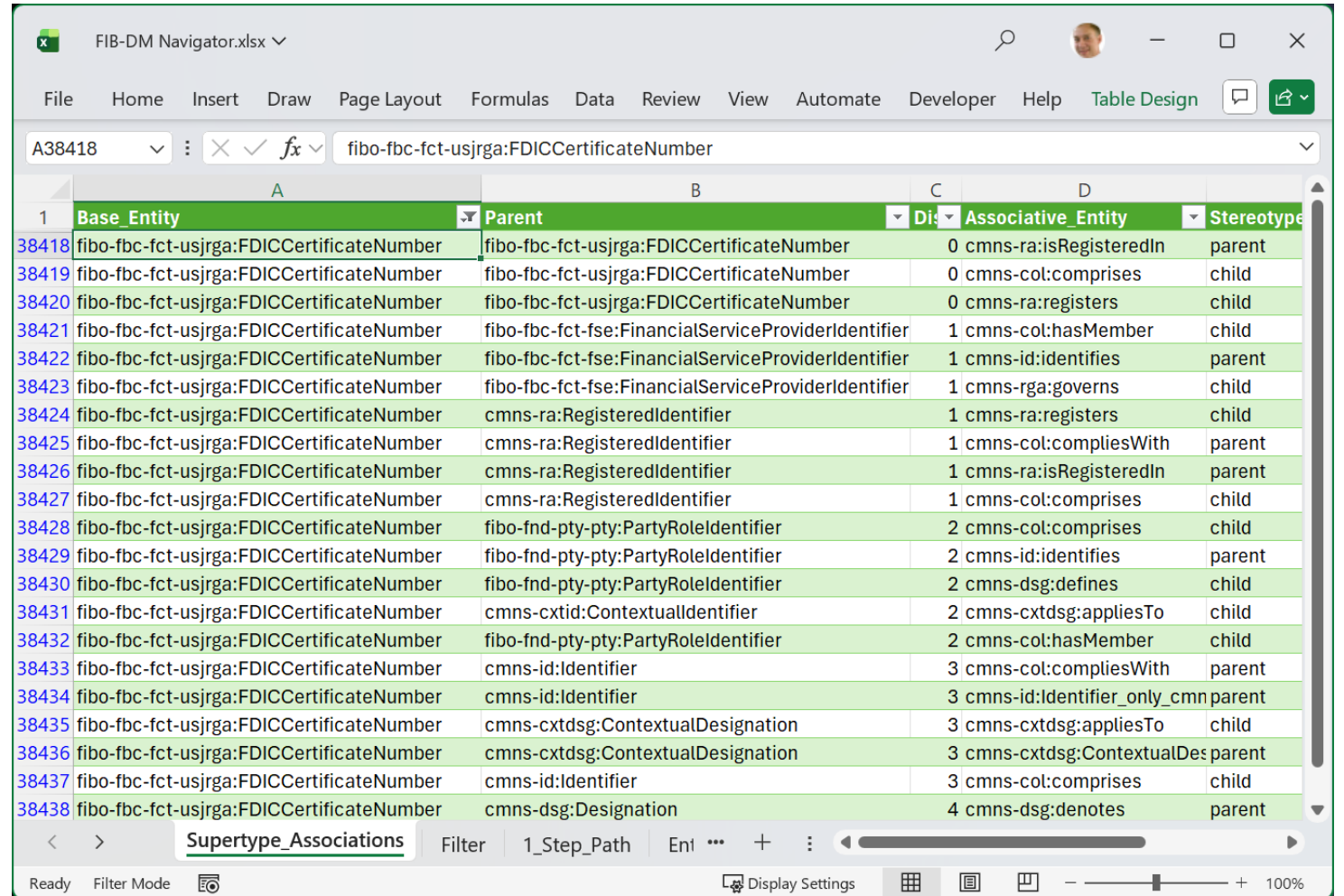


Identifying Entities and Concepts

We can use the modeling tool or MS Excel to research Concept Entities.



In this example, we look for supertypes of the FDIC Certificate and their Associations



The screenshot shows the FIB-DM Navigator application with a table titled 'Supertype_Associations'. The table lists various associations between the entity 'FDICCertificateNumber' and other entities, including their parent/child relationships and the specific association types.

	A	B	C	D	E
	Base_Entity	Parent	Dis	Associative_Entity	Stereotype
38418	fibonacci-fct-usjrga:FDICCertificateNumber	fibonacci-fct-usjrga:FDICCertificateNumber	0	cmns-ra:isRegisteredIn	parent
38419	fibonacci-fct-usjrga:FDICCertificateNumber	fibonacci-fct-usjrga:FDICCertificateNumber	0	cmns-col:comprises	child
38420	fibonacci-fct-usjrga:FDICCertificateNumber	fibonacci-fct-usjrga:FDICCertificateNumber	0	cmns-ra:registers	child
38421	fibonacci-fct-usjrga:FDICCertificateNumber	fibonacci-fct-fse:FinancialServiceProviderIdentifier	1	cmns-col:hasMember	child
38422	fibonacci-fct-usjrga:FDICCertificateNumber	fibonacci-fct-fse:FinancialServiceProviderIdentifier	1	cmns-id:identifies	parent
38423	fibonacci-fct-usjrga:FDICCertificateNumber	fibonacci-fct-fse:FinancialServiceProviderIdentifier	1	cmns-rga:governs	child
38424	fibonacci-fct-usjrga:FDICCertificateNumber	cmns-ra:RegisteredIdentifier	1	cmns-ra:registers	child
38425	fibonacci-fct-usjrga:FDICCertificateNumber	cmns-ra:RegisteredIdentifier	1	cmns-col:compliesWith	parent
38426	fibonacci-fct-usjrga:FDICCertificateNumber	cmns-ra:RegisteredIdentifier	1	cmns-ra:isRegisteredIn	parent
38427	fibonacci-fct-usjrga:FDICCertificateNumber	cmns-ra:RegisteredIdentifier	1	cmns-col:comprises	child
38428	fibonacci-fct-usjrga:FDICCertificateNumber	fibonacci-fnd-pty-pty:PartyRoleIdentifier	2	cmns-col:comprises	child
38429	fibonacci-fct-usjrga:FDICCertificateNumber	fibonacci-fnd-pty-pty:PartyRoleIdentifier	2	cmns-id:identifies	parent
38430	fibonacci-fct-usjrga:FDICCertificateNumber	fibonacci-fnd-pty-pty:PartyRoleIdentifier	2	cmns-dsg:defines	child
38431	fibonacci-fct-usjrga:FDICCertificateNumber	cmns-cxtid:ContextualIdentifier	2	cmns-cxtidsg:appliesTo	child
38432	fibonacci-fct-usjrga:FDICCertificateNumber	fibonacci-fnd-pty-pty:PartyRoleIdentifier	2	cmns-col:hasMember	child
38433	fibonacci-fct-usjrga:FDICCertificateNumber	cmns-id:Identifier	3	cmns-col:compliesWith	parent
38434	fibonacci-fct-usjrga:FDICCertificateNumber	cmns-id:Identifier	3	cmns-id:Identifier_only_cm	parent
38435	fibonacci-fct-usjrga:FDICCertificateNumber	cmns-cxtidsg:ContextualDesignation	3	cmns-cxtidsg:appliesTo	child
38436	fibonacci-fct-usjrga:FDICCertificateNumber	cmns-cxtidsg:ContextualDesignation	3	cmns-cxtidsg:ContextualDes	parent
38437	fibonacci-fct-usjrga:FDICCertificateNumber	cmns-id:Identifier	3	cmns-col:comprises	child
38438	fibonacci-fct-usjrga:FDICCertificateNumber	cmns-dsg:Designation	4	cmns-dsg:denotes	parent



Creating the concept map diagram



FIB-DM has a *Legal Entity Identifier*, an exact match for the LEI in the sample. Designation (D) is the ultimate supertype of Legal Entity Identifier.



Likewise, we have an Entity named *Country* in FIB-DM. The country is a specialization of the fundamental concept of Region/Location(LOC).



The FDIC Certificate Number is another direct match.



The FDIC Institution Directory is a *Registry*. The entity Registry belongs to the Collection concept.



The LEI identifies a Legal Person. In our example, JPMC NA, a *Stock Corporation*, is an entity in the FIB-DM. The stock corporation is a subtype of the Agent (A). The concept comprises Person, Legal Person, Automated System, and Organization.



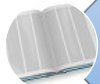
The FDIC insures and regulates financial institutions that take deposits. *Depository Institution* is an entity in the data model, rolling up to the fundamental concept of the Role (R).



The FDIC is the *Registration Authority* that issues the certificate number. The FDIC also has an identity as an Autonomous Agent, but we don't need that detail for our scope.



JPMC's capital is a *Balance*, a subtype of *Monetary Amount*. The entity holds the number and more descriptive properties, such as the currency and date. Following the supertype hierarchy we see that Monetary Amount is a Scalar Quantity Value.



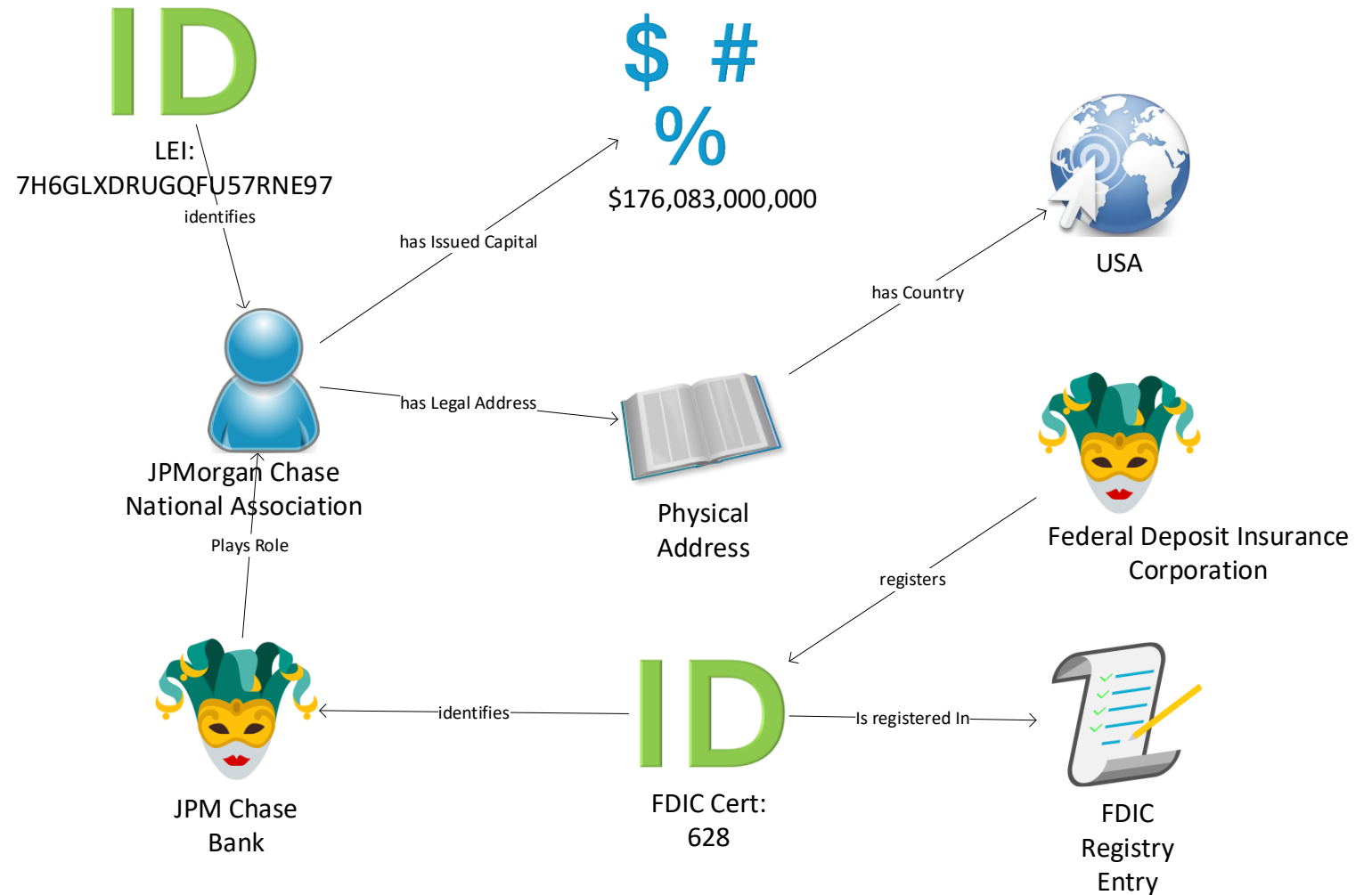
The address fields in our schedule are a *Registered Address*, a subtype of Reference. The Reference functions like an associative entity with a role, linking Country to Agent.



Our sample data as a concept map

A concept map, or conceptual diagram, depicts suggested relationships among concepts.

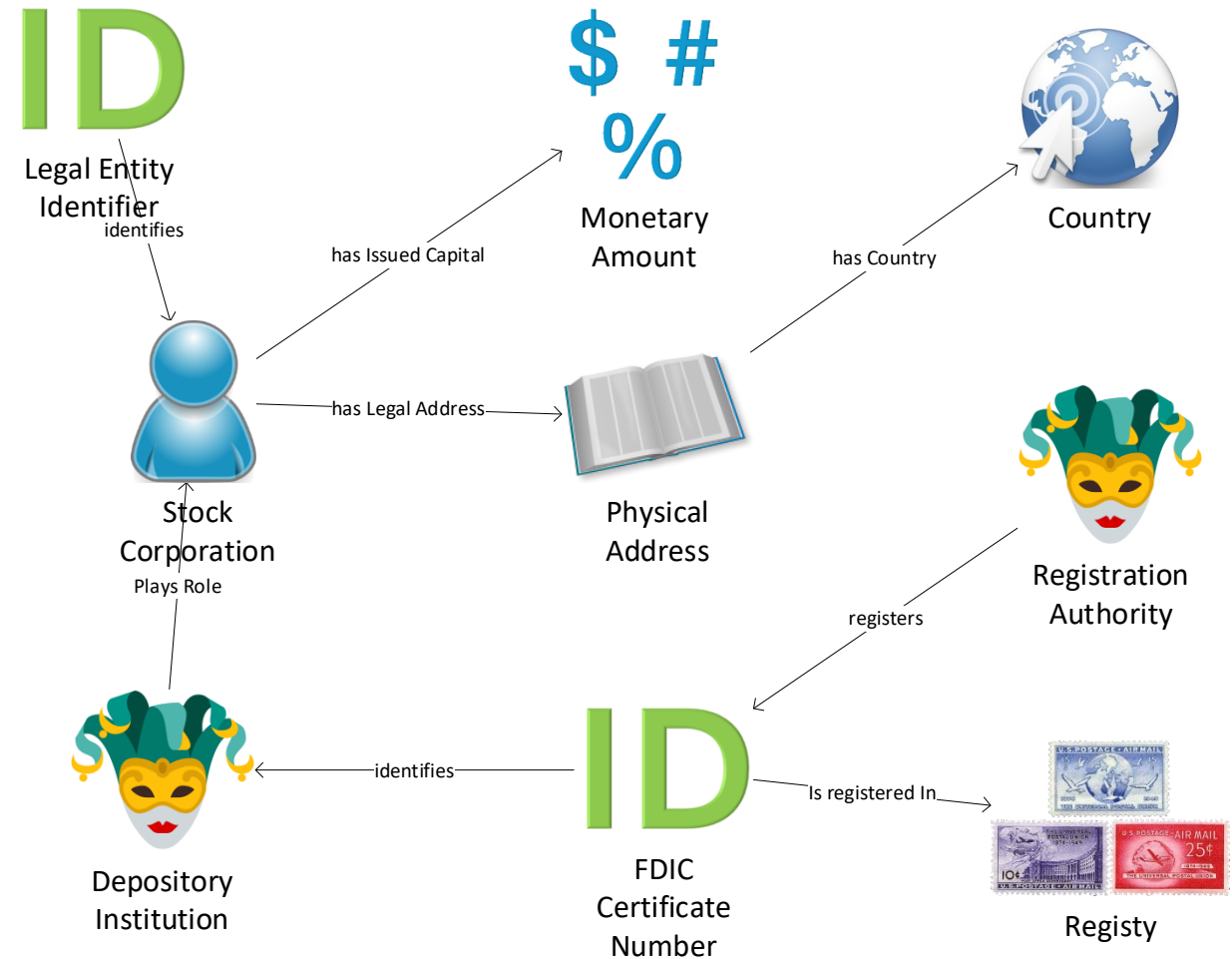
We replace the circles in our sample data diagram with shapes of the Fundamental Business Concepts.



Standardize concept map relations

Similarly, we standardize relationships in our concept map. The data modeler suggests FIB-DM association names that match the related concepts and requirements.

Finally, we replace the sample values with identified FIB-DM entities. Here is our Fundamental Business Concept map for the Call Report Entity Schedule.

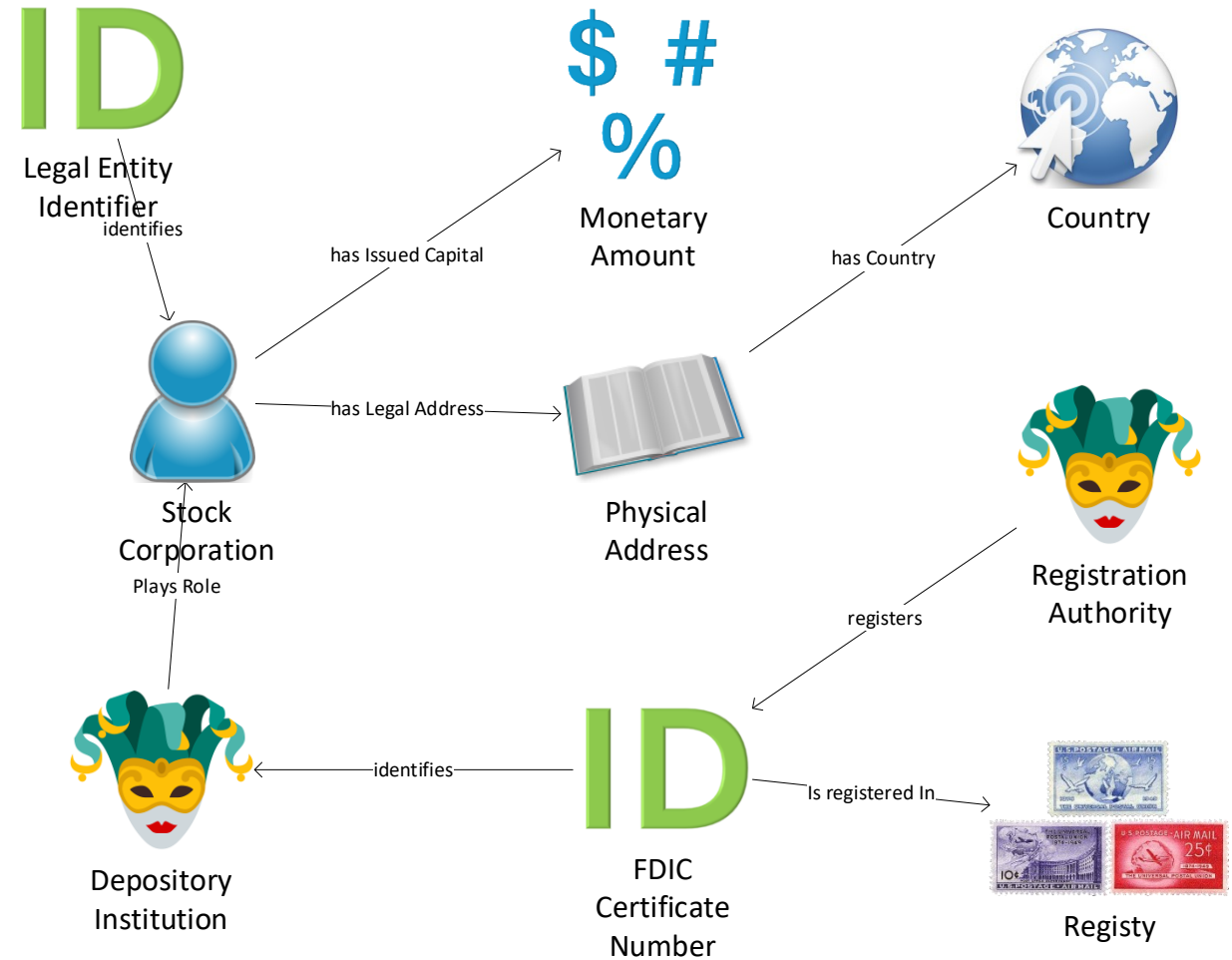


The FIB-DM Concept Map

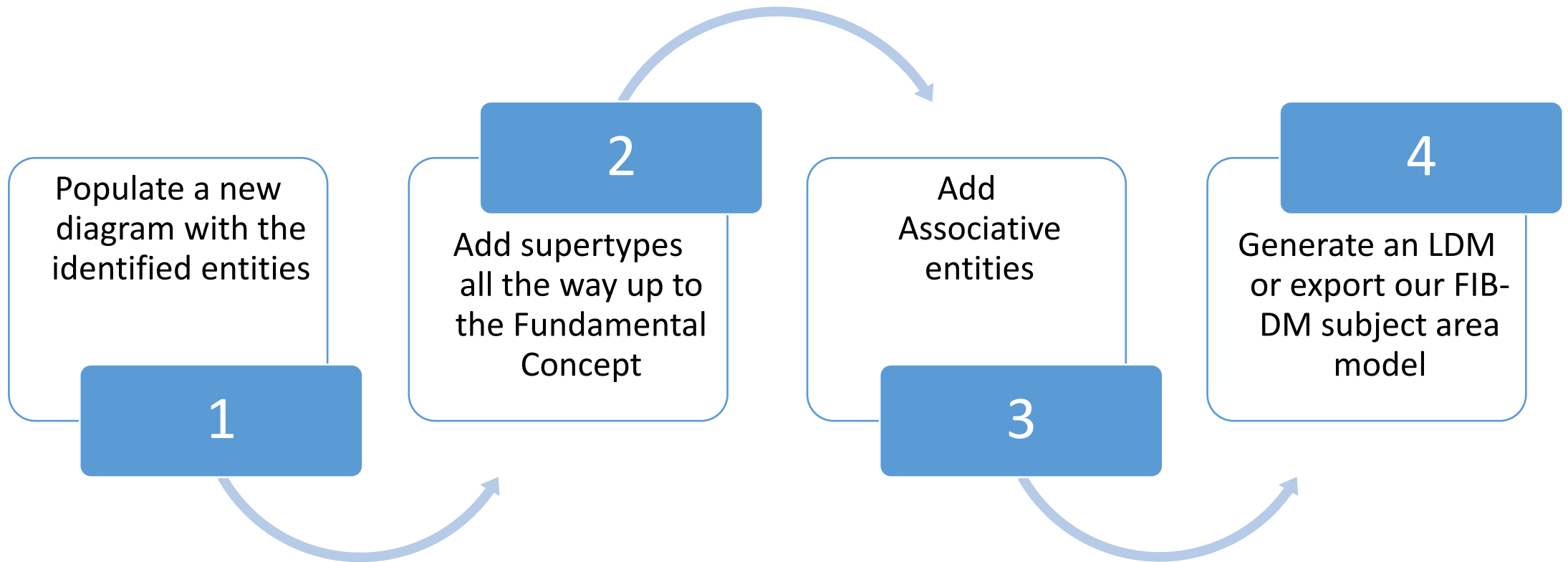
- Easy to understand for non-technical business users.
- The methodology keeps the concept-mapping within the vocabulary and structure of the underlying model.

We can see how the diagram expands.

- The Monetary Amount has more defining concepts
- JPMC is a Thing in many more Roles, so is the FDIC
- We can add other Regulators to the picture, and so on.



From Concept Map to Data Model

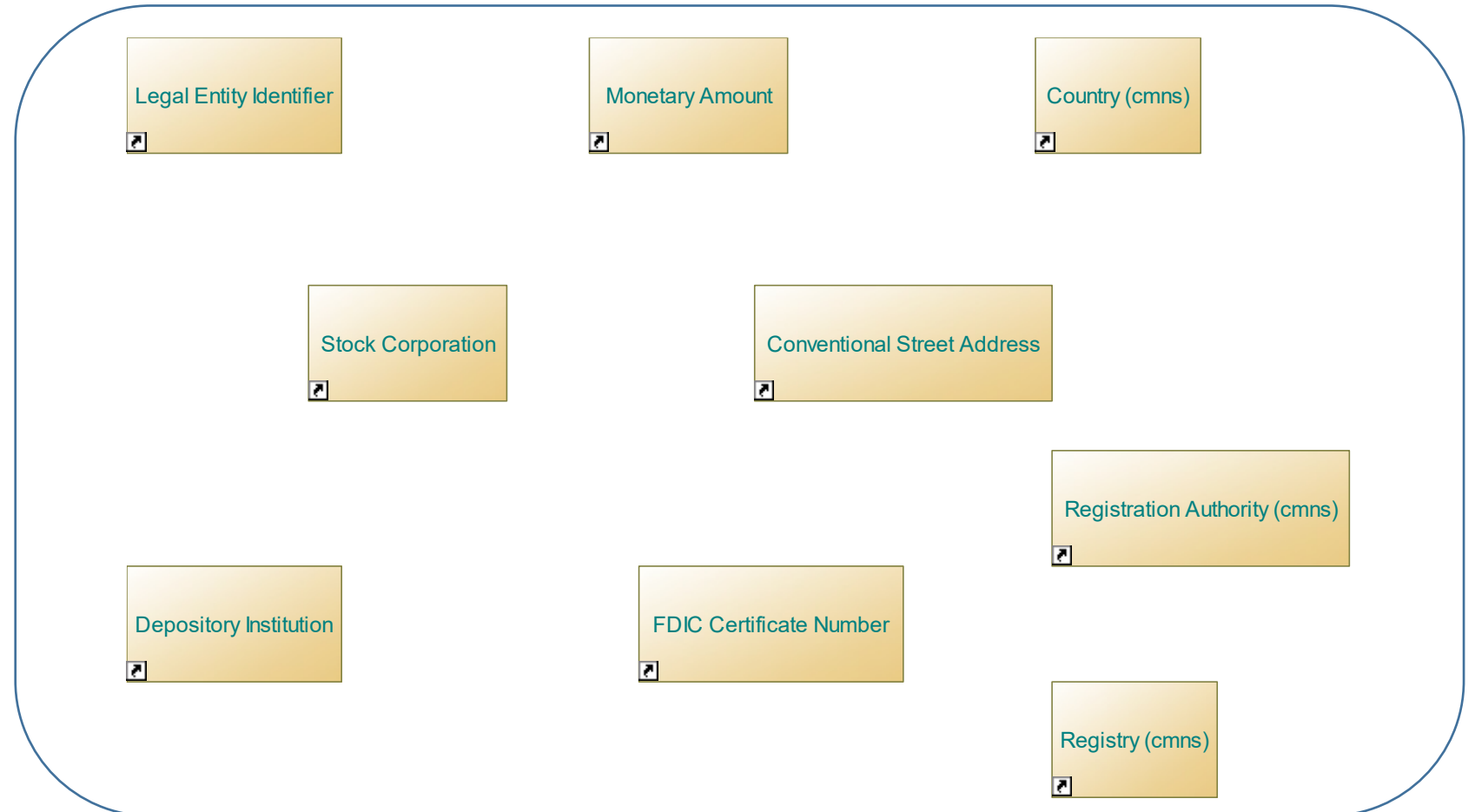


1. Create a new diagram of the nine entities

Open FIB-DM in your data modeling tool. The screenshots and diagrams in this education module are PowerDesigner.

Populate your diagram with the nine entities of the concept map. These are existing FIB-DM entities derived from FIBO classes.

In practice, you may draw the concept map and CDM in parallel. However, you want to use the concept map to validate the design with the business.



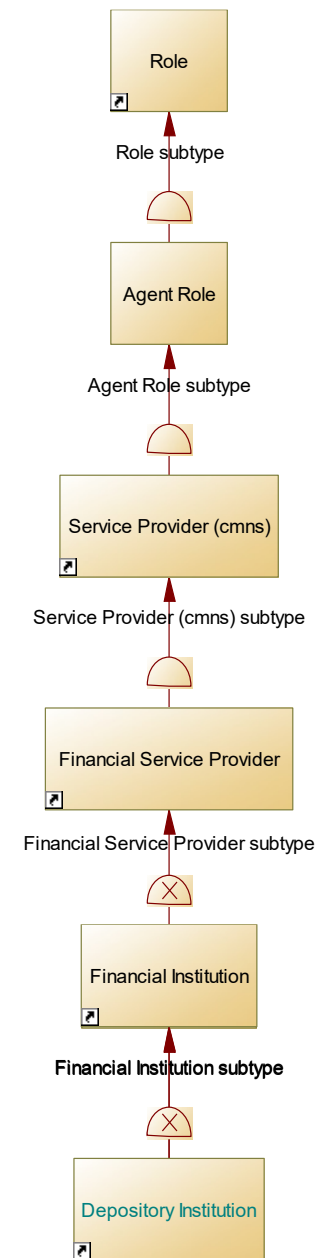
2.1 Adding Depository Institution supertypes to the diagram

Let's start with the **Depository Institution**. We use the data modeling tool to navigate to the Inheritance (a.k.a. subtype symbol) and the supertype.

In PowerDesigner, this is a bit cumbersome: we open the entity properties dependencies tab, select the parents to find the Financial Institution subtypes, open the inheritance properties, find the inheritance in the browser, and copy the inheritance as a link into the diagram.

We repeat the process until we arrive at the ultimate supertype, our Fundamental Concept, the Role.

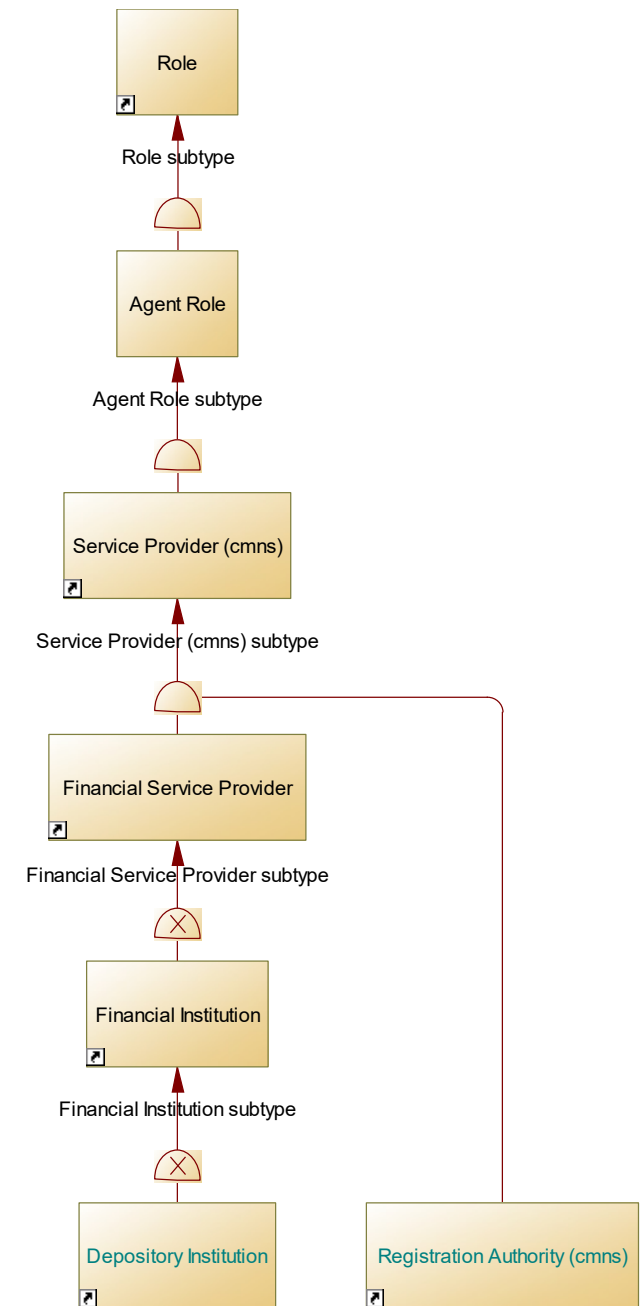
The Depository Institution is a Financial Institution, which is a Financial Service Provider, with is a Service Provider, a direct subtype of the Thing.



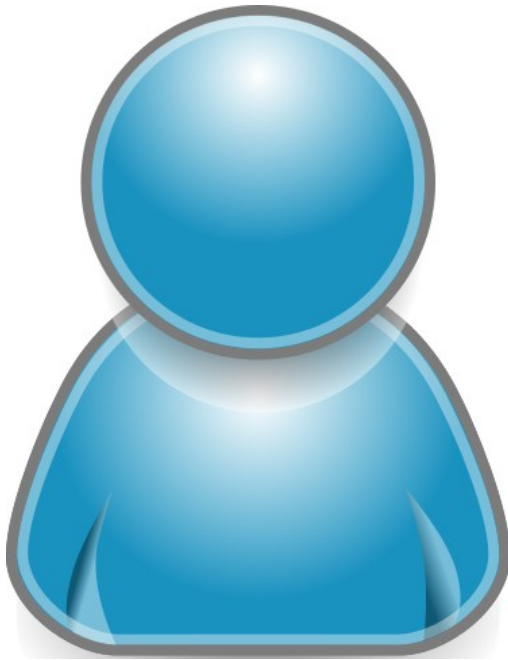
2.2 Adding the Registration Authority supertype



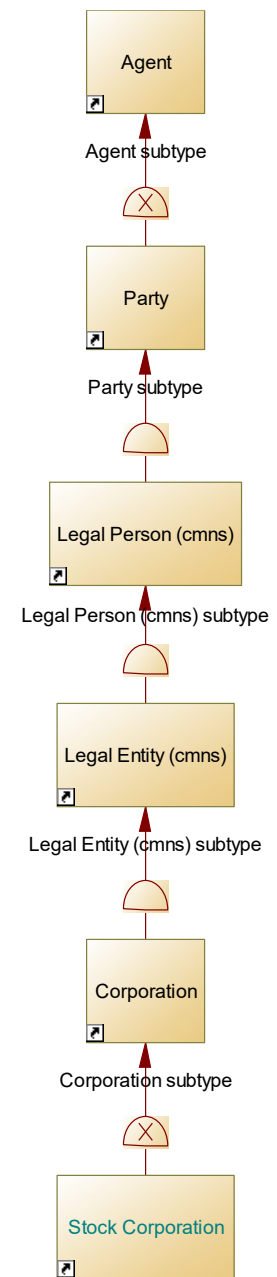
The **Registration Authority**, our entity for the FDIC and other registrars, is also a Service Provider, a subtype of Agent Role, a subtype of the Fundamental Concept of Role (R).



2.3 Stock Corporation rolls up to the Agent



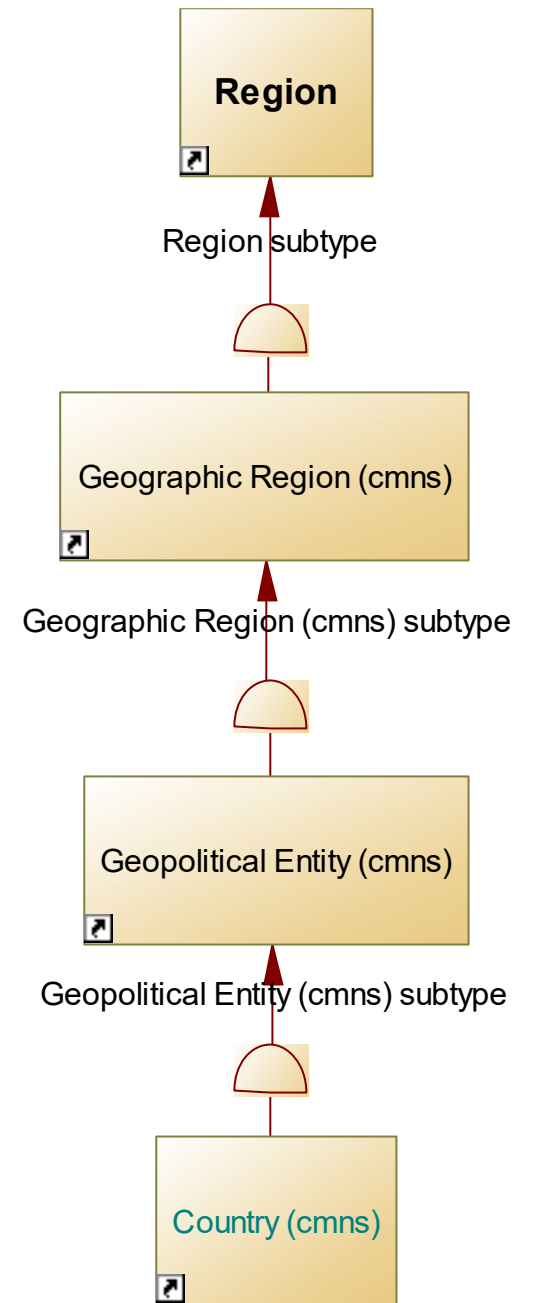
The **Stock Corporation** is a Legal Entity, ultimately a subtype of the Agent (A).



2.4 Country and Registry



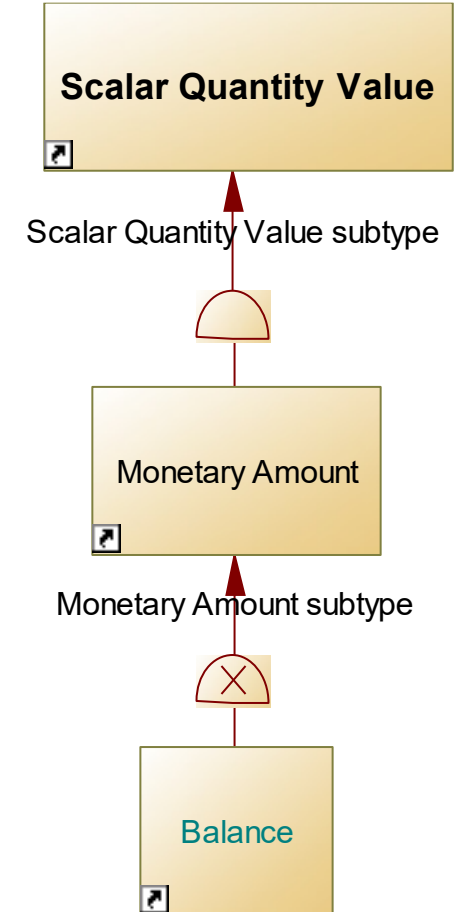
The country is a Geopolitical Entity, a subtype of Geographic Region, and ultimately the Fundamental Concept of Region.



2.5 Balance



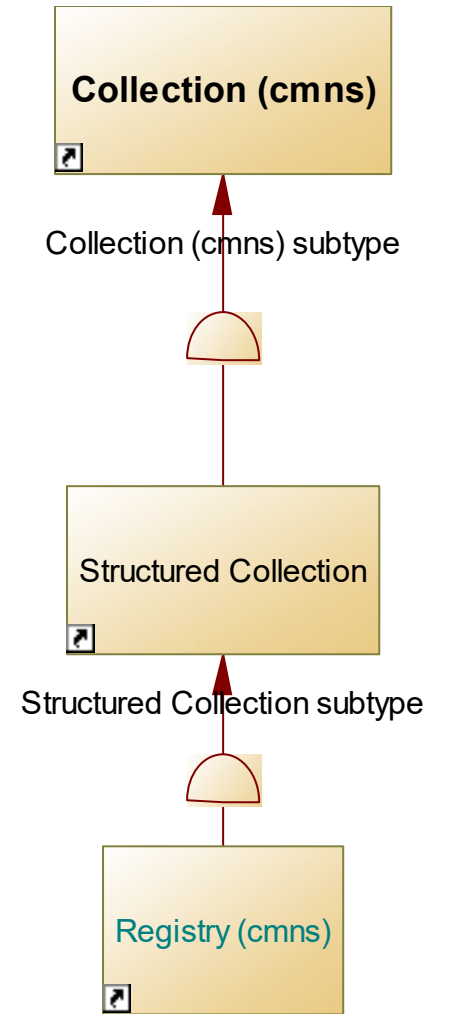
The Issued Capital is on the Balance sheet, and hence a Balance, which is a Monetary Amount subtype of the Scalar Quantity.



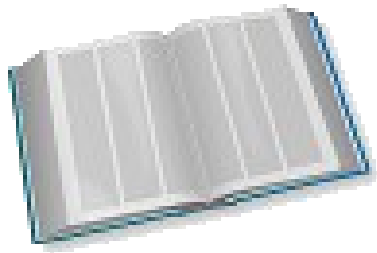
2.6 Registry



The Registry is a Structured Collection, a subtype of the OMG Commons concept of Collection.



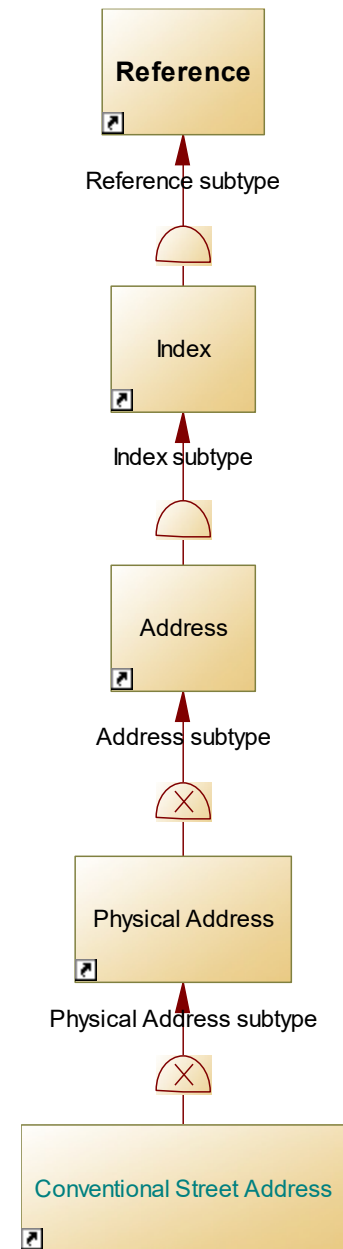
2.7 Reference



The [Conventional] Street Address is a Physical Address.

Addresses are a type of Index under the fundamental concept of Reference.

Identifiers are under the fundamental concept of Designation.

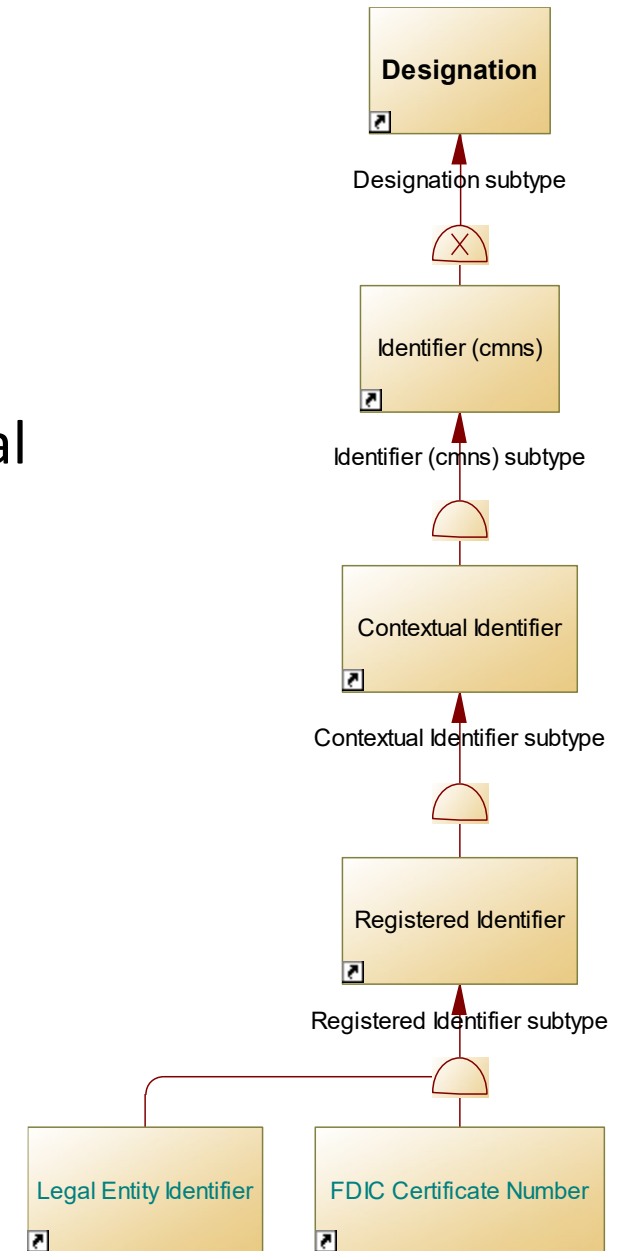


2.8 Designation

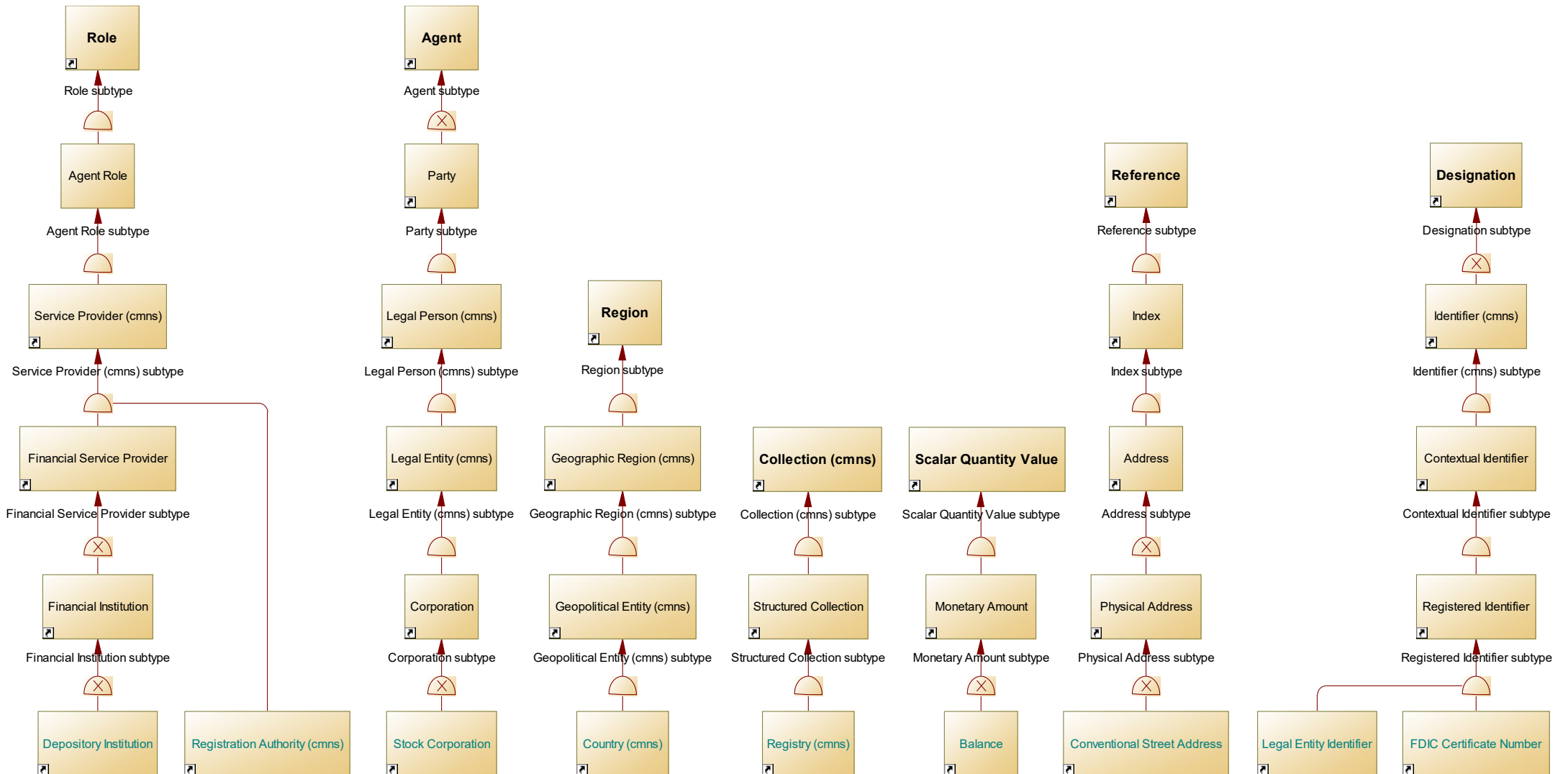
ID

The LEI and FDIC Certificate Number are Registered Identifiers, a subtype of Contextual Identifier.

Identifiers are under the fundamental concept of Designation.



2.9 Our Entities and their Fundamental Concepts.



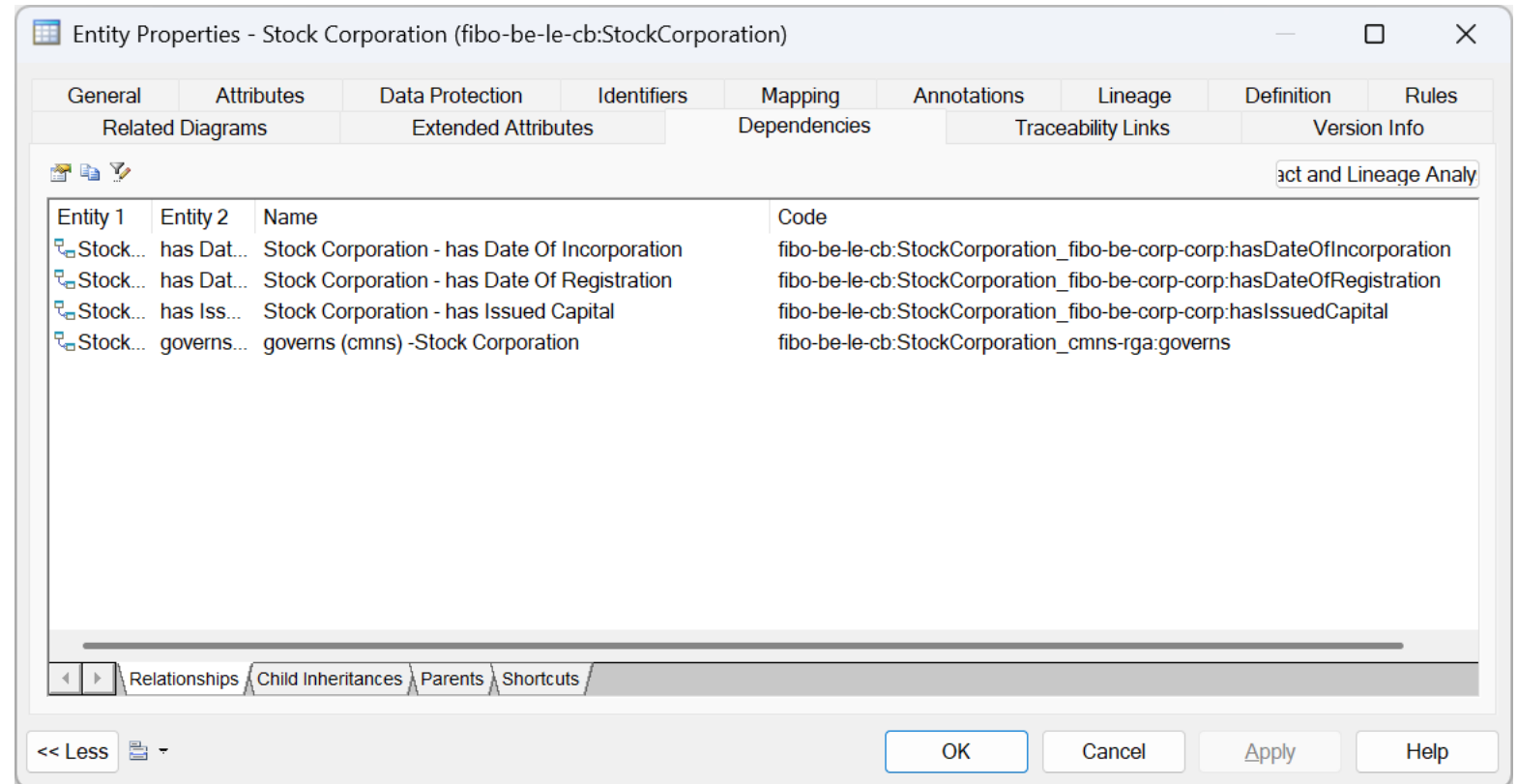
3 Adding Associative Entities.

The next step is to connect the entities by adding the appropriate Association or Associative entity for the business context.

Finding a matching Association is a challenge, even for experienced FIBO experts.

How does Issued Capital relate to the Stock Corporation?

We can research the entity's relationships in the data modelling tool.



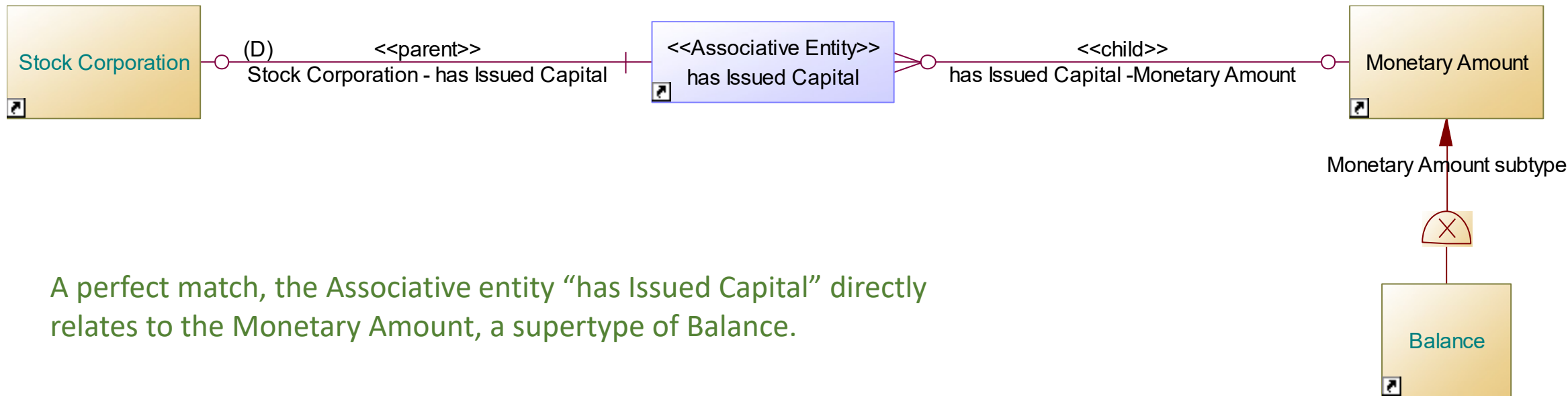
Entity 1	Entity 2	Name	Code
Stock...	has Dat...	Stock Corporation - has Date Of Incorporation	fib-be-le-cb:StockCorporation_fibo-be-corp-corp:hasDateOfIncorporation
Stock...	has Dat...	Stock Corporation - has Date Of Registration	fib-be-le-cb:StockCorporation_fibo-be-corp-corp:hasDateOfRegistration
Stock...	has Iss...	Stock Corporation - has Issued Capital	fib-be-le-cb:StockCorporation_fibo-be-corp-corp:hasIssuedCapital
Stock...	governs...	governs (cmns) -Stock Corporation	fib-be-le-cb:StockCorporation_cmns-rga:governs



3.1 Stock Corporation - Balance

The preferred association connects our scoped concept hierarchies at the leaf level. In other words the green entities of the concept map. Often, however, supertypes connect the Base Entities.

We use the modeling tool or the Relationships spreadsheet to investigate relationships of the Stock Corporation and find *has Issued Capital*.

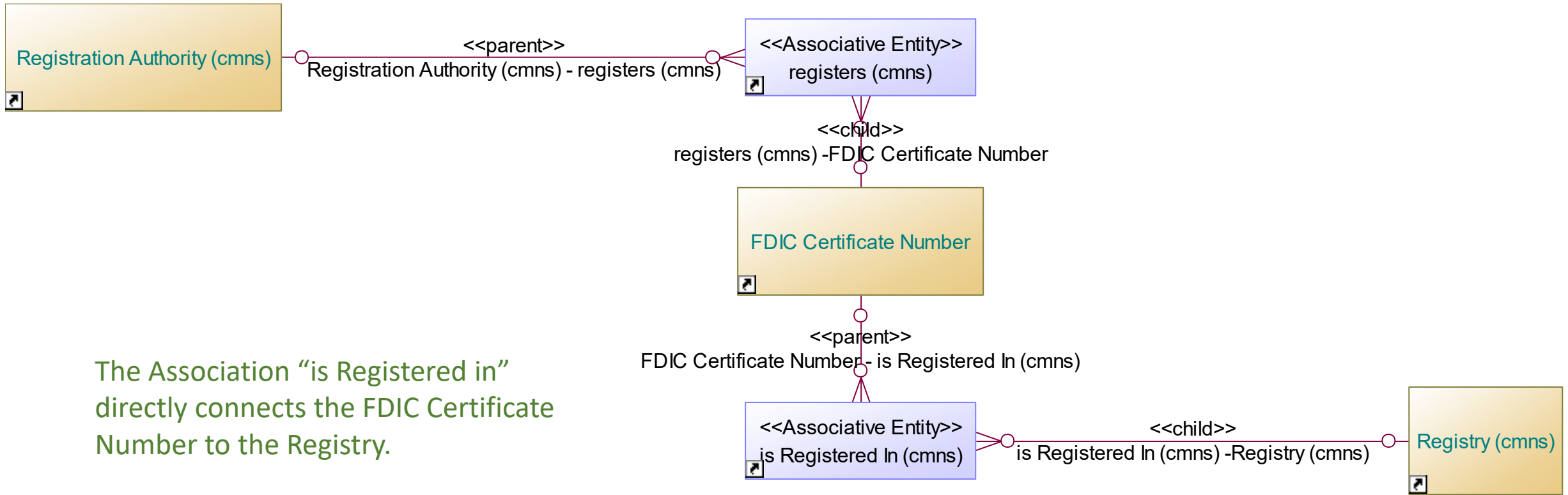


A perfect match, the Associative entity “has Issued Capital” directly relates to the Monetary Amount, a supertype of Balance.



3.2 Associating the FDIC Certificate Number

Another easy match, the associative entity “*registers*” has relationships to the FDIC Certificate Number and the Registration Authority.



The Association “is Registered in” directly connects the FDIC Certificate Number to the Registry.



Preview: The Navigator finds Associations

FIB-DM Navigator.xlsx • Last Modified: Thu at 17:57

From the Stock Corporation to its Capital Balance

File Home Insert Draw Page Layout Formulas Data Review View Automate Developer Help Table Design

A1 : fx Entity_1

Entity_1	Parent_1	Distance_1	Stereotype_1	Associative_Entity	Entity_2	Parent_2	Stereotype_2	Distance_2
fib-be-le-cb:StockCorporation	fib-be-le-cb:StockCorporation	0	parent	fib-be-le-cb:hasIssuedCapital	fib-fbc-pas-caa:Balance	fib-fnd-acc-cur:MonetaryAmount	child	1

Ultimate_Supertype_Hierarchy Subtype Associations Supertype_Associations Subtype_Associations Filter Entity_1_Association_Entity_2 Entity_1_Assoc_Assoc_Entity_2 Entity_1_Assoc_All

Count: 2 Display Settings 122%

Stock Corporation has Issued Capital a Balance [amount] associated via its supertype, the Monetary Amount

FIB-DM Navigator.xlsx • Last Modified: Thu at 17:57

From the Registration Authority to the FDIC Certificate Number to the Registry

File Home Insert Draw Page Layout Formulas Data Review View Automate Developer Help Table Design

1R x9C : fx cmns-ra:RegistrationAuthority

Entity_1	Parent_1	Distance_1	Associative_Entity_1	Stereotype_1	Intermediate_Entity	Entity_2	Parent_2	Distance_2	Associative_Entity_2	Stereotype_2	
cmns-ra:RegistrationAuthority	cmns-ra:RegistrationAuthority	0	cmns-ra:hasRegistrationAuthorit	child	parent	fib-fbc-fct-usjrjga:IssuerIdentificationNumber	cmns-ra:Registry	cmns-ra:Registry	0	cmns-ra:isRegisteredIn	child
cmns-ra:RegistrationAuthority	cmns-ra:RegistrationAuthority	0	cmns-ra:hasRegistrationAuthorit	child	parent	fib-fbc-fct-usjrjga:RoutingTransitNumber	cmns-ra:Registry	cmns-ra:Registry	0	cmns-ra:isRegisteredIn	child
cmns-ra:RegistrationAuthority	cmns-ra:RegistrationAuthority	0	cmns-ra:registers	parent	child	cmns-ra:RegisteredIdentifier	cmns-ra:Registry	cmns-ra:Registry	0	cmns-ra:isRegisteredIn	child
cmns-ra:RegistrationAuthority	cmns-ra:RegistrationAuthority	0	cmns-ra:registers	parent	child	fib-fbc-fct-usjrjga:FDICCertificateNumber	cmns-ra:Registry	cmns-ra:Registry	0	cmns-ra:isRegisteredIn	child
cmns-ra:RegistrationAuthority	cmns-ra:RegistrationAuthority	0	cmns-ra:registers	parent	child	fib-fbc-fct-usjrjga:ResearchStatisticsSupervisionDiscountIdentifier	cmns-ra:Registry	cmns-ra:Registry	0	cmns-ra:isRegisteredIn	child
cmns-ra:RegistrationAuthority	cmns-ra:RegistrationAuthority	0	cmns-ra:registers	parent	child	fib-sec-sec-id>ListedSecurityIdentifier	cmns-ra:Registry	cmns-ra:Registry	0	cmns-ra:isRegisteredIn	child

Subtype Associations Supertype_Associations Subtype_Associations Filter Entity_1_Association_Entity_2 Entity_1_Assoc_Assoc_Entity_2 Entity_1_Assoc_All Concepts Concept_Hierarchy

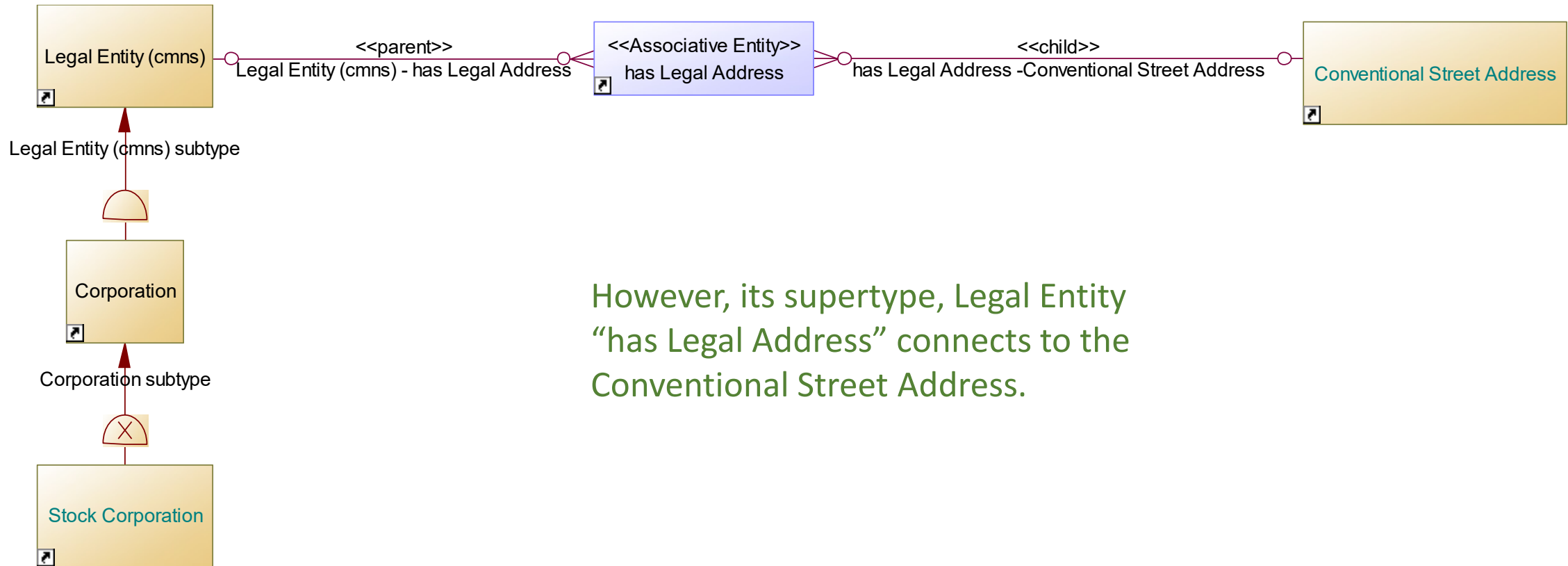
Ready 11 of 227 records found Average: 0 Count: 9 Sum: 0 Display Settings 100%

Registration Authority registers FDIC Certificate Number is Registered in a Registry



3.3 Stock Corporation - Address

The Stock Corporation has no direct Associative Entity relating to an Address.



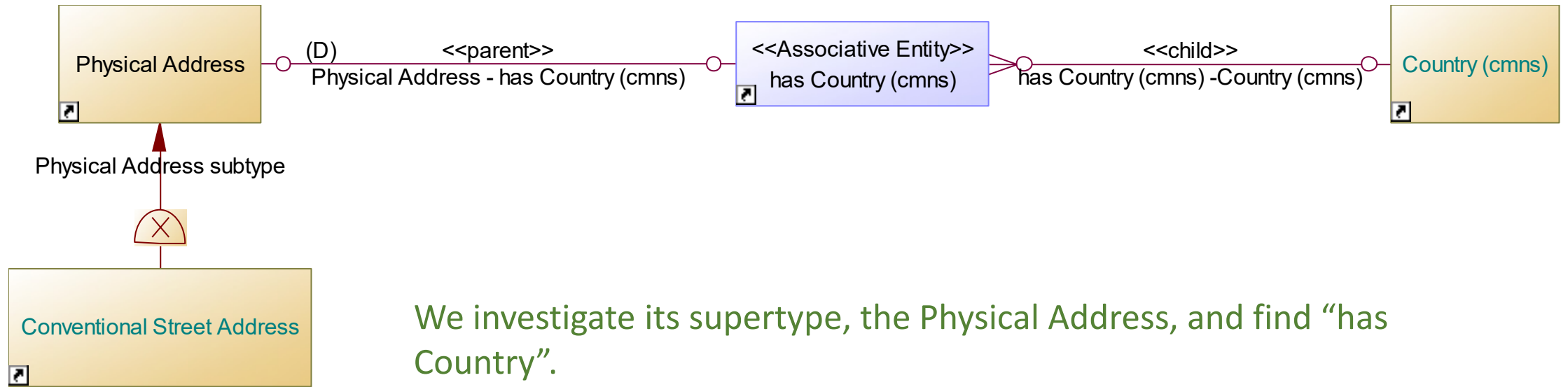
However, its supertype, Legal Entity “has Legal Address” connects to the Conventional Street Address.



3.4 Address - Country

The Conventional Street Address does not have an Association relating to the Country.

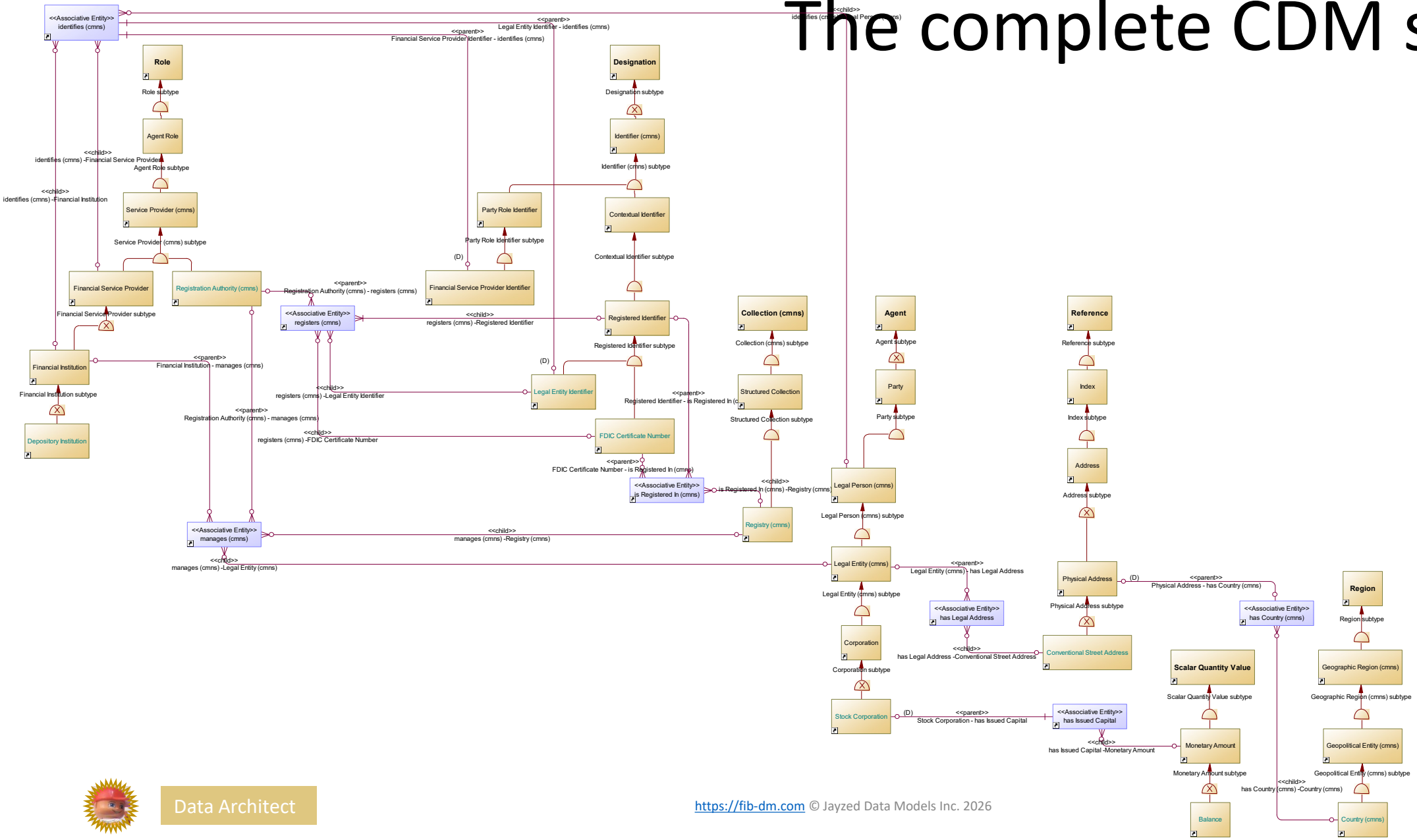
.



We investigate its supertype, the Physical Address, and find “has Country”.



The complete CDM scope



Discussion – do I really need all these entities?

The short answer is no.

For a project model, it is perfectly fine to scope only the directly required green entities.

In practice, the following Logical Modeling phase attributes the model. The Logical Data Modeler examines the full set of required data items and maps them to the entities' attributes.

A simple rule:

You can remove any entity from the subtype hierarchy that has no attributes or relationships.

The FIB-DM is a reference data model. For the data modeler, the Financial Industry Business Data Model provides a rich library of building blocks to accelerate the design process.



LDM denormalization and simplifications

Next steps:

The modeler will review the associative entities and those that are not many-to-many with direct relationships. For example, if the Physical Address has only one country; we can replace the associative entity with a direct relationship.

Supertype/subtype relations, such as Physical/Conventional Address, can be configured to roll up or down during Physical Model generation.

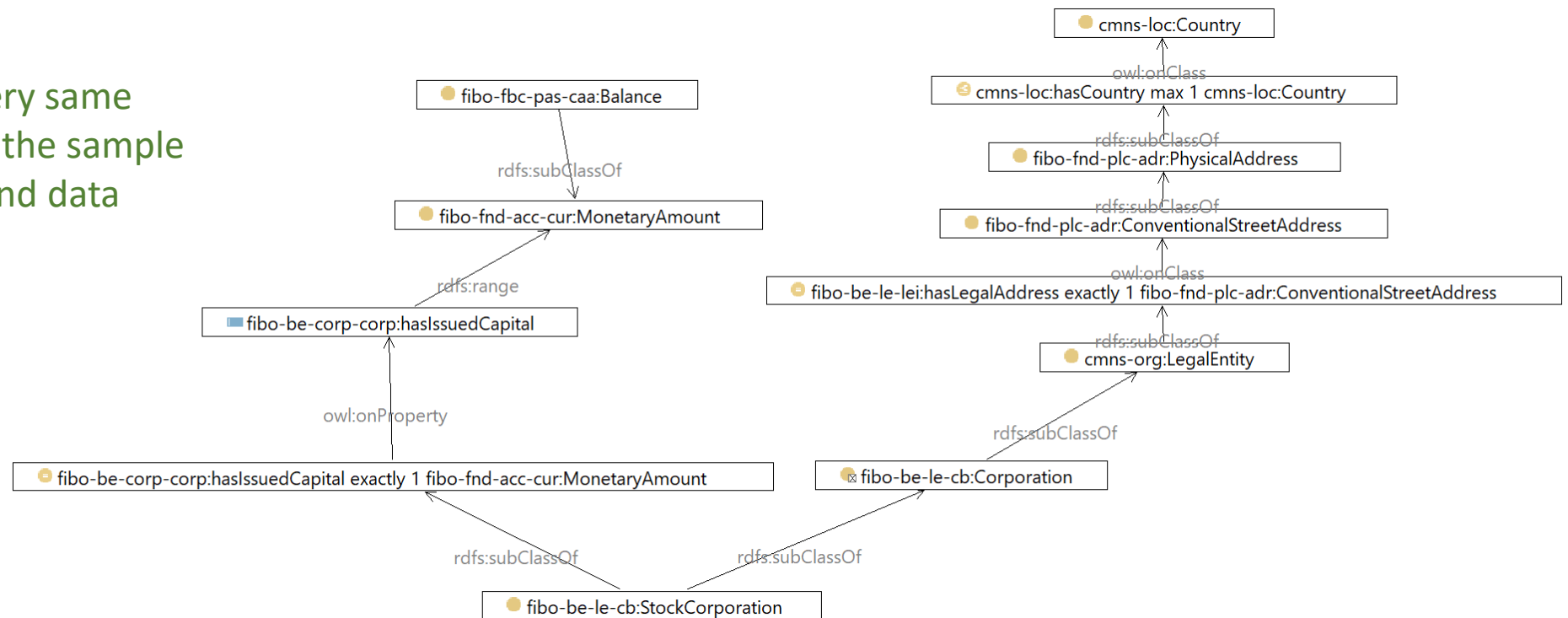
It is a Logical/Physical Model decision whether certain Scalar Quantities and Dates should be transformed into plain attributes/columns.



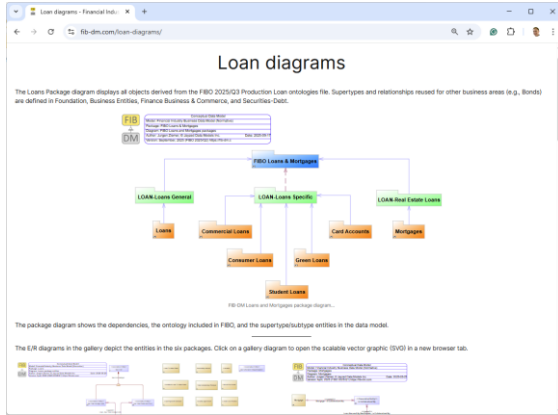
Excursus: Scoping an operational ontology

The 15 Fundamental Business Concepts apply to both the Financial Industry Business Ontology and Data Model. We use the same methodology to create the concept map. With the concept map we can easily scope a subset of the FIBO to hold the regulatory reference data. The Call Report presentation and the Semantic Compliance article on the Bank Ontology website show the instance graph below.

We recognize the very same design pattern as in the sample data concept map and data model.

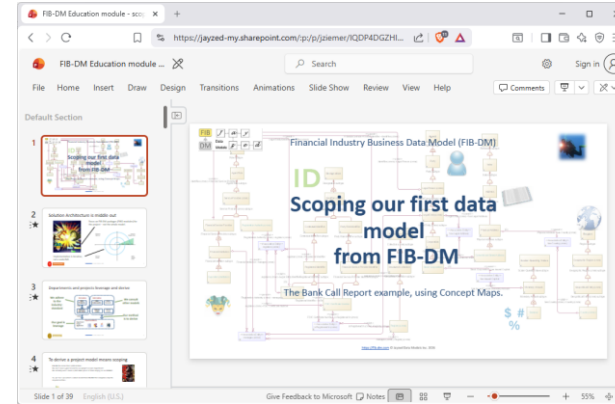


Resources for further study



Find selected diagrams on the FIB-DM website or your Full Model delivery zip folder.

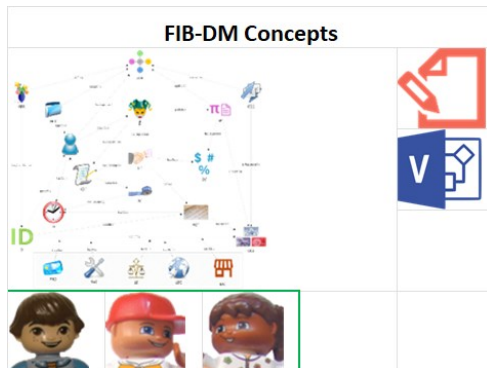
<https://fib-dm.com/diagrams/>



Open-source users can review the PowerPoint in MS Office Online and download a PDF.

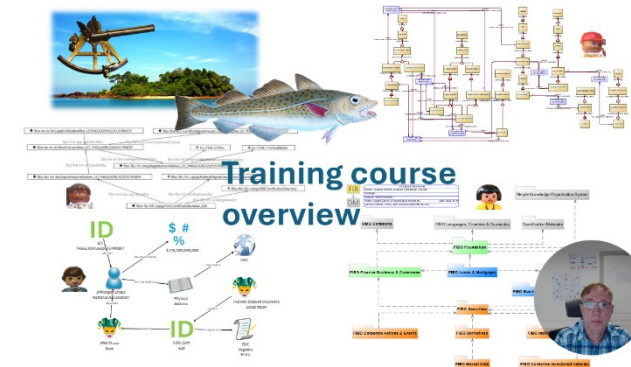
Full Model licensees find the PPTX file in their delivery folder.

<https://fib-dm.com/education-module-scoping-our-first-data-model/>



Study the article for a deeper understanding of the FIBO/FIB-DM Fundamental Concepts.

<https://fib-dm.com/house-of-finance-15-business-concepts/>



Avoid islands and watch the Navigator lesson on the YouTube Course.

<https://www.youtube.com/@FIBDM/courses>

