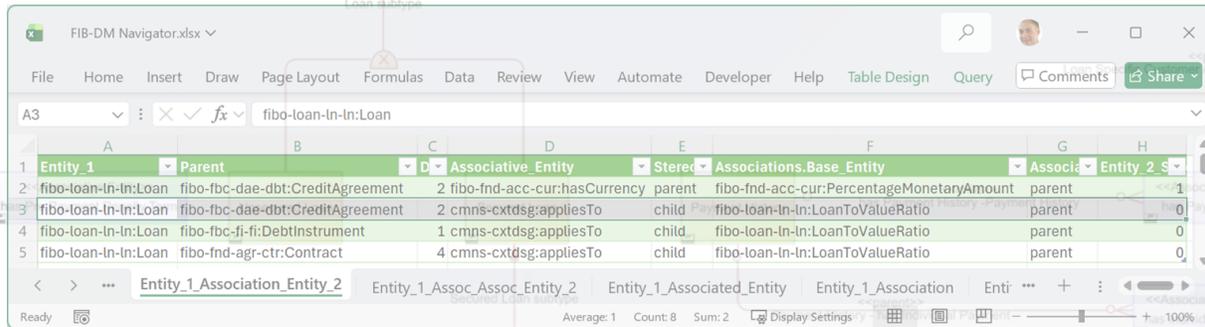
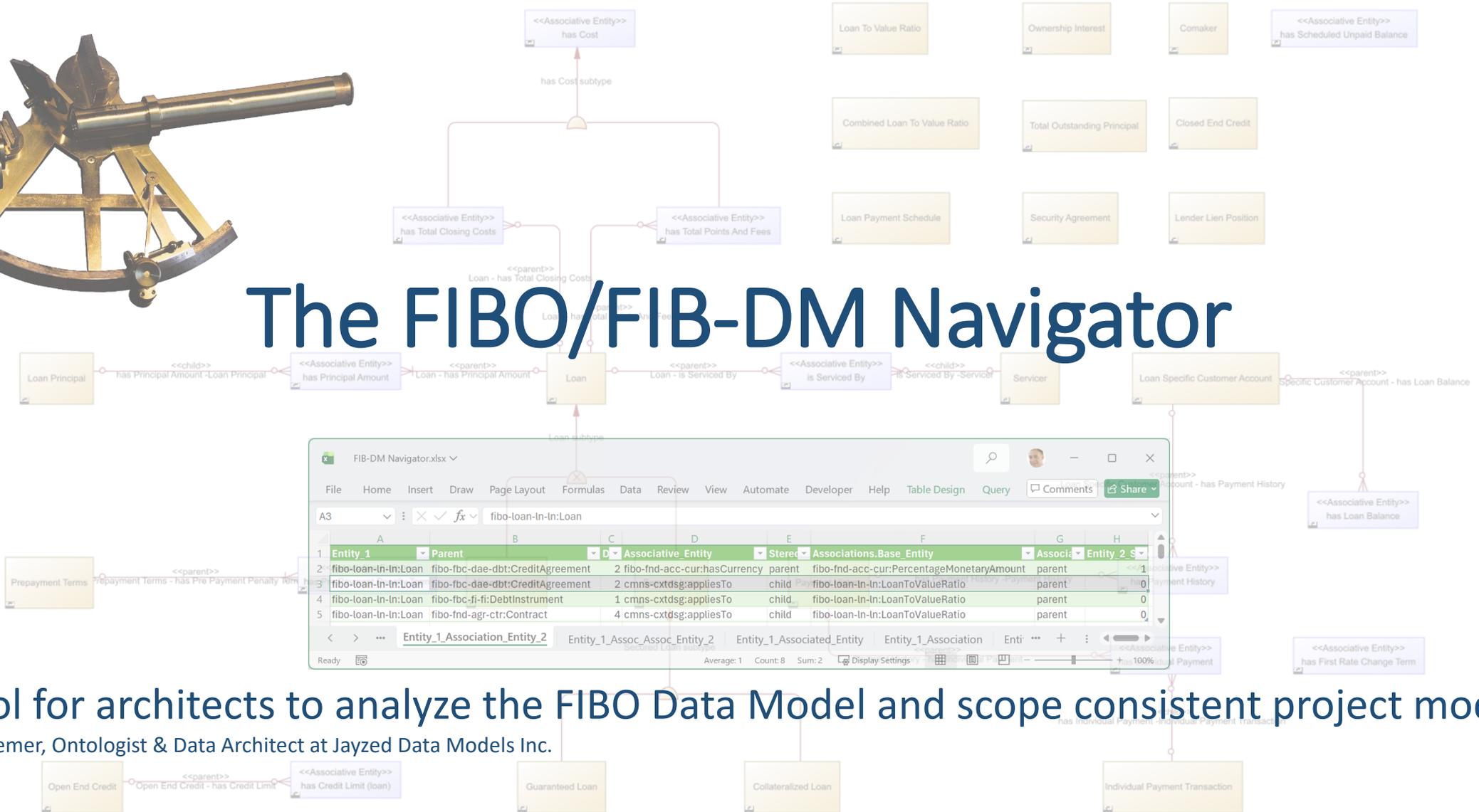


The FIBO/FIB-DM Navigator



A tool for architects to analyze the FIBO Data Model and scope consistent project models.

Jurgen Ziemer, Ontologist & Data Architect at Jayzed Data Models Inc.

An MS-Excel FIB-DM analysis workbook.

The Navigator provides 23 worksheets that accelerate model research on hierarchies and associations.

- A white book without a special GUI.
- You use standard MS Excel functionality to search, filter, and sort the metadata.
- The tool is pre-populated with the latest FIB-DM release (Q4/2025 or later).
- Part of the FIB-DM resources (bonus materials) for commercial licensees.



Data Architects find critical information ad hoc, rather than manually traversing object relations in the data modeling tool.



Business Users or Subject Matter Experts can research FIB-DM content without knowledge or a license of PowerDesigner or ERWin.



Ontologists have the same need to find joins when populating a FIBO-derived operational ontology or writing SPARQL queries. FIB-DM Base and Associative Entities lineage provides the URI of the FIBO class or object property that they derived from. Subtypes derived from FIBO/OMG Commons `rdfs:subTypeOf` properties.



Data Architect



Business, SME

<https://fib-dm.com> © Jayzed Data Models Inc. 2026

Islands



Island near Phra Tong, Thailand (Wikimedia Commons)

Pristine beaches, beautiful scenery, and unique wildlife. Islands are beautiful!
(as a vacation destination)

But a defect in a data model!

In data modeler lingo, the term “island” refers to an entity with no relationships to the rest of the model.



FIB-DM Package diagrams, Loans

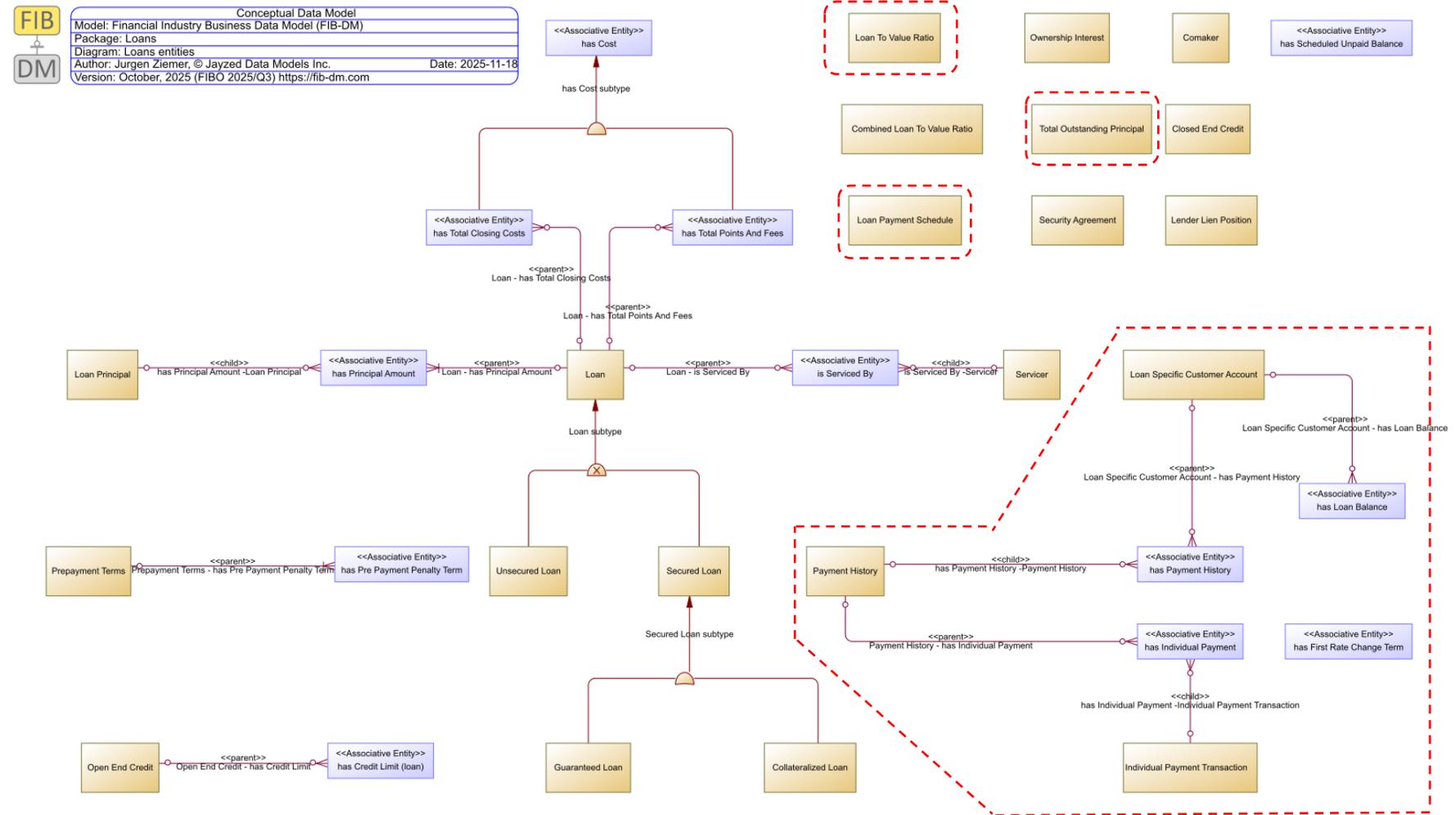
The Loans package diagram includes isolated entities, such as LTV, Principal, and Security Arrangement.

We also observe a cluster of entities modeling the account and payments with no Association to the Loan.

This is not a model defect. The FIB-DM package diagram depicts only the entities defined in the source ontology.

The Loans ontology imports other FIBO modules that define the Associative entities.

As we will see, supertypes of Loan, Account, and Payment have connecting Associative entities.



Navigation = the Path for query join, or population.

How do we “navigate” from the Loan to its LTV or Principal?

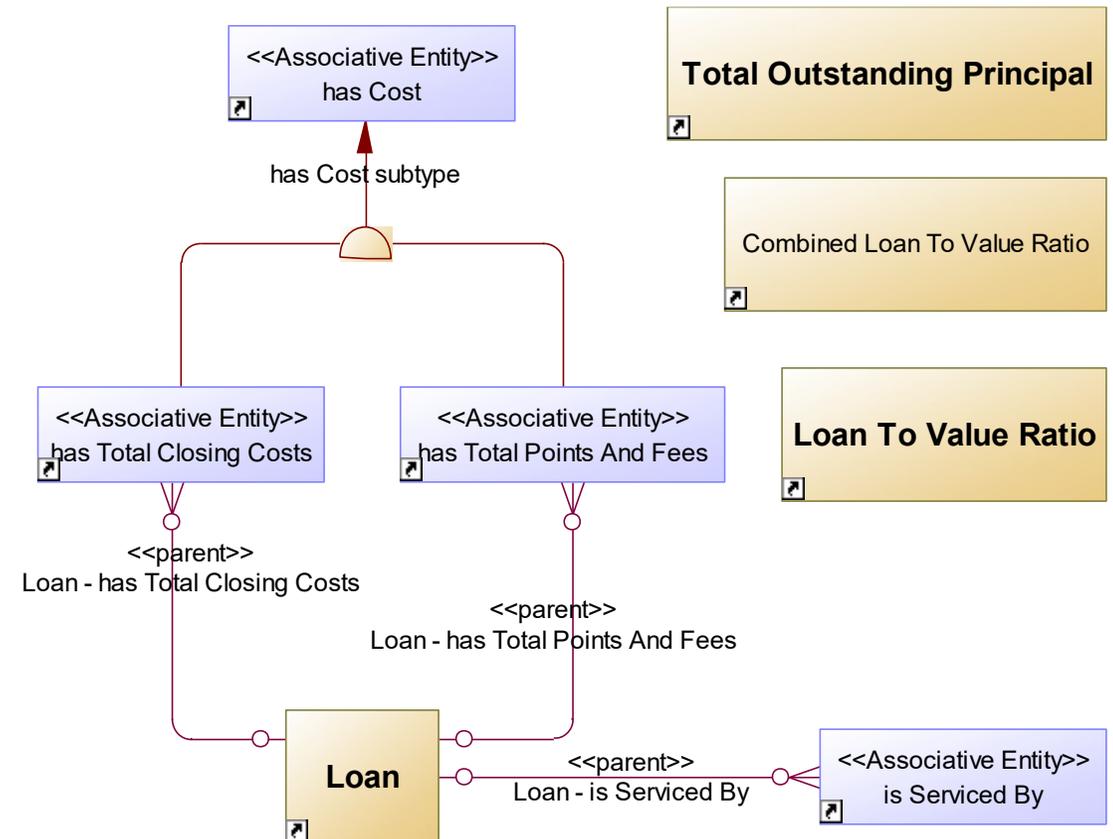
- Application developers need to query.
- ETL architects must populate the FIB-DM database.

There are no islands in the FIBO, and hence none in FIB-DM.

All FIB-DM entities have connecting relationships.

The FIB-DM modeler is responsible for scoping a consistent subset model (without islands).

In a 3000-entity data model, this is a challenge, even for FIBO/FIB-DM experts.



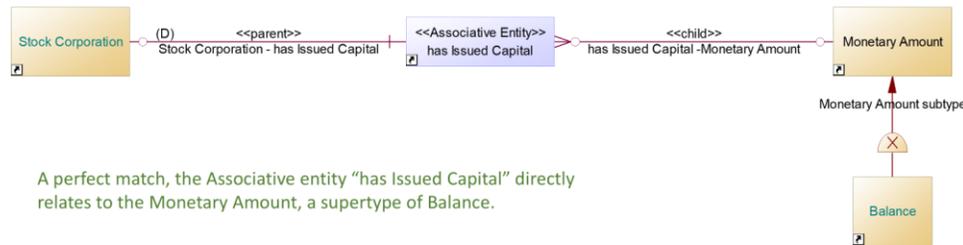
Supertype Associations

In the “Scoping our first data model” class, we added the supertypes of our scoped entities all the way to the ultimate FIB-DM concept entity.

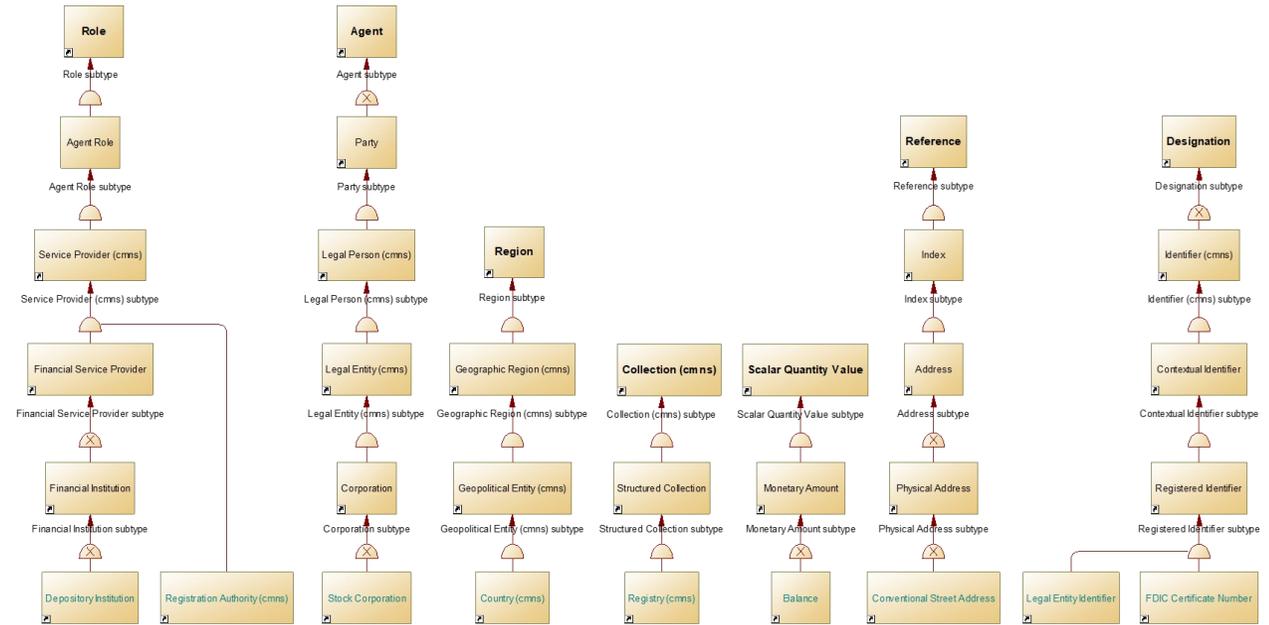
3.1 Stock Corporation - Balance

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.



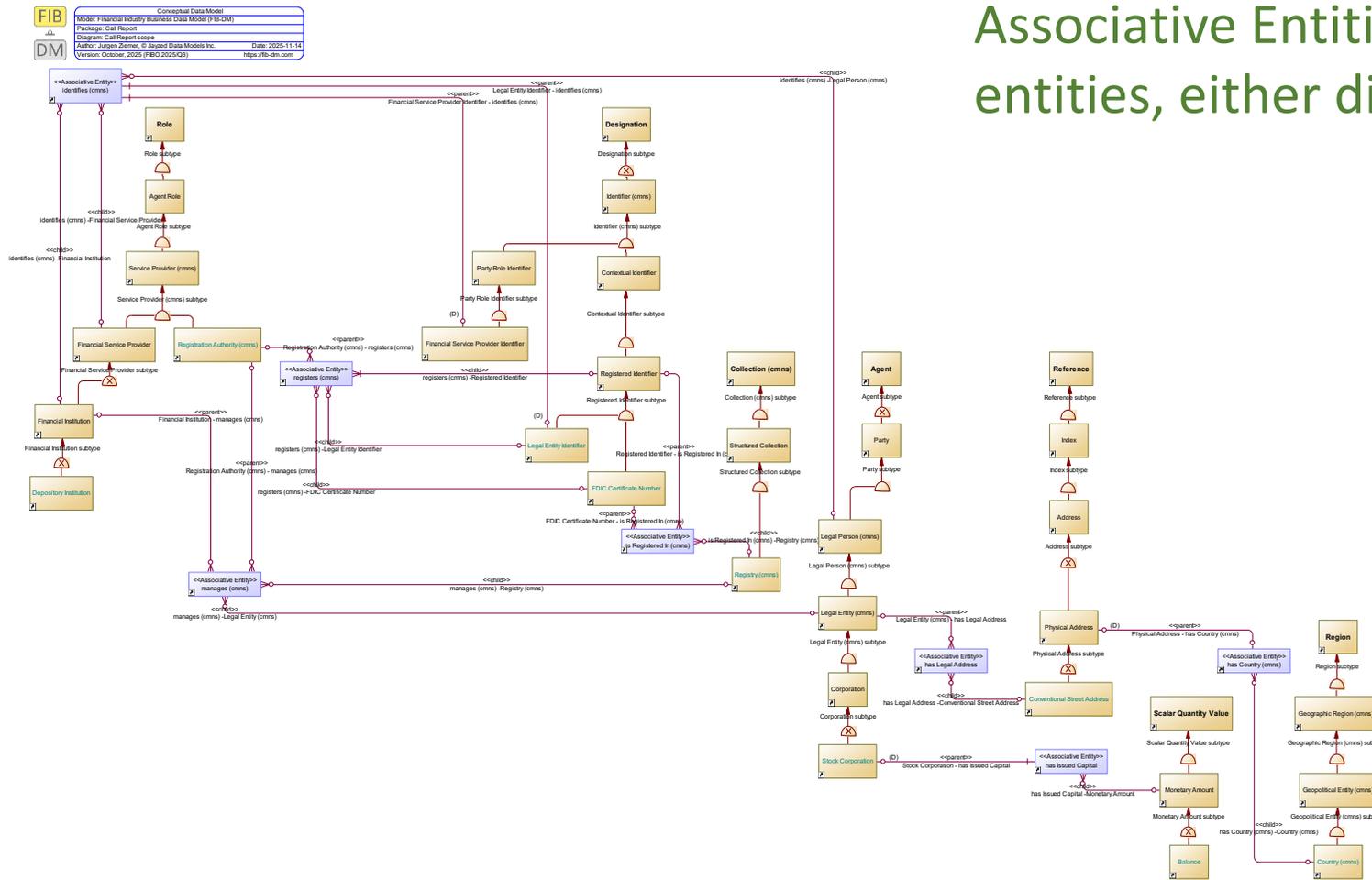
Then we scoped Associative Entities to match the business requirements in the Concept Map.



A consistent FIB-DM submodel

Associative Entities connect all required entities, either directly or via their supertypes.

No islands, no archipelagos.



But how do we find the correct FIB-DM Associative Entity?



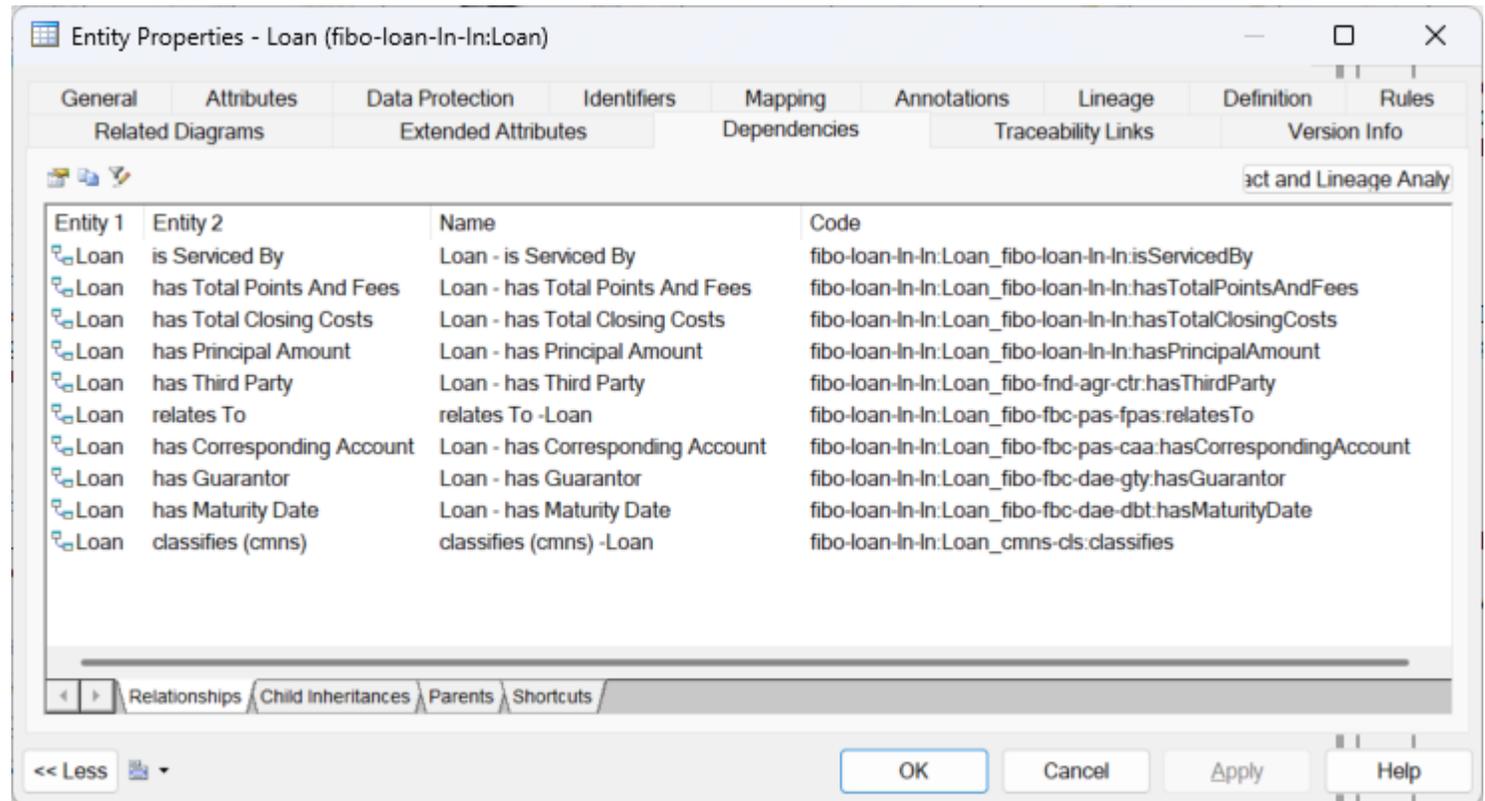
Navigating in the data modeling tool

In PowerDesigner, the Loan Entity Properties Relationships tab lists all connected Associative Entities.

The Code shows the four relationships depicted in our diagram, as well as additional relationships from other packages: FIBO Foundation (fnd), Finance Business & Commerce, and OMG Commons.

Alas, none of the Associative entities suggest a connection to a payment schedule. Maybe “relates to” is a candidate?

We have to navigate to Entity2 and examine its relationships.



Relationships of the Associative Entity

The “relates to” associative entity connects only two Base Entities:
The Loan Specific Customer Account and the Loan itself.

Take note: an important Association that relates accounts to loans and their subtypes, such as student, commercial, and mortgages.

However, we were looking for the Payment Schedule.

We must repeat the exercise for the Entity SuperTypes.

Entity 1	Entity 2	Name	Code
Loan Specific Customer Account	relates To	Loan S...	fibo-loan-ln-ln:LoanSpecificCustomerAccount_fibo-fbc-pas-fpas:relatesTo
Loan	relates To	relates ...	fibo-loan-ln-ln:Loan_fibo-fbc-pas-fpas:relatesTo

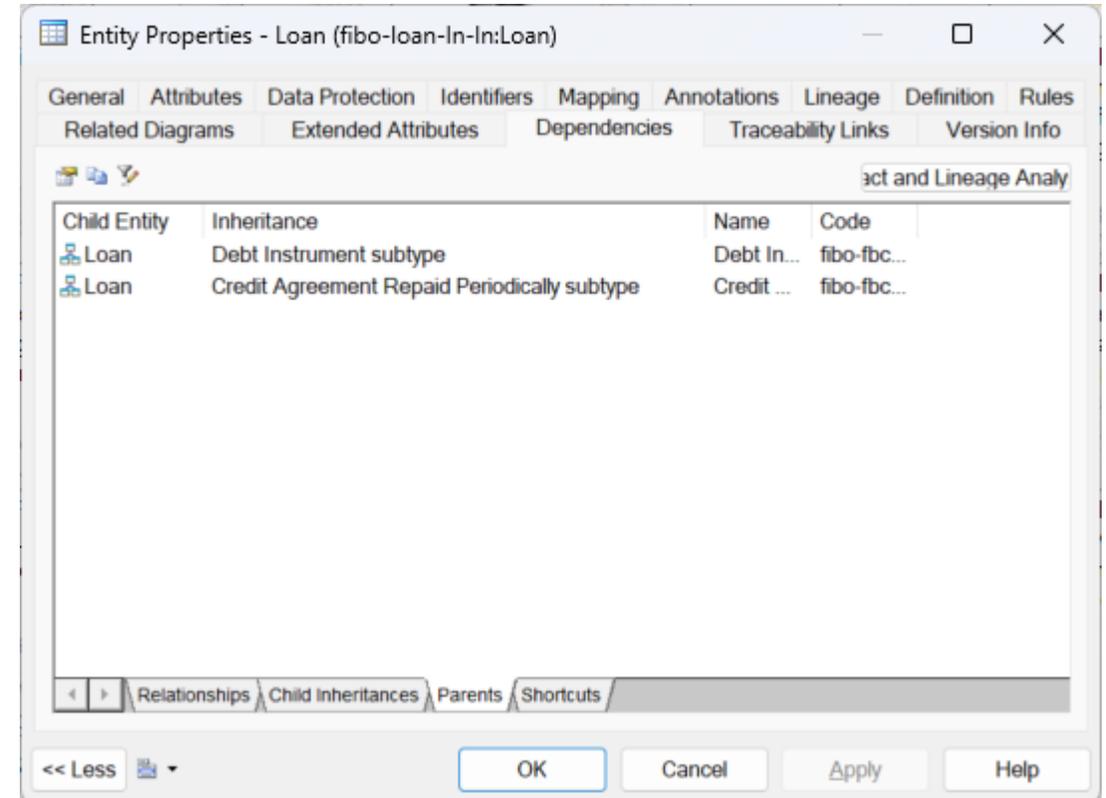


Supertypes of the Base Entity

In PowerDesigner, the Loan Entity Parents tab lists all supertypes of the entity.

We see that the Loan is both a Debt Instrument and a Credit Agreement Repaid Periodically.

We investigate Associative Entities related to the two supertypes.



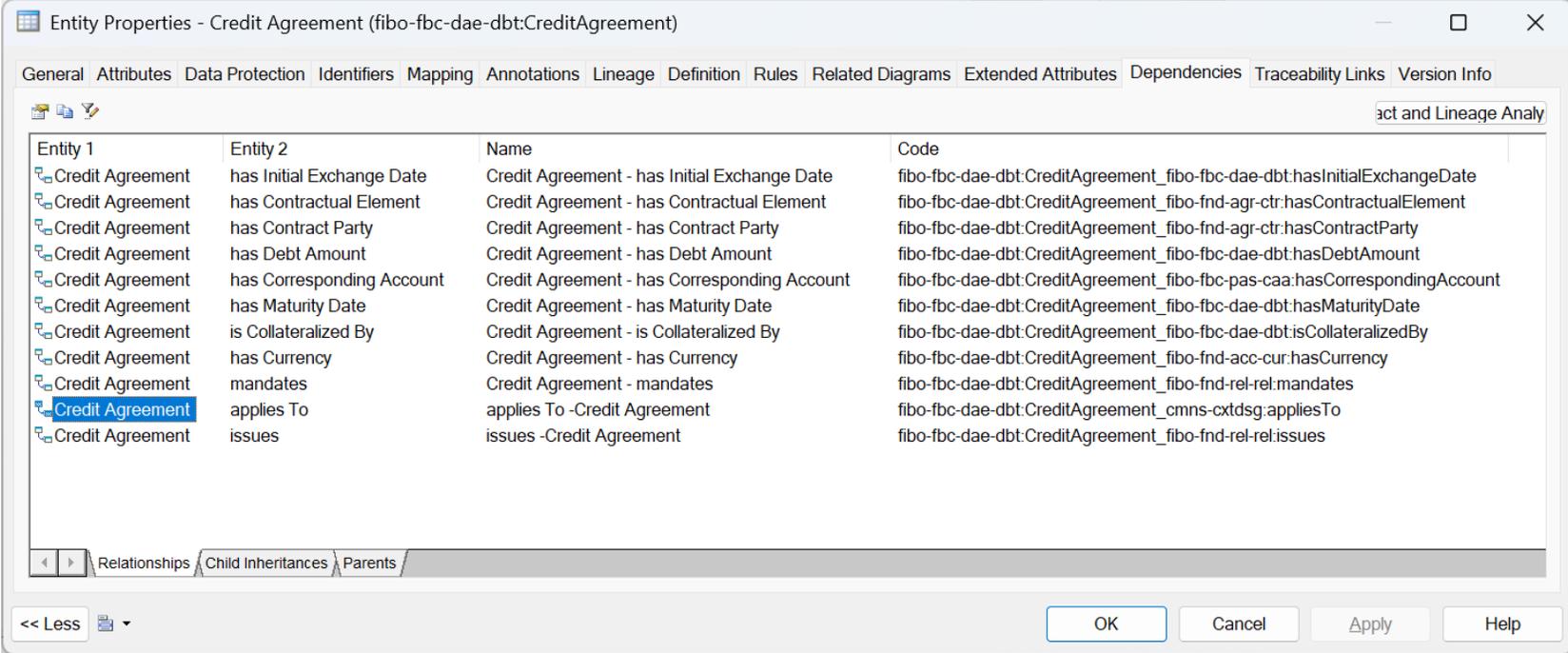
Associations of the supertype

The Credit Agreement has relationships with many Associate Entities.

The cms-cxtmsg:appliesTo relationship to the likenamed Associative entity appears to be a candidate.

Excursus: The code, left of the colon, derived from the ontology prefix. In this case, OMG Commons (cms), Contextual Designators (cxtmsg) module.

We explore the Associative entity.



The screenshot shows the 'Entity Properties' dialog for 'Credit Agreement (fibo-fbc-dae-dbt:CreditAgreement)'. The 'Relationships' tab is selected, displaying a table of relationships between 'Entity 1' and 'Entity 2'. The table has four columns: 'Entity 1', 'Entity 2', 'Name', and 'Code'. The 'Credit Agreement' relationship is highlighted in blue.

Entity 1	Entity 2	Name	Code
Credit Agreement	has Initial Exchange Date	Credit Agreement - has Initial Exchange Date	fibo-fbc-dae-dbt:CreditAgreement_fibo-fbc-dae-dbt:hasInitialExchangeDate
Credit Agreement	has Contractual Element	Credit Agreement - has Contractual Element	fibo-fbc-dae-dbt:CreditAgreement_fibo-fnd-agr-ctr:hasContractualElement
Credit Agreement	has Contract Party	Credit Agreement - has Contract Party	fibo-fbc-dae-dbt:CreditAgreement_fibo-fnd-agr-ctr:hasContractParty
Credit Agreement	has Debt Amount	Credit Agreement - has Debt Amount	fibo-fbc-dae-dbt:CreditAgreement_fibo-fbc-dae-dbt:hasDebtAmount
Credit Agreement	has Corresponding Account	Credit Agreement - has Corresponding Account	fibo-fbc-dae-dbt:CreditAgreement_fibo-fbc-pas-caa:hasCorrespondingAccount
Credit Agreement	has Maturity Date	Credit Agreement - has Maturity Date	fibo-fbc-dae-dbt:CreditAgreement_fibo-fbc-dae-dbt:hasMaturityDate
Credit Agreement	is Collateralized By	Credit Agreement - is Collateralized By	fibo-fbc-dae-dbt:CreditAgreement_fibo-fbc-dae-dbt:isCollateralizedBy
Credit Agreement	has Currency mandates	Credit Agreement - has Currency mandates	fibo-fbc-dae-dbt:CreditAgreement_fibo-fnd-acc-cur:hasCurrency
Credit Agreement	applies To	applies To -Credit Agreement	fibo-fbc-dae-dbt:CreditAgreement_fibo-fnd-rel-rel:mandates
Credit Agreement	issues	issues -Credit Agreement	fibo-fbc-dae-dbt:CreditAgreement_cmns-cxtmsg:appliesTo
Credit Agreement			fibo-fbc-dae-dbt:CreditAgreement_fibo-fnd-rel-rel:issues



Entities related to the Association

The OMG Commons “apples To” Associative Entities relates to numerous Base Entities. The foundational Object Property is quite generic and applied throughout the FIBO Data Model.

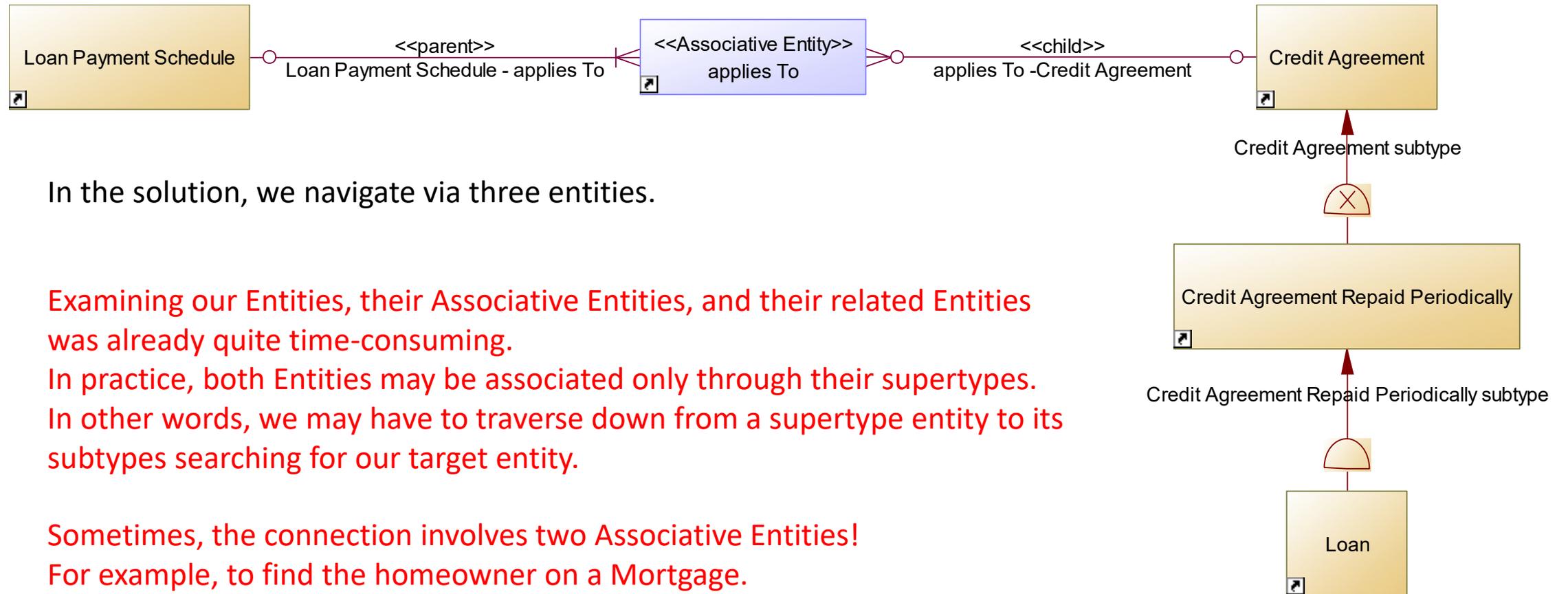
We find a direct match - a relationship - to the Loan Payment Schedule.

Entity 1	Entity 2	Name	Code
Enterprise	applies To	Enterprise - applies To	fib-ind-ei-ei:Enterprise_cmns-ctdsg:appliesTo
Establishment	applies To	Establishment - applies To	fib-ind-ei-ei:Establishment_cmns-ctdsg:appliesTo
Government Specified Statistical Area	applies To	applies To -Government Specified Statistical Area	fib-ind-ei-ei:GovernmentSpecifiedStatisticalArea_cmns-ctdsg:appliesTo
Household	applies To	Household - applies To	fib-ind-ei-ei:Household_cmns-ctdsg:appliesTo
Inflation Rate	applies To	Inflation Rate - applies To	fib-ind-ei-ei:InflationRate_cmns-ctdsg:appliesTo
Consumer Expenditure Survey	applies To	Consumer Expenditure Survey - applies To	fib-ind-ei-usei:ConsumerExpenditureSurvey_cmns-ctdsg:appliesTo
Employment Situation Establishment Su...	applies To	applies To -Employment Situation Establishment Survey	fib-ind-ei-usei:EmploymentSituationEstablishmentSurvey_cmns-ctdsg:appliesTo
Employment Situation Household Survey	applies To	applies To -Employment Situation Household Survey	fib-ind-ei-usei:EmploymentSituationHouseholdSurvey_cmns-ctdsg:appliesTo
Point Of Purchase Survey	applies To	Point Of Purchase Survey - applies To	fib-ind-ei-usei:PointOfPurchaseSurvey_cmns-ctdsg:appliesTo
Urban Consumer Price Index	applies To	Urban Consumer Price Index - applies To	fib-ind-ei-usei:UrbanConsumerPriceIndex_cmns-ctdsg:appliesTo
Urban Consumers Universe	applies To	applies To -Urban Consumers Universe	fib-ind-ei-usei:UrbanConsumersUniverse_cmns-ctdsg:appliesTo
Market Capitalization	applies To	Market Capitalization - applies To	fib-ind-mkt-bas:MarketCapitalization_cmns-ctdsg:appliesTo
Combined Loan To Value Ratio	applies To	Combined Loan To Value Ratio - applies To	fib-loan-ln-ln:CombinedLoanToValueRatio_cmns-ctdsg:appliesTo
Loan Payment Schedule	applies To	Loan Payment Schedule - applies To	fib-loan-ln-ln:LoanPaymentSchedule_cmns-ctdsg:appliesTo
Loan Specific Customer Account	applies To	applies To -Loan Specific Customer Account	fib-loan-ln-ln:LoanSpecificCustomerAccount_cmns-ctdsg:appliesTo
Loan To Value Ratio	applies To	Loan To Value Ratio - applies To	fib-loan-ln-ln:LoanToValueRatio_cmns-ctdsg:appliesTo
Card Account	applies To	applies To -Card Account	fib-loan-spc-crd:CardAccount_cmns-ctdsg:appliesTo
Card Verification Code Value	applies To	Card Verification Code Value - applies To	fib-loan-spc-crd:CardVerificationCodeValue_cmns-ctdsg:appliesTo
Credit Card Account	applies To	applies To -Credit Card Account	fib-loan-spc-crd:CreditCardAccount_cmns-ctdsg:appliesTo
Credit Card Agreement	applies To	Credit Card Agreement - applies To	fib-loan-spc-crd:CreditCardAgreement_cmns-ctdsg:appliesTo
Payment Card	applies To	applies To -Payment Card	fib-loan-spc-crd:PaymentCard_cmns-ctdsg:appliesTo
Payment Card Agreement	applies To	Payment Card Agreement - applies To	fib-loan-spc-crd:PaymentCardAgreement_cmns-ctdsg:appliesTo
Assessment Boundary	applies To	Assessment Boundary - applies To - Assessment Boundary	fib-loan-spc-grn:AssessmentBoundary_cmns-ctdsg:appliesTo
Debt Offering	applies To	Debt Offering - applies To	fib-sec-dbt-dbt:DebtOffering_cmns-ctdsg:appliesTo
Debt Pool Statistical Measure	applies To	Debt Pool Statistical Measure - applies To	fib-sec-dbt-pbs:DebtPoolStatisticalMeasure_cmns-ctdsg:appliesTo
Share Issuer	applies To	applies To -Share Issuer	fib-sec-eq-eq:ShareIssuer_cmns-ctdsg:appliesTo
Basel III Designation	applies To	applies To -Basel III Designation	fib-sec-sec-eurst:BaselIIIDesignation_cmns-ctdsg:appliesTo
National Security Identification Scheme	applies To	National Security Identification Scheme - applies To	fib-sec-sec-id:NationalSecurityIdentificationScheme_cmns-ctdsg:appliesTo
Security Registry Entry	applies To	Security Registry Entry - applies To	fib-sec-sec-id:SecurityRegistryEntry_cmns-ctdsg:appliesTo
Financial Instrument Global Identifier Re...	applies To	Financial Instrument Global Identifier Registry Entry - applies To	fib-sec-sec-id:FinancialInstrumentGlobalIdentifierRegistryEntry_cmns-ctdsg:appliesTo



From Loan Payment Schedule to Loan

The Loan Payment Schedule “applies To” a Credit Agreement, which is a supertype of the Loan.



In the solution, we navigate via three entities.

Examining our Entities, their Associative Entities, and their related Entities was already quite time-consuming.

In practice, both Entities may be associated only through their supertypes.

In other words, we may have to traverse down from a supertype entity to its subtypes searching for our target entity.

Sometimes, the connection involves two Associative Entities!

For example, to find the homeowner on a Mortgage.



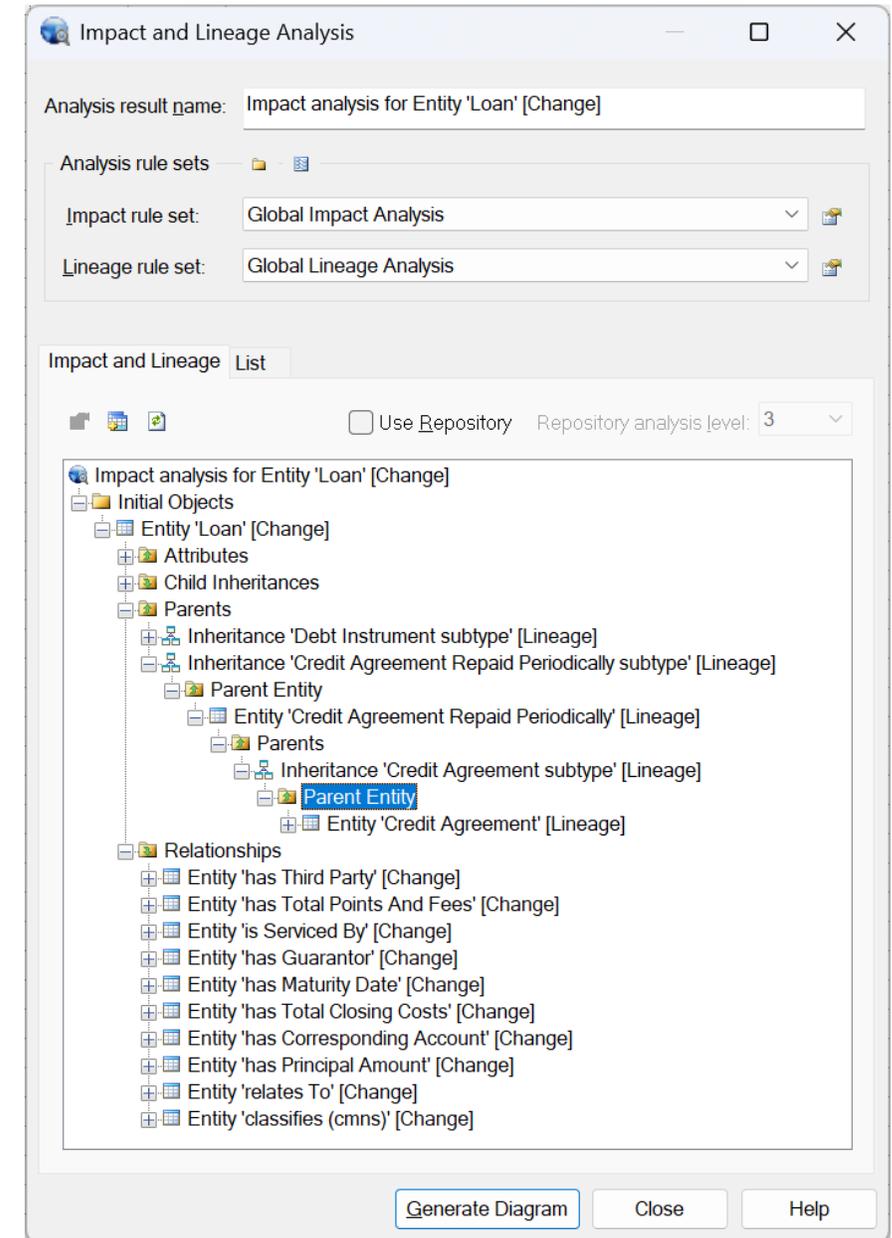
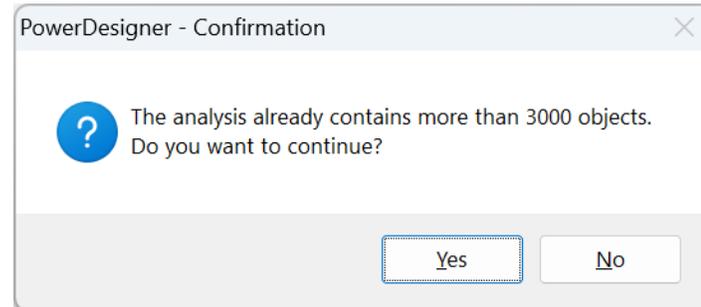
PD Impact Analysis

PowerDesigner has an Impact Analysis that shows the Loan Relationships. So we can find the Loan Specific Customer Account.

We also see the Loan supertypes (parents).

However, the Impact Analysis does not show the relationships of the Credit Agreement.

Also, at 3000 impacted model objects, PowerDesigner has reached its limitations.



The challenge in summary

“Islands,” entities or clusters of entities without connections to the rest of the model, are a data model defect.

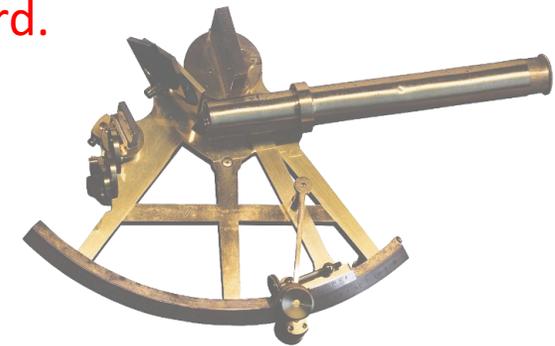
There are no islands in the FIBO, and hence none in FIB-DM.
All FIB-DM entities have connecting relationships.



The way from one entity to another often traverses their supertypes. Sometimes, the route involves an intermediate base entity and two Associative entities.

Finding the route in the data modeling tool can be slow and cumbersome, even for FIBO Experts.
FIBO/FIB-DM novices are overwhelmed by the size of the industry standard.

FIB-DM Data Architects need a fast and comprehensive tool to analyse
Entity hierarchies and Associations.



Introducing the FIB-DM Navigator

The Entity_1_Association_Entity_2 tab shows all Associative Entities that are related to the Loan and Loan Payment Schedule, or their supertypes.

We are not interested in the Loan supertypes of Debt and Financial Instrument. *The Credit Agreement applies to our route.*

Entity_1	Parent_1	Distance_1	Stereotype_1	Associative_Entity	Entity_2	Parent_2	Stereotype_2	Distance_2
✗ fibo-loan-ln-ln:Loan	fibo-fbc-fi-fi:DebtInstrument	1	child	cmns-cxtmsg:appliesTo	fibo-loan-ln-ln:LoanPaymentSchedule	fibo-loan-ln-ln:LoanPaymentSchedule	parent	0
✗ fibo-loan-ln-ln:Loan	fibo-fbc-fi-fi:DebtInstrument	1	child	cmns-col:hasMember	fibo-fnd-pas-psch:PaymentSchedule	fibo-fnd-pas-psch:PaymentSchedule	parent	1
✓ fibo-loan-ln-ln:Loan	fibo-fbc-dae-dbt:CreditAgreement	2	child	cmns-cxtmsg:appliesTo	fibo-loan-ln-ln:LoanPaymentSchedule	fibo-loan-ln-ln:LoanPaymentSchedule	parent	0
✗ fibo-loan-ln-ln:Loan	fibo-fbc-fi-fi:FinancialInstrument	2	child	cmns-col:hasMember	fibo-fnd-pas-psch:PaymentSchedule	fibo-fnd-pas-psch:PaymentSchedule	parent	1

On the left side are the first Entity, its Parent (supertype), and the distance (number of hierarchy levels from Entity to Parent).

The Associative Entities are in the center of the table: hasMember and appliesTo

On the right, the same information for the second Entity.



Navigator source data

The Navigator comprises 23 worksheets and MS Power Queries.

Input data are 3 FIB-DM release reports defined in PowerDesigner and shipped with the quarterly releases. (FIBO Q4/2025 for this tutorial): The Entity Definitions, Relationships, and Inheritances (subtypes).

Analytics worksheets sort, filter, and merge the input data sheets. They are useful views for the Data Architect or Subject Matter Expert, as well as for gradually arriving at complex analytics, such as the Associations between two entities.

The following slides provide a detailed explanation of the worksheets.

The screenshot shows the PowerDesigner interface. On the left is the Object Browser with a tree view of the model structure. The main area displays a Conceptual Data Model for 'Simple Knowledge Organization System'. A dialog box titled 'List Report Properties - Subtypes (Subtypes)' is open, showing a table of entity relationships.

Code	Parent Entity Code	Parent Entity Stere	Child Entity Code
2730	fib-loan-in-in.CollateralizedLoan - fib-loan-in-in	fib-loan-in-in.CollateralizedLoan	fib-loan-reln-mtg.LoanSecuredByRealEstate
2731	fib-loan-in-in.CollateralizedLoan - fib-loan-in-in	fib-loan-in-in.CollateralizedLoan	fib-loan-spc-cns.MotorVehicleLoan
2732	fib-loan-in-in.hasCost - fib-loan-in-in.hasCost	fib-loan-in-in.hasCost	fib-loan-in-in.hasTotalClosingCosts
2733	fib-loan-in-in.hasCost - fib-loan-in-in.hasCost	fib-loan-in-in.hasCost	fib-loan-in-in.hasTotalPointsAndFees
2734	fib-loan-in-in.Loan - fib-loan-in-in.Loan_ST - fib	fib-loan-in-in.Loan	fib-loan-in-in.SecuredLoan
2735	fib-loan-in-in.Loan - fib-loan-in-in.Loan_ST - fib	fib-loan-in-in.Loan	fib-loan-in-in.UnsecuredLoan
2736	fib-loan-in-in.Loan - fib-loan-in-in.Loan_ST - fib	fib-loan-in-in.Loan	fib-loan-spc-cns.ConsumerLoan
2737	fib-loan-in-in.Loan - fib-loan-in-in.Loan_ST - fib	fib-loan-in-in.Loan	fib-loan-spc-com.CommercialLoan
2738	fib-loan-in-in.Loan - fib-loan-in-in.Loan_ST - fib	fib-loan-in-in.Loan	fib-loan-spc-stu.StudentLoan
2739	fib-loan-in-in.OpenEndCredit - fib-loan-in-in.Op	fib-loan-in-in.OpenEndCredit	fib-loan-reln-mtg.OpenEndMortgageLoan
2740	fib-loan-in-in.SecuredLoan - fib-loan-in-in.Secu	fib-loan-in-in.SecuredLoan	fib-loan-in-in.CollateralizedLoan
2741	fib-loan-in-in.SecuredLoan - fib-loan-in-in.Secu	fib-loan-in-in.SecuredLoan	fib-loan-in-in.GuaranteedLoan
2742	fib-loan-in-in.SecuredLoan - fib-loan-in-in.Secu	fib-loan-in-in.SecuredLoan	fib-loan-spc-cns.SecuredConsumerLoan
2743	fib-loan-in-in.UnsecuredLoan - fib-loan-in-in.U	fib-loan-in-in.UnsecuredLoan	fib-loan-spc-cns.UnsecuredConsumerLoan
2744	fib-loan-reln-mtg.ClosedEndMortgageLoan - fib	fib-loan-reln-mtg.ClosedEndMortgageLoan	fib-loan-reln-mtg.ClosedEndReverseMortgage
2745	fib-loan-reln-mtg.LoanSecuredByRealEstate - fi	fib-loan-reln-mtg.LoanSecuredByRealEstate	fib-loan-reln-mtg.ClosedEndMortgageLoan
2746	fib-loan-reln-mtg.LoanSecuredByRealEstate - fi	fib-loan-reln-mtg.LoanSecuredByRealEstate	fib-loan-reln-mtg.OpenEndMortgageLoan
2747	fib-loan-reln-mtg.LoanSecuredByRealEstate - fi	fib-loan-reln-mtg.LoanSecuredByRealEstate	fib-loan-reln-mtg.ReverseMortgageLoan
2748	fib-loan-reln-mtg.LoanSecuredByRealEstate - fi	fib-loan-reln-mtg.LoanSecuredByRealEstate	fib-loan-spc-cns.HomeEquityLineOfCredit
2749	fib-loan-reln-mtg.OpenEndMortgageLoan - fibo-	fib-loan-reln-mtg.OpenEndMortgageLoan	fib-loan-reln-mtg.OpenEndReverseMortgage
2750	fib-loan-reln-mtg.ReverseMortgageLoan - fibo-l	fib-loan-reln-mtg.ReverseMortgageLoan	fib-loan-reln-mtg.ClosedEndReverseMortgage
2751	fib-loan-reln-mtg.ReverseMortgageLoan - fibo-l	fib-loan-reln-mtg.ReverseMortgageLoan	fib-loan-reln-mtg.OpenEndReverseMortgaae



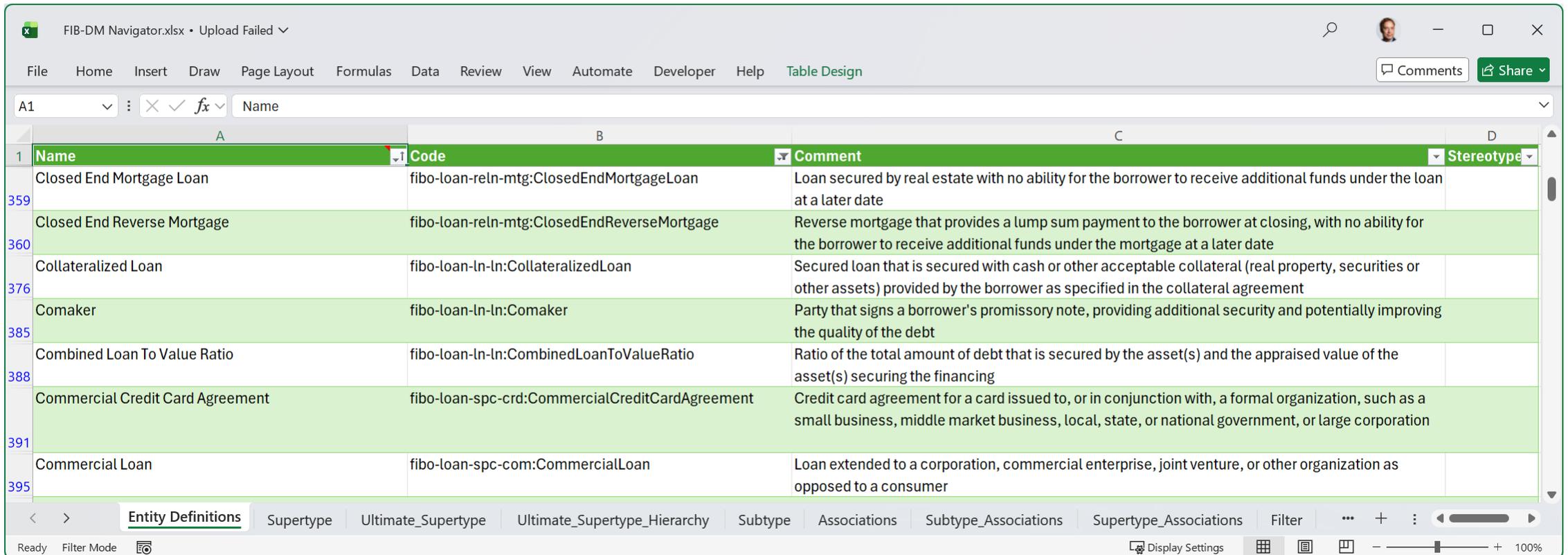
Data Architect



Business, SME

Entity Definitions

This sheet is a copy of the FIB-DM Release Entities Report. Users sort and filter to look up entity names and definitions. For MS Power Queries that populate analytics sheets, the report provides a list of all entities and their Stereotype to differentiate Base from Associative Entities.



Name	Code	Comment	Stereotype
Closed End Mortgage Loan	fibloan-reln-mtg:ClosedEndMortgageLoan	Loan secured by real estate with no ability for the borrower to receive additional funds under the loan at a later date	
Closed End Reverse Mortgage	fibloan-reln-mtg:ClosedEndReverseMortgage	Reverse mortgage that provides a lump sum payment to the borrower at closing, with no ability for the borrower to receive additional funds under the mortgage at a later date	
Collateralized Loan	fibloan-ln-ln:CollateralizedLoan	Secured loan that is secured with cash or other acceptable collateral (real property, securities or other assets) provided by the borrower as specified in the collateral agreement	
Comaker	fibloan-ln-ln:Comaker	Party that signs a borrower's promissory note, providing additional security and potentially improving the quality of the debt	
Combined Loan To Value Ratio	fibloan-ln-ln:CombinedLoanToValueRatio	Ratio of the total amount of debt that is secured by the asset(s) and the appraised value of the asset(s) securing the financing	
Commercial Credit Card Agreement	fibloan-spc-crd:CommercialCreditCardAgreement	Credit card agreement for a card issued to, or in conjunction with, a formal organization, such as a small business, middle market business, local, state, or national government, or large corporation	
Commercial Loan	fibloan-spc-com:CommercialLoan	Loan extended to a corporation, commercial enterprise, joint venture, or other organization as opposed to a consumer	



Supertype

The worksheet flattens the recursive hierarchy of the data model subtype report.

Filtered for the Closed End Mortgage Loan, it shows all supertypes (Parent) of an entity. The Distance is the number of hierarchy levels from the Entity to the Parent.

The Architect can see all supertypes at a glance, rather than manually traversing the hierarchy in the modeling tool.

The Navigator joins this sheet in analytical queries to determine all Associations of a given entity.

	A	B	C
1	Entity	Parent	Distance
13036	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	0
13037	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-loan-ln-ln:ClosedEndCredit	1
13038	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-loan-reln-mtg:LoanSecuredByRealEstate	1
13039	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-fbc-dae-dbt:CreditAgreement	2
13040	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-loan-ln-ln:CollateralizedLoan	2
13041	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-fnd-agr-ctr:WrittenContract	3
13042	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-loan-ln-ln:SecuredLoan	3
13043	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-fnd-agr-ctr:Contract	4
13044	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-loan-ln-ln:Loan	4
13045	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-fnd-agr-agr:Agreement	5
13046	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-fbc-fi-fi:DebtInstrument	5
13047	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-fbc-dae-dbt:CreditAgreementRepaidPeriodically	5
13048	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-fbc-fi-fi:FinancialInstrument	6
13049	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	cmns-pts:Situation	6
13050	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-fbc-dae-dbt:CreditAgreement	6
13051	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-fnd-agr-ctr:WrittenContract	7
13052	fibonacci-loan-reln-mtg:ClosedEndMortgageLoan	fibonacci-fnd-agr-ctr:Contract	8



Data Architect



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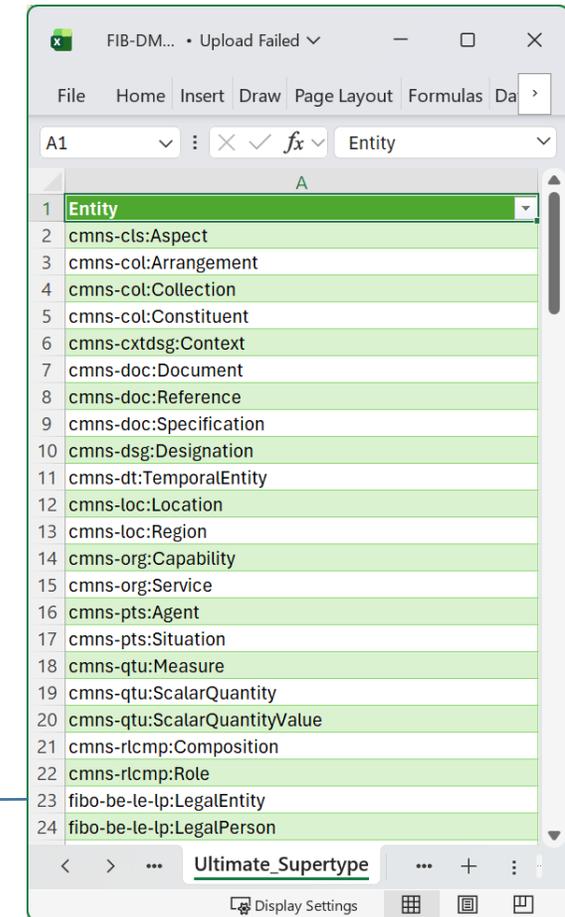
Ultimate Supertype

Ultimate supertypes are entities that are not a subtype of (have to inheritances from) other data model entities.

They derive from ontology classes that are only `rfs:subType of The Thing`.

FIBO imports the OMG Commons Ontology Library, and Commons Entities (code starting `cmns-`) are now the ultimate supertype for 90% of FIBO-DM entities.

Note: Likenamed OMG Commons entities have replaced the FIBO Legal Entity and Legal Person, but they are still listed as ultimate supertypes. However, the FIBO entities are deprecated and will be removed in future ontology and data model releases.



Ultimate Supertype Hierarchy

The worksheet lists all subtypes of an ultimate supertype.
The table is a join of Ultimate Supertype and subtypes.

The distance column shows the subtype's level.

The screenshot shows the Situation hierarchy.
Direct suptypes (Distace 1) relevant for Loans are the Commitment and the Agreement.
Distance, level 2 shows the Guarantee and the Contract.

The screenshot shows an Excel spreadsheet titled "FIB-DM Navigator.xlsx". The table has three columns: "Entity", "Subtype", and "Distance". The "Entity" column contains "cmns-pts:Situation" for all rows. The "Subtype" column lists various subtypes, and the "Distance" column shows the level of the subtype. The table is filtered to show subtypes with a distance of 1 and 2.

	Entity	Subtype	Distance
1	cmns-pts:Situation	cmns-pts:Situation	0
1169	cmns-pts:Situation	cmns-bauth:Authorization	1
1171	cmns-pts:Situation	cmns-org:Membership	1
1172	cmns-pts:Situation	fibc-fbc-pas-fpas:Trade	1
1173	cmns-pts:Situation	fibc-fnd-agr-agr:Agreement	1
1174	cmns-pts:Situation	fibc-fnd-agr-agr:Commitment	1
1175	cmns-pts:Situation	fibc-fnd-gao-obj:Program	1
1176	cmns-pts:Situation	fibc-fnd-gao-obj:Project	1
1177	cmns-pts:Situation	fibc-fnd-gao-obj:Study	1
1178	cmns-pts:Situation	fibc-fnd-oac-ctl:Control	1
1179	cmns-pts:Situation	fibc-fnd-oac-oac:OwnershipControlSituation	1
1180	cmns-pts:Situation	fibc-fnd-oac-own:Ownership	1
1181	cmns-pts:Situation	fibc-fnd-pas-pas:Sale	1
1182	cmns-pts:Situation	fibc-be-oac-cctl:Affiliation	2
1183	cmns-pts:Situation	fibc-be-oac-cown:BeneficialOwnership	2
1184	cmns-pts:Situation	fibc-be-oac-exec:BoardCompositionControl	2
1185	cmns-pts:Situation	fibc-be-oac-exec:BoardMembership	2
1186	cmns-pts:Situation	fibc-be-oac-opty:EntityOwnership	2
1187	cmns-pts:Situation	fibc-fbc-dae-dbt:Debt	2
1188	cmns-pts:Situation	fibc-fbc-dae-gty:Guaranty	2
1189	cmns-pts:Situation	fibc-fbc-fi-fi:SecuritiesTransaction	2
1190	cmns-pts:Situation	fibc-fbc-pas-fpas:Holding	2
1191	cmns-pts:Situation	fibc-fnd-agr-agr:BilateralAgreement	2
1192	cmns-pts:Situation	fibc-fnd-agr-agr:MultilateralAgreement	2
1193	cmns-pts:Situation	fibc-fnd-agr-agr:UnilateralCommitment	2
1194	cmns-pts:Situation	fibc-fnd-agr-ctr:Contract	2
1195	cmns-pts:Situation	fibc-fnd-agr-ctr:TermSheet	2
1196	cmns-pts:Situation	fibc-fnd-oac-ctl:DeFactoControl	2
1197	cmns-pts:Situation	fibc-fnd-oac-ctl:DeJureControl	2
1198	cmns-pts:Situation	fibc-fnd-org-fm:Employment	2
1199	cmns-pts:Situation	fibc-fnd-pas-psch:PaymentObligation	2
1200	cmns-pts:Situation	fibc-fnd-utl-afx:StatisticalProgram	2
1201	cmns-pts:Situation	fibc-loan-spc-grn:EnvironmentalProgram	2

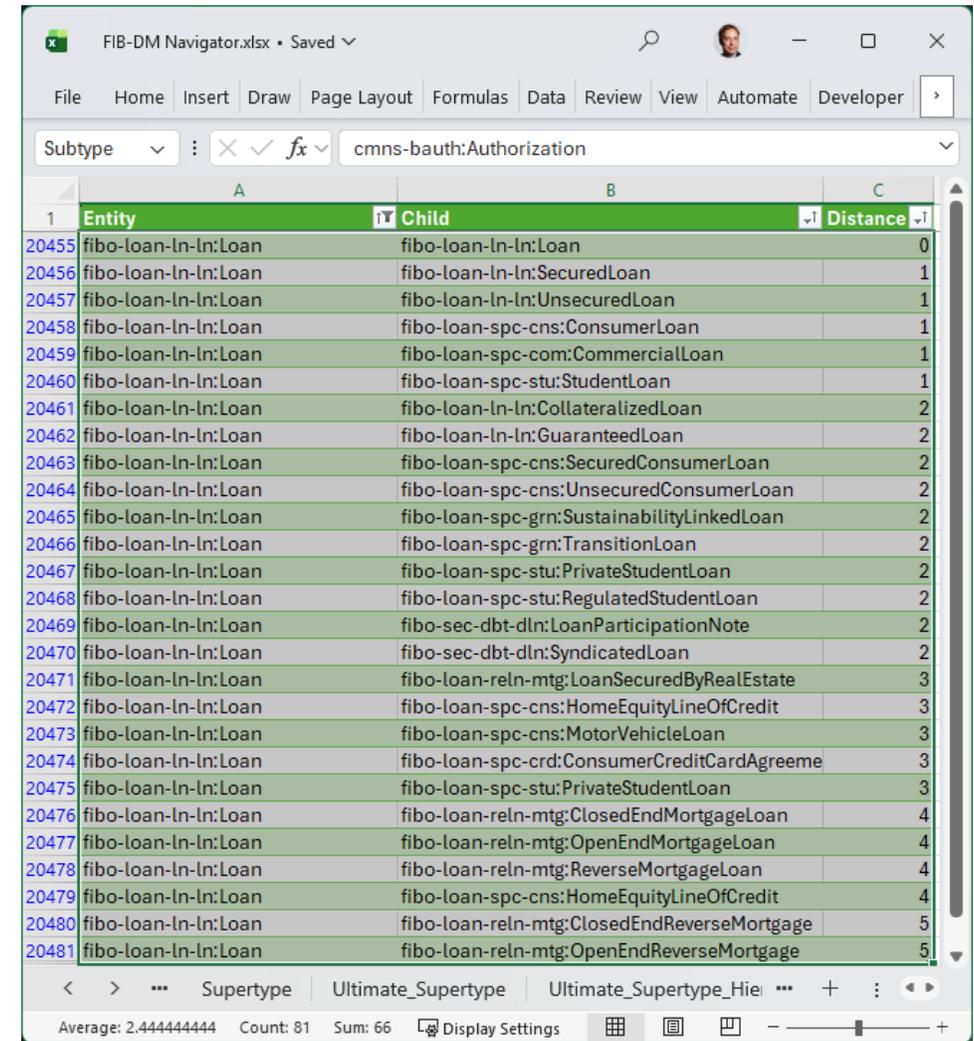


Subtype

The worksheet list all subtypes of FIB-DM entities.

The screenshot example is filtered for the Loan entity.

This is a useful filter for the Architect or Subject Matter Expert to find specialization like Consumer, Commercial loans and mortgages.



	A	B	C
1	Entity	Child	Distance
20455	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0
20456	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:SecuredLoan	1
20457	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:UnsecuredLoan	1
20458	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-cns:ConsumerLoan	1
20459	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-com:CommercialLoan	1
20460	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-stu:StudentLoan	1
20461	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:CollateralizedLoan	2
20462	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:GuaranteedLoan	2
20463	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-cns:SecuredConsumerLoan	2
20464	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-cns:UnsecuredConsumerLoan	2
20465	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-grn:SustainabilityLinkedLoan	2
20466	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-grn:TransitionLoan	2
20467	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-stu:PrivateStudentLoan	2
20468	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-stu:RegulatedStudentLoan	2
20469	fiblo-loan-ln-ln:Loan	fiblo-sec-dbt-dln:LoanParticipationNote	2
20470	fiblo-loan-ln-ln:Loan	fiblo-sec-dbt-dln:SyndicatedLoan	2
20471	fiblo-loan-ln-ln:Loan	fiblo-loan-reln-mtg:LoanSecuredByRealEstate	3
20472	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-cns:HomeEquityLineOfCredit	3
20473	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-cns:MotorVehicleLoan	3
20474	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-crd:ConsumerCreditCardAgreeme	3
20475	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-stu:PrivateStudentLoan	3
20476	fiblo-loan-ln-ln:Loan	fiblo-loan-reln-mtg:ClosedEndMortgageLoan	4
20477	fiblo-loan-ln-ln:Loan	fiblo-loan-reln-mtg:OpenEndMortgageLoan	4
20478	fiblo-loan-ln-ln:Loan	fiblo-loan-reln-mtg:ReverseMortgageLoan	4
20479	fiblo-loan-ln-ln:Loan	fiblo-loan-spc-cns:HomeEquityLineOfCredit	4
20480	fiblo-loan-ln-ln:Loan	fiblo-loan-reln-mtg:ClosedEndReverseMortgage	5
20481	fiblo-loan-ln-ln:Loan	fiblo-loan-reln-mtg:OpenEndReverseMortgage	5



Associations

This table is central to finding the connections between two entities.

For each Base Entity, it lists all Associative entities connected by a relationship.

The worksheet is derived from the Data Model relationships report, with Base and Associative entities as Entity 1 and Entity 2.

The Stereotype indicates the directions of the relationship. For example, the Loan (parent) has a Guarantor.

The Configurable Ontology to Data model Transformation (CODT) derives the stereotype from the object property's domain (parent) and range (child), as well as from class restrictions.

	A	B	C
1	Base_Entity	Associative_Entity	Stereotype
2870	fibo-loan-ln-ln:CollateralizedLoan	fibo-fbc-dae-dbt:isCollateralizedBy	parent
2871	fibo-loan-ln-ln:CollateralizedLoan	fibo-fnd-agr-ctr:isPrimaryContractFor	parent
2872	fibo-loan-ln-ln:CombinedLoanToValueRatio	cmns-cxtmsg:appliesTo	parent
2873	fibo-loan-ln-ln:CombinedLoanToValueRatio	cmns-doc:refersTo	parent
2874	fibo-loan-ln-ln:CombinedLoanToValueRatio	cmns-qtu:hasArgument	parent
2875	fibo-loan-ln-ln:GuaranteedLoan	cmns-col:comprises	parent
2876	fibo-loan-ln-ln:GuaranteedLoan	fibo-fbc-dae-gty:hasGuarantor	parent
2877	fibo-loan-ln-ln:IndividualPaymentTransaction	fibo-loan-ln-ln:hasIndividualPayment	child
2878	fibo-loan-ln-ln:LenderLienPosition	cmns-cls:classifies	parent
2879	fibo-loan-ln-ln:Loan	cmns-cls:classifies	child
2880	fibo-loan-ln-ln:Loan	fibo-fbc-dae-dbt:hasMaturityDate	parent
2881	fibo-loan-ln-ln:Loan	fibo-fbc-dae-gty:hasGuarantor	parent
2882	fibo-loan-ln-ln:Loan	fibo-fbc-pas-cao:hasCorrespondingAccount	parent
2883	fibo-loan-ln-ln:Loan	fibo-fbc-pas-fpas:relatesTo	child
2884	fibo-loan-ln-ln:Loan	fibo-fnd-agr-ctr:hasThirdParty	parent
2885	fibo-loan-ln-ln:Loan	fibo-loan-ln-ln:hasPrincipalAmount	parent
2886	fibo-loan-ln-ln:Loan	fibo-loan-ln-ln:hasTotalClosingCosts	parent
2887	fibo-loan-ln-ln:Loan	fibo-loan-ln-ln:hasTotalPointsAndFees	parent
2888	fibo-loan-ln-ln:Loan	fibo-loan-ln-ln:isServedBy	parent
2889	fibo-loan-ln-ln:LoanPaymentSchedule	cmns-cxtmsg:appliesTo	parent
2890	fibo-loan-ln-ln:LoanPaymentSchedule	fibo-fnd-pas-psch:hasPaymentSchedule	child
2891	fibo-loan-ln-ln:LoanSpecificCustomerAccount	cmns-cxtmsg:appliesTo	child
2892	fibo-loan-ln-ln:LoanSpecificCustomerAccount	cmns-org:provides	child
2893	fibo-loan-ln-ln:LoanSpecificCustomerAccount	fibo-fbc-pas-cao:appliesToAccount	child
2894	fibo-loan-ln-ln:LoanSpecificCustomerAccount	fibo-fbc-pas-cao:hasCorrespondingAccount	child
2895	fibo-loan-ln-ln:LoanSpecificCustomerAccount	fibo-fbc-pas-fpas:relatesTo	parent
2896	fibo-loan-ln-ln:LoanSpecificCustomerAccount	fibo-fnd-pas-psch:hasPaymentSchedule	parent
2897	fibo-loan-ln-ln:LoanSpecificCustomerAccount	fibo-fnd-rel-rel:holds	child
2898	fibo-loan-ln-ln:LoanSpecificCustomerAccount	fibo-loan-ln-ln:hasLoanBalance	parent
2899	fibo-loan-ln-ln:LoanSpecificCustomerAccount	fibo-loan-ln-ln:hasPaymentHistory	parent
2900	fibo-loan-ln-ln:LoanToValueRatio	cmns-cxtmsg:appliesTo	parent
2901	fibo-loan-ln-ln:LoanToValueRatio	cmns-doc:refersTo	parent
2902	fibo-loan-ln-ln:LoanToValueRatio	cmns-qtu:hasArgument	parent
2903	fibo-loan-ln-ln:OpenEndCredit	fibo-fbc-dae-dbt:hasCreditLimit	parent
2904	fibo-loan-ln-ln:OwnershipInterest	cmns-cls:classifies	parent



Subtype Associations

The worksheet shows all Associations of an Entity, including its subtypes.

The FIB-DM Architect uses the report to expand the scope of her subset model.

The Loan example in the screenshot lists important Associations to pull into scope, such as Principal, Guarantor, Account, Borrower, Schedule, Collateral, and Contractual Elements.

The screenshot shows a spreadsheet titled "FIB-DM Navigator.xlsx" with a table of associations. The table has columns for Entity, Child, Distance, Associative_Entity, and Stereotype. The data rows list various associations between Loan entities and their subtypes, such as "PrincipalAmount", "isServicedBy", "TotalPointsAndFees", etc.

Entity	Child	Distance	Associative_Entity	Stereotype
2879	fiblo-loan-ln-ln:Loan	0	fiblo-loan-ln-ln:hasPrincipalAmount	parent
2880	fiblo-loan-ln-ln:Loan	0	fiblo-loan-ln-ln:isServicedBy	parent
2881	fiblo-loan-ln-ln:Loan	0	fiblo-loan-ln-ln:hasTotalPointsAndFees	parent
2882	fiblo-loan-ln-ln:Loan	0	fiblo-loan-ln-ln:hasTotalClosingCosts	parent
2883	fiblo-loan-ln-ln:Loan	0	fiblo-fnd-agr-ctr:hasThirdParty	parent
2884	fiblo-loan-ln-ln:Loan	0	fiblo-fbc-pas-caa:hasCorrespondingAccount	parent
2885	fiblo-loan-ln-ln:Loan	0	fiblo-fbc-dae-gty:hasGuarantor	parent
2886	fiblo-loan-ln-ln:Loan	0	fiblo-fbc-dae-dbt:hasMaturityDate	parent
2887	fiblo-loan-ln-ln:Loan	0	cmns-clc:classifies	child
2888	fiblo-loan-ln-ln:Loan	0	fiblo-fbc-pas-fpas:relatesTo	child
7411	fiblo-loan-ln-ln:Loan	1	fiblo-fbc-dae-dbt:hasBorrower	parent
7412	fiblo-loan-ln-ln:Loan	1	fiblo-fbc-dae-dbt:hasBorrower	parent
7413	fiblo-loan-ln-ln:Loan	1	fiblo-fnd-gao-obj:hasObjective	parent
7414	fiblo-loan-ln-ln:Loan	1	fiblo-fbc-dae-dbt:hasBorrower	parent
7415	fiblo-loan-ln-ln:Loan	1	cmns-col:hasPart	child
11886	fiblo-loan-ln-ln:Loan	2	fiblo-fnd-agr-ctr:isPrimaryContractFor	parent
11887	fiblo-loan-ln-ln:Loan	2	fiblo-fbc-dae-dbt:isCollateralizedBy	parent
11888	fiblo-loan-ln-ln:Loan	2	cmns-col:comprises	parent
11889	fiblo-loan-ln-ln:Loan	2	fiblo-fbc-dae-gty:hasGuarantor	parent
11890	fiblo-loan-ln-ln:Loan	2	fiblo-fnd-agr-ctr:hasContractualElement	parent
11891	fiblo-loan-ln-ln:Loan	2	fiblo-fnd-agr-ctr:hasMilestoneProvision	parent
11892	fiblo-loan-ln-ln:Loan	2	fiblo-fnd-dt-fd:hasSchedule	parent
11893	fiblo-loan-ln-ln:Loan	2	fiblo-fnd-gao-obj:hasStrategy	parent
11894	fiblo-loan-ln-ln:Loan	2	fiblo-fnd-gao-obj:hasStrategy	parent
11895	fiblo-loan-ln-ln:Loan	2	fiblo-fnd-dt-fd:hasSchedule	parent
11896	fiblo-loan-ln-ln:Loan	2	fiblo-fnd-agr-ctr:hasContractualElement	parent
11897	fiblo-loan-ln-ln:Loan	2	fiblo-fnd-agr-ctr:hasMilestoneProvision	parent
11898	fiblo-loan-ln-ln:Loan	2	cmns-pts:actsIn	child
11899	fiblo-loan-ln-ln:Loan	2	cmns-pts:actsIn	child
15375	fiblo-loan-ln-ln:Loan	3	cmns-doc:refersTo	parent
15376	fiblo-loan-ln-ln:Loan	3	fiblo-fbc-dae-dbt:isCollateralizedBy	parent
15377	fiblo-loan-ln-ln:Loan	3	fiblo-fnd-agr-ctr:hasContractualElement	parent
15378	fiblo-loan-ln-ln:Loan	3	fiblo-loan-reln-mtg:hasInitialFundingDate	parent
15379	fiblo-loan-ln-ln:Loan	3	cmns-col:hasPart	child
15380	fiblo-loan-ln-ln:Loan	3	fiblo-fbc-dae-dbt:isCollateralizedBy	parent



Data Architect



Business, SME

Supertype Associations

The worksheet shows all Associations of an Entity, including its supertypes.

This table is the key input for finding the path between two entities.

The Loan's direct supertype (Parent, Distance 1) has Associations to the Lender, Borrower, and Payment Terms.

The Loan's direct supertype (Parent, Distance 1), the Debt Instrument, has Associations to the Lender, Borrower, and Payment Terms.

The Credit Arrangement (two levels up the hierarchy) associates the Account, Currency, Collateral, and Maturity.

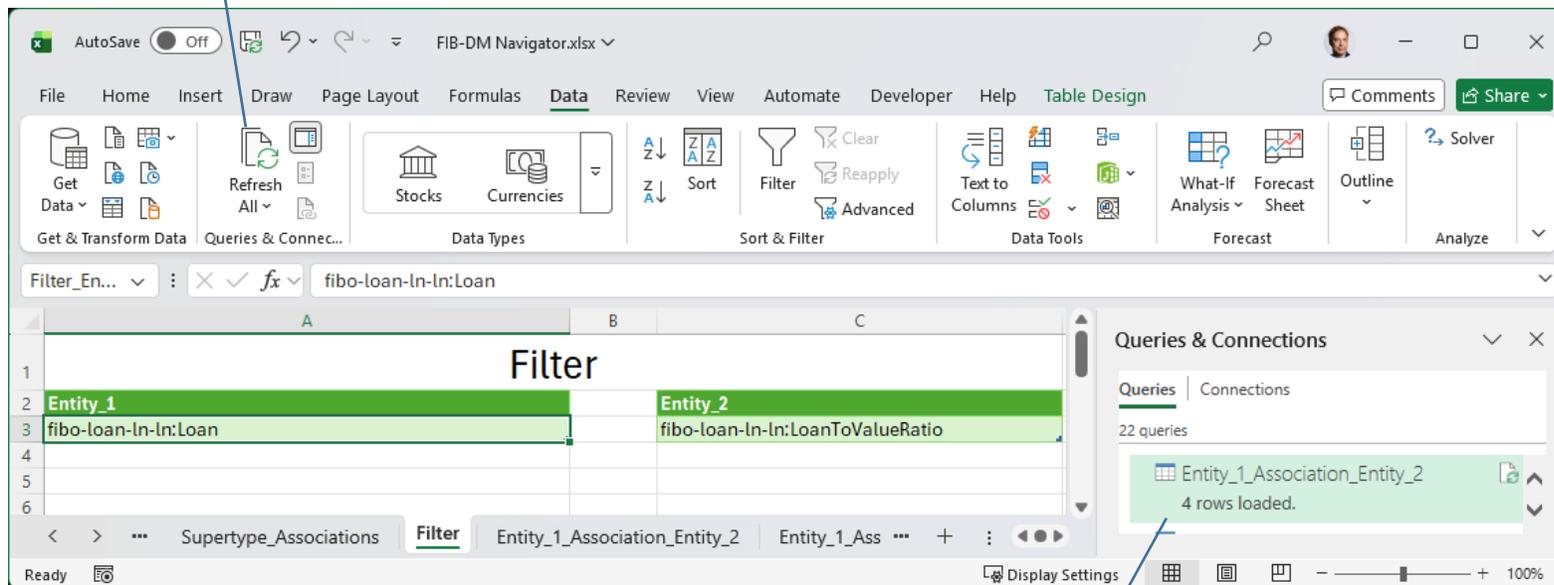
	Base_Entity	Parent	Di	Associative_Entity	Stereotype
51413	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0	fiblo-loan-ln-ln:hasTotalPointsAndFees	parent
51414	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0	fiblo-fbc-pas-fpas:relatesTo	child
51415	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0	fiblo-loan-ln-ln:hasTotalClosingCosts	parent
51416	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0	fiblo-loan-ln-ln:hasPrincipalAmount	parent
51417	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0	fiblo-fbc-dae-dbt:hasMaturityDate	parent
51418	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0	fiblo-fbc-pas-caa:hasCorrespondingAccount	parent
51419	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0	fiblo-loan-ln-ln:isServicedBy	parent
51420	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0	fiblo-fbc-dae-gty:hasGuarantor	parent
51421	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0	fiblo-fnd-agr-ctr:hasThirdParty	parent
51422	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0	cmns-clc:classifies	child
51423	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-fbc-dae-dbt:hasLender	parent
51424	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-sec-dbt-dbt:hasRepaymentTerms	parent
51425	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	cmns-cxtsdg:appliesTo	child
51426	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-sec-dbt-dbt:hasInterestPaymentTerms	parent
51427	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-fbc-fi-fi:hasRedemptionProvision	parent
51428	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-sec-dbt-dbt:hasPutFeature	parent
51429	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	cmns-col:hasMember	child
51430	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-fbc-pas-fpas:hasOffering	parent
51431	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-fbc-fi-fi:DebtInstrument_only_fiblo-fnd-rel-rel:confers	parent
51432	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-fbc-dae-dbt:hasBorrower	parent
51433	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-sec-dbt-dbt:hasCallFeature	parent
51434	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fbc-dae-dbt:hasDebtAmount	parent
51435	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	cmns-cxtsdg:appliesTo	child
51436	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fbc-dae-dbt:hasInitialExchangeDate	parent
51437	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fbc-pas-caa:hasCorrespondingAccount	parent
51438	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fnd-rel-rel:issues	child
51439	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fnd-agr-ctr:hasContractualElement	parent
51440	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fnd-acc-cur:hasCurrency	parent
51441	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fbc-dae-dbt:isCollateralizedBy	parent
51442	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fnd-agr-ctr:hasContractParty	parent
51443	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fbc-dae-dbt:hasMaturityDate	parent
51444	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fnd-rel-rel:mandates	parent
51445	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:FinancialInstrument	2	fiblo-sec-sec-rst:SecuritiesRestriction_only_cmns-cxtsdg:appliesTo	child
51446	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:FinancialInstrument	2	cmns-id:identifies	child
51447	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:FinancialInstrument	2	cmns-rlcmp:playsRole	parent



Filter the path between two entities

First, we must specify the entities in the Filter tab. In the example screenshot, we are looking for connections between the Loan and its Loan to Value Ratio.

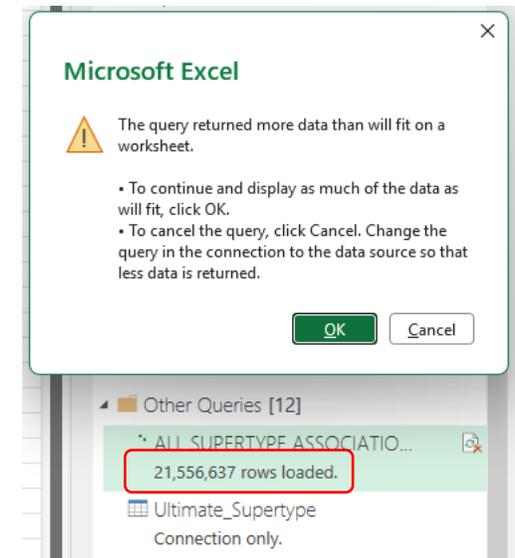
Second, we Refresh All queries in the Data ribbon, Queries and Connections



The Queries and Connections tab shows the query status and the number of rows in the result sets.

Q: Why can't we have a worksheet that shows connections among all entities?

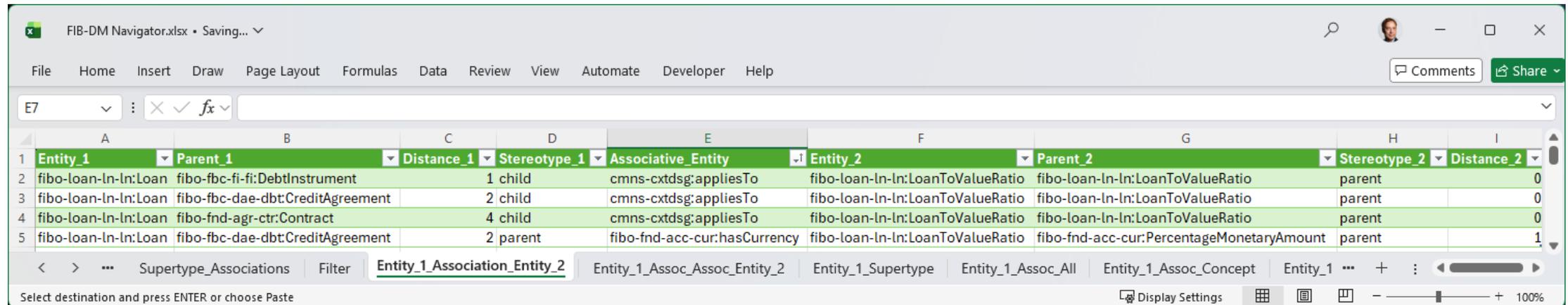
A: The self-join has too many rows.



Selecting the right Association

The Entity_1_Association_Entity_2 tab shows 4 rows of Associate Entities and their relationships to Loan and LTV

The stereotypes are our first criterion. We are looking for Parent-Child relationships. Credit Agreement and LTV, in row 5, both Parent merely have a Currency, but that doesn't navigate from the Loan to its LTV.



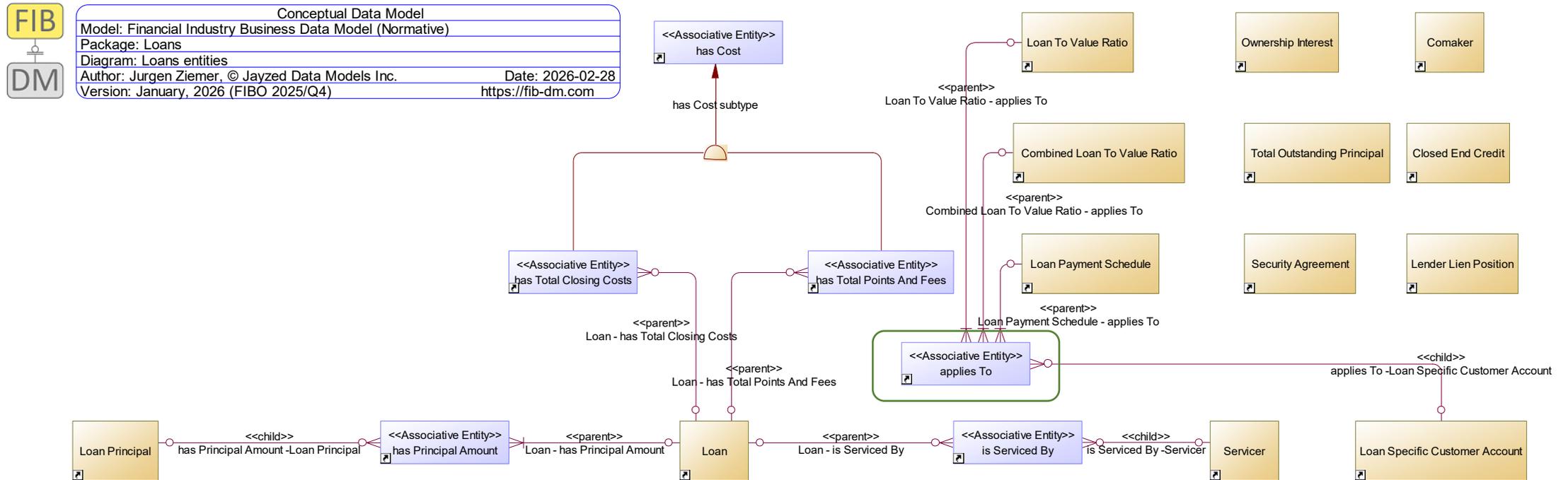
	Entity_1	Parent_1	Distance_1	Stereotype_1	Associative_Entity	Entity_2	Parent_2	Stereotype_2	Distance_2
1	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	child	cmns-cxtmsg:appliesTo	fiblo-loan-ln-ln:LoanToValueRatio	fiblo-loan-ln-ln:LoanToValueRatio	parent	0
2	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	child	cmns-cxtmsg:appliesTo	fiblo-loan-ln-ln:LoanToValueRatio	fiblo-loan-ln-ln:LoanToValueRatio	parent	0
3	fiblo-loan-ln-ln:Loan	fiblo-fnd-agr-ctr:Contract	4	child	cmns-cxtmsg:appliesTo	fiblo-loan-ln-ln:LoanToValueRatio	fiblo-loan-ln-ln:LoanToValueRatio	parent	0
4	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	parent	fiblo-fnd-acc-cur:hasCurrency	fiblo-loan-ln-ln:LoanToValueRatio	fiblo-fnd-acc-cur:PercentageMonetaryAmount	parent	1

LTV applies to Loan supertypes Credit Arrangement and Debt Instrument.



Adding the Associative Entity to the scope

The appliesTo associative entity provides the path not only to the LTV, but also to the Combined LTV, Payment Schedule, and the Customer Account



Next, we scope the appropriate Loan supertype.



Adding the related supertype to the scope

The Entity Property Dependencies and the Navigator Supertypes indicate multiple inheritance (two rows with Distance 1).

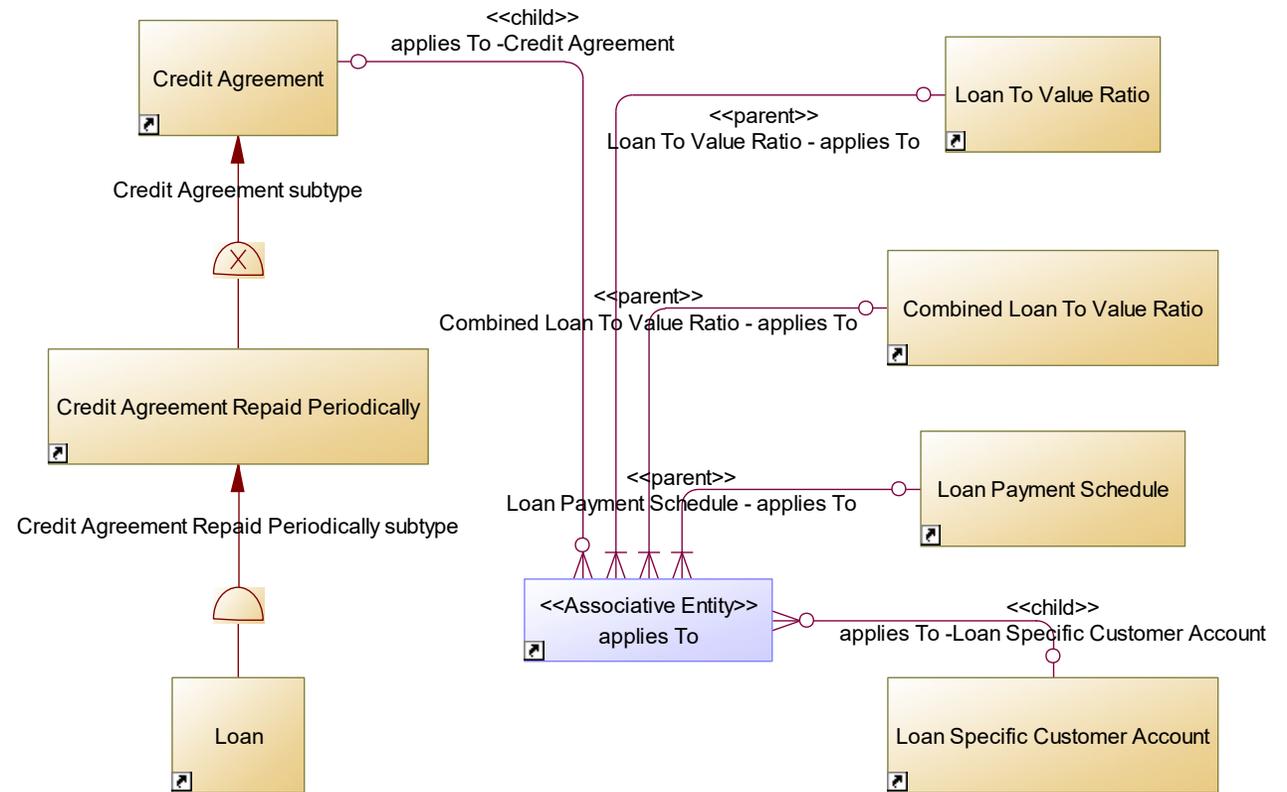
	Entity	Parent	Distance
13036	fiblo-loan-ln-ln:Loan	fiblo-loan-ln-ln:Loan	0
13037	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1
13038	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreementRepaidPeriodically	1
13039	fiblo-loan-ln-ln:Loan	fiblo-fbc-fi-fi:FinancialInstrument	2
13040	fiblo-loan-ln-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2
13041	fiblo-loan-ln-ln:Loan	fiblo-fnd-agr-ctr:WrittenContract	3
13042	fiblo-loan-ln-ln:Loan	fiblo-fnd-agr-ctr:Contract	4
13043	fiblo-loan-ln-ln:Loan	fiblo-fnd-agr-agr:Agreement	5
13044	fiblo-loan-ln-ln:Loan	cmns-pts:Situation	6

Entity Properties - Loan (fiblo-loan-ln-ln:Loan)

Child E... Inheritance Name

- Loan Credit Agreement Repaid Periodically subtype Credit Agreement Repaid Periodically - Credit Agr...
- Loan Debt Instrument subtype Debt Instrument - Debt Instrument subtype - Loan

At the bank, we scope the Credit Agreement and the Credit Agreement Repaid Periodically (An Investment Fund might scope the Debt Instrument).



Loan to Principal – a two-off join

We set the Filter for Loan and Total Outstanding Principal, and Refresh All queries. Alas, there is no direct Association between the entities. So, we try the Entity_1_Assoc_Assoc_Entity_2 tab, which is a route with an intermediate entity between the entities.

For the two entities, the worksheet provides the same information as the previous direct path: Entity, Parent, Distance, Associative Entity, and Stereotype

Entity 1	Parent 1	Distance 1	Associative Entity 1	Stereotype 1	Intermediate Stereotype 1	Intermediate Entity	Entity 2	Parent 2	Distance 2	Associative Entity 2	Stereotype 2	Intermediate Stereotype 2
fiblo-loan-In-Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-der-drc-exo:LookbackStrikeTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	cmns-qtu:hasArgument	child	parent
fiblo-loan-In-Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-der-drc-exo:LookbackStrikeTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-loan-In-Loan:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	parent
fiblo-loan-In-Loan	fiblo-fnd-agr-agr:Agreement	5	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-der-drc-exo:LookbackStrikeTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	cmns-qtu:hasArgument	child	parent
fiblo-loan-In-Loan	fiblo-fnd-agr-agr:Agreement	5	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-der-drc-exo:LookbackStrikeTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-loan-In-Loan:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	parent
fiblo-loan-In-Loan	fiblo-fnd-agr-ctr:Contract	4	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-der-drc-exo:LookbackStrikeTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	cmns-qtu:hasArgument	child	parent
fiblo-loan-In-Loan	fiblo-fnd-agr-ctr:Contract	4	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-der-drc-exo:LookbackStrikeTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-loan-In-Loan:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	parent
fiblo-loan-In-Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-fbc-dae-dbt:DebtTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-In-Loan	fiblo-fnd-agr-agr:Agreement	5	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-fbc-dae-dbt:DebtTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-In-Loan	fiblo-fnd-agr-ctr:Contract	4	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-fbc-dae-dbt:DebtTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-In-Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	cmns-ctxdsg:appliesTo	child	child	fiblo-fbc-dae-dbt:Interest	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	child
fiblo-loan-In-Loan	fiblo-fbc-fi-fi:DebtInstrument	1	cmns-ctxdsg:appliesTo	child	child	fiblo-fbc-dae-dbt:Interest	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	child
fiblo-loan-In-Loan	fiblo-fnd-agr-ctr:Contract	4	cmns-ctxdsg:appliesTo	child	child	fiblo-fbc-dae-dbt:Interest	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	child
fiblo-loan-In-Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-sec-dbt-dbti:hasInterestPaymentTerms	parent	child	fiblo-fbc-dae-dbt:InterestPaymentTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-In-Loan	fiblo-fnd-agr-ctr:Contract	4	fiblo-fnd-agr-ctr:hasExtensionProvision	parent	parent	fiblo-fbc-dae-dbt:PrincipalRepaymentTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-In-Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-sec-dbt-dbti:hasRepaymentTerms	parent	child	fiblo-fbc-dae-dbt:PrincipalRepaymentTerms	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-In-Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fnd-acc-cur:hasCurrency	parent	parent	fiblo-fbc-dae-dbt:MidPrice	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	cmns-qtu:hasArgument	child	parent
fiblo-loan-In-Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fnd-acc-cur:hasCurrency	parent	parent	fiblo-fbc-fi-ip:MidPrice	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-loan-In-Loan:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	parent
fiblo-loan-In-Loan	fiblo-fbc-fi-fi:DebtInstrument	1	cmns-col:hasMember	child	child	fiblo-fbc-fi-ip:SecurityPrice	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	cmns-qtu:hasArgument	child	child
fiblo-loan-In-Loan	fiblo-fbc-fi-fi:DebtInstrument	1	cmns-col:hasMember	child	child	fiblo-fbc-fi-ip:SecurityPrice	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-loan-In-Loan:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	child
fiblo-loan-In-Loan	fiblo-fbc-fi-fi:FinancialInstrument	2	cmns-col:hasMember	child	child	fiblo-fbc-fi-ip:SecurityPrice	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	cmns-qtu:hasArgument	child	child
fiblo-loan-In-Loan	fiblo-fbc-fi-fi:FinancialInstrument	2	cmns-col:hasMember	child	child	fiblo-fbc-fi-ip:SecurityPrice	fiblo-loan-In-Loan:TotalOutstandingPrincipal	fiblo-loan-In-Loan:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	child

In the worksheet center, we see the Intermediate Entity and the stereotypes of the Relationships to Entity 1 and 2.



Filtering candidate intermediate entities

The initial result set has 130 records! But you can use judgment and experience to narrow down the candidates.

1. We exclude FIBO Indicators and Derivative packages, which do not pertain to Loans
2. We deselect Intermediate Entities that obviously have no relevance: Security Price, Basket, Trade, Owners Equity, Dated Structured Collection, Product, Environmental Program, Debt Pool Statistics.
We keep Intermediate Entities that look reasonable: Debt Terms, Interest, Principal Repayment Terms, Loan to Value Ratio.

The screenshot displays the FIB-DM Navigator interface. The main window shows a data table with columns: Entity 1, Parent 1, Distance 1, Associative Entity 1, Stereotype 1, Intermediate Stereotype 1, Intermediate Entity, Entity 2, Parent 2, Distance 2, Associative Entity 2, Stereotype 2, and Intermediate Stereotype 2. The table contains 30 rows of data. A 'Custom Autofilter' dialog box is open, showing the following filters:

- Show rows where: **Intermediate_Entity**
- does not begin with
- And Or
- does not begin with

Below the filters, it says: Use ? to represent any single character, Use * to represent any series of characters. There are 'OK' and 'Cancel' buttons.

On the left side of the table, there is a search filter with the following checked items:

- (Select All)
- fibo-der-drc-exo:LookbackStrikeTe
- fibo-fbc-dae-dbt:DebtTerms
- fibo-fbc-dae-dbt:Interest
- fibo-fbc-dae-dbt:InterestPayment1
- fibo-fbc-dae-dbt:PrincipalRepaym
- fibo-fbc-fi-ip:MidPrice
- fibo-fbc-fi-ip:SecurityPrice
- fibo-fbc-fi-ip:Yield
- fibo-fbc-pas-fpas:Basket
- fibo-fbc-pas-fpas:Trade
- fibo-fbc-pas-fpas:TradeLifecycle



Reviewing the remaining candidates

We can disregard the LTV, rows 107-118, and the Intermediate Entity because Associative Entity 2 merely declares that the Principal is an argument of the LTV. We want to tie the Principal to the Loan, regardless of whether we calculate LTV.

Entity 1	Parent 1	Distance 1	Associative Entity 1	Stereotype 1	Intermediate Stereotype 1	Intermediate Entity	Entity 2	Parent 2	Distance 2	Associative Entity 2	Stereotype 2	Intermediate Stereotype 2
fiblo-loan-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-fbc-dae-dbt:DebtTerms	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-ln:Loan	fiblo-fnd-agr-agr:Agreement	5	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-fbc-dae-dbt:DebtTerms	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-ln:Loan	fiblo-fnd-agr-ctr:Contract	4	fiblo-fnd-agr-ctr:hasContractualElement	parent	child	fiblo-fbc-dae-dbt:DebtTerms	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	cmns-cxtsg:appliesTo	child	child	fiblo-fbc-dae-dbt:Interest	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	child
fiblo-loan-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	cmns-cxtsg:appliesTo	child	child	fiblo-fbc-dae-dbt:Interest	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	child
fiblo-loan-ln:Loan	fiblo-fnd-agr-ctr:Contract	4	cmns-cxtsg:appliesTo	child	child	fiblo-fbc-dae-dbt:Interest	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	child
fiblo-loan-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-sec-dbt-dbt:hasInterestPaymentTerms	parent	child	fiblo-fbc-dae-dbt:InterestPaymentTerms	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-ln:Loan	fiblo-fnd-agr-ctr:Contract	4	fiblo-fnd-agr-ctr:hasExtensionProvision	parent	parent	fiblo-fbc-dae-dbt:PrincipalRepaymentTerms	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	fiblo-sec-dbt-dbt:hasRepaymentTerms	parent	child	fiblo-fbc-dae-dbt:PrincipalRepaymentTerms	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	fiblo-fbc-dae-dbt:governsPaymentOf	child	parent
fiblo-loan-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	cmns-cxtsg:appliesTo	child	parent	fiblo-loan-ln:CombinedLoanToValueRatio	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	cmns-qtu:hasArgument	child	parent
fiblo-loan-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	cmns-cxtsg:appliesTo	child	parent	fiblo-loan-ln:CombinedLoanToValueRatio	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-loan-ln:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	parent
fiblo-loan-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	cmns-cxtsg:appliesTo	child	parent	fiblo-loan-ln:CombinedLoanToValueRatio	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	cmns-qtu:hasArgument	child	parent
fiblo-loan-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	cmns-cxtsg:appliesTo	child	parent	fiblo-loan-ln:CombinedLoanToValueRatio	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-loan-ln:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	parent
fiblo-loan-ln:Loan	fiblo-fnd-agr-ctr:Contract	4	cmns-cxtsg:appliesTo	child	parent	fiblo-loan-ln:CombinedLoanToValueRatio	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	cmns-qtu:hasArgument	child	parent
fiblo-loan-ln:Loan	fiblo-fnd-agr-ctr:Contract	4	cmns-cxtsg:appliesTo	child	parent	fiblo-loan-ln:CombinedLoanToValueRatio	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-loan-ln:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	parent
fiblo-loan-ln:Loan	fiblo-fbc-dae-dbt:CreditAgreement	2	cmns-cxtsg:appliesTo	child	parent	fiblo-loan-ln:LoanToValueRatio	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-loan-ln:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	parent
fiblo-loan-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	cmns-cxtsg:appliesTo	child	parent	fiblo-loan-ln:LoanToValueRatio	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	cmns-qtu:hasArgument	child	parent
fiblo-loan-ln:Loan	fiblo-fbc-fi-fi:DebtInstrument	1	cmns-cxtsg:appliesTo	child	parent	fiblo-loan-ln:LoanToValueRatio	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-loan-ln:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	parent
fiblo-loan-ln:Loan	fiblo-fnd-agr-ctr:Contract	4	cmns-cxtsg:appliesTo	child	parent	fiblo-loan-ln:LoanToValueRatio	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-fbc-dae-dbt:Principal	1	cmns-qtu:hasArgument	child	parent
fiblo-loan-ln:Loan	fiblo-fnd-agr-ctr:Contract	4	cmns-cxtsg:appliesTo	child	parent	fiblo-loan-ln:LoanToValueRatio	fiblo-loan-ln:TotalOutstandingPrincipal	fiblo-loan-ln:TotalOutstandingPrincipal	0	cmns-qtu:hasArgument	child	parent

Principal Repayment Terms or Debt Terms (in grey) govern the Payment of Principal (Associative_Entity_2), which is a strong Association.

Debt Instrument and Credit Agreement (Parent 1) are close supertypes of the Loan. Repayment Terms is actually a subtype of Contractual Element.

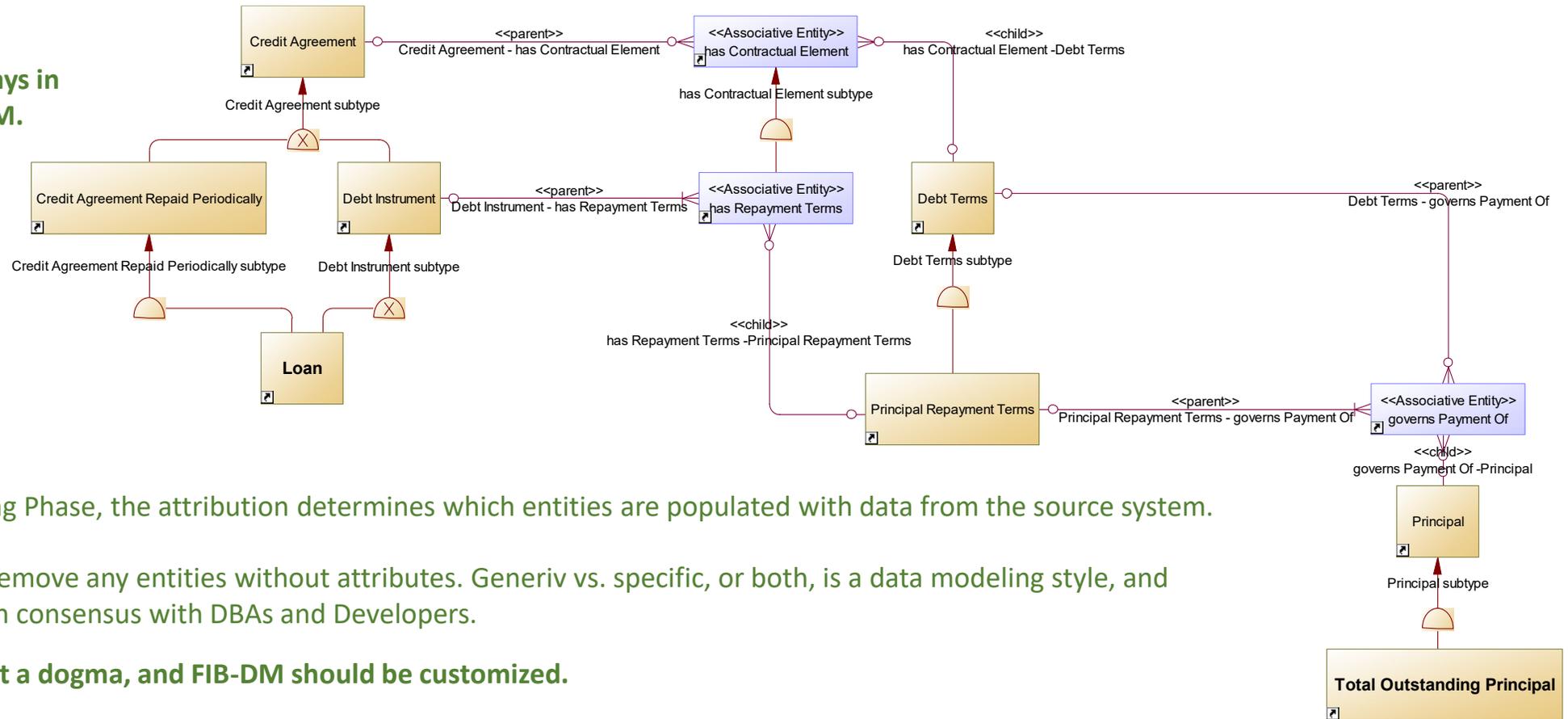
Let's look at the diagram that includes both in the FIB-DM Loans scope.



Two valid ways to navigate from Loan to Principal

1. A more generic route: The Credit Agreement has a Contractual Element, the Debt Terms, which govern the Payment of Principal.
2. A more specific route: The Debt Instrument has Repayment Terms, the Principal Repayment Terms, which govern the Payment of Principal.

The FIB-DM Architect should scope both ways in her initial project CDM.



In the Logical Modeling Phase, the attribution determines which entities are populated with data from the source system.

The LDM review will remove any entities without attributes. Generic vs. specific, or both, is a data modeling style, and it should be decided in consensus with DBAs and Developers.

Finally, the FIBO is not a dogma, and FIB-DM should be customized.



All Entity 1 Associations

Similar to the Entity_1_Association_Entity_2 table, this worksheet example shows all associations of the Closed-End Mortgage. Architects and SME use the worksheet to research other entities that should be included in the scope. We filter the large number of records:

3. Any "Date" related to the loan

1. Exclude Derivatives, fibo-der

2. Child Associations

Entity 1	Parent	Distance	Associative Entity	Stereotype	Entity 2	Stereotype 2
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fnd-agr-ctr:WrittenContract	3	cmns-dt:hasDateOfIssuance	parent	cmns-dt:Date	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fnd-agr-ctr:WrittenContract	7	cmns-dt:hasDateOfIssuance	parent	cmns-dt:Date	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fbc-dae-dbt:CreditAgreement	2	fibo-fbc-dae-dbt:hasInitialExchangeDate	parent	cmns-dt:ExplicitDate	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fbc-dae-dbt:CreditAgreement	6	fibo-fbc-dae-dbt:hasInitialExchangeDate	parent	cmns-dt:ExplicitDate	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fbc-dae-dbt:CreditAgreement	2	fibo-fbc-dae-dbt:hasMaturityDate	parent	cmns-dt:ExplicitDate	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-loan-ln-ln:Loan	4	fibo-fbc-dae-dbt:hasMaturityDate	parent	cmns-dt:ExplicitDate	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fbc-dae-dbt:CreditAgreement	6	fibo-fbc-dae-dbt:hasMaturityDate	parent	cmns-dt:ExplicitDate	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fnd-agr-ctr:Contract	4	fibo-fnd-agr-ctr:hasEffectiveDate	parent	cmns-dt:Date	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fnd-agr-ctr:Contract	8	fibo-fnd-agr-ctr:hasEffectiveDate	parent	cmns-dt:Date	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fnd-agr-ctr:WrittenContract	3	fibo-fnd-agr-ctr:hasEffectiveDateTimeStamp	parent	cmns-dt:DateTimeStamp	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fnd-agr-ctr:WrittenContract	7	fibo-fnd-agr-ctr:hasEffectiveDateTimeStamp	parent	cmns-dt:DateTimeStamp	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fnd-agr-ctr:WrittenContract	3	fibo-fnd-agr-ctr:hasExecutionDate	parent	cmns-dt:Date	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fnd-agr-ctr:WrittenContract	7	fibo-fnd-agr-ctr:hasExecutionDate	parent	cmns-dt:Date	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fnd-agr-ctr:WrittenContract	3	fibo-fnd-agr-ctr:hasExecutionDateTimeStamp	parent	cmns-dt:DateTimeStamp	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-fnd-agr-ctr:WrittenContract	7	fibo-fnd-agr-ctr:hasExecutionDateTimeStamp	parent	cmns-dt:DateTimeStamp	child
fibo-loan-reln-mtg:ClosedEndMortgageLoan	fibo-loan-reln-mtg:LoanSecuredByRealEstate	1	fibo-loan-reln-mtg:hasInitialFundingDate	parent	fibo-fbc-pas-caa:TransactionDate	child

Written Contracts have a Date of Issuance, an Effective and Execution Date, a Date of Maturity, and Real Estate Loans have a Funding Date.

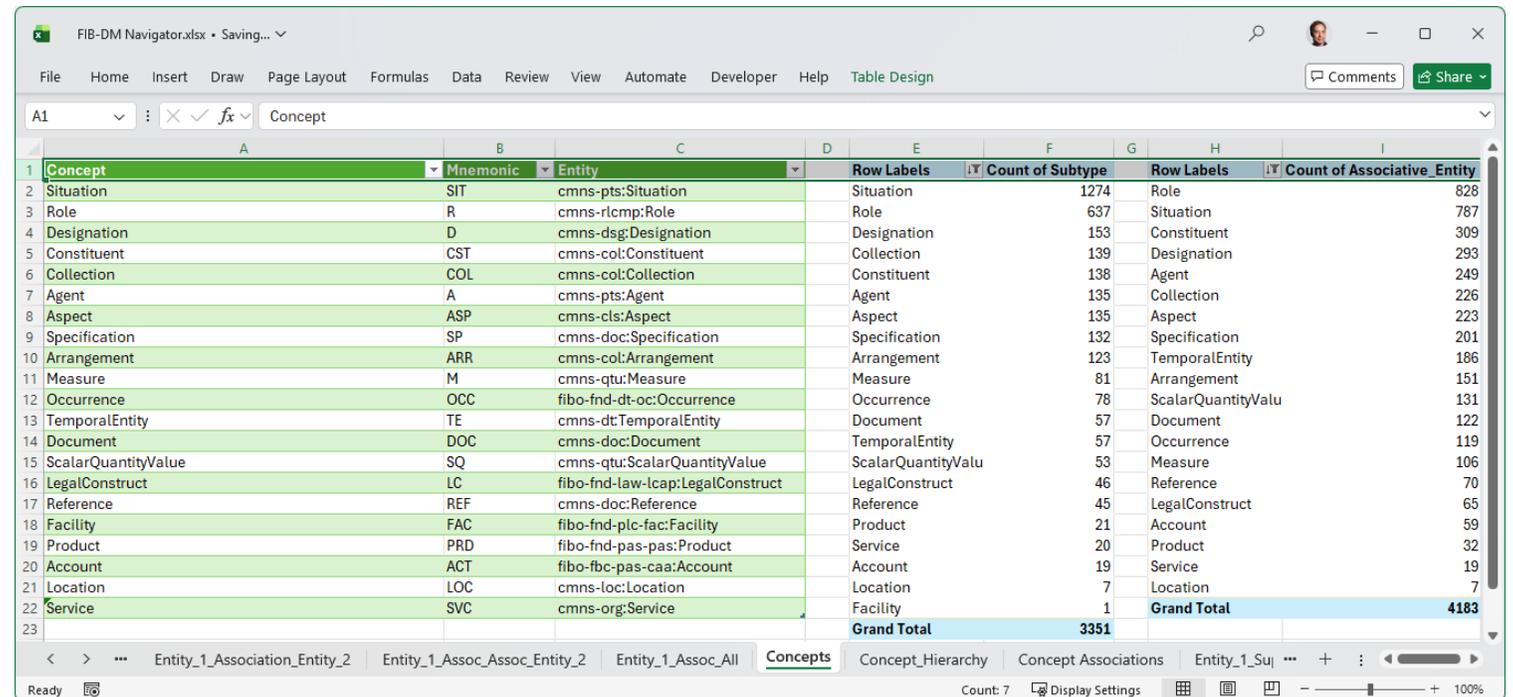


FIBO/FOB-DM 15+5 concepts

The workbook shows concepts with their names, mnemonics, and Ultimate Supertype entities.

Study the Semantics for Finance Users lesson and the House of Finance article for details.

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



Concept	Mnemonic	Entity	Row Labels	Count of Subtype	Row Labels	Count of Associative Entity
Situation	SIT	cmns-pts:Situation	Situation	1274	Role	828
Role	R	cmns-rlcmp:Role	Role	637	Situation	787
Designation	D	cmns-dsg:Designation	Designation	153	Constituent	309
Constituent	CST	cmns-col:Constituent	Collection	139	Designation	293
Collection	COL	cmns-col:Collection	Constituent	138	Agent	249
Agent	A	cmns-pts:Agent	Agent	135	Collection	226
Aspect	ASP	cmns-cls:Aspect	Aspect	135	Aspect	223
Specification	SP	cmns-doc:Specification	Specification	132	Specification	201
Arrangement	ARR	cmns-col:Arrangement	Arrangement	123	TemporalEntity	186
Measure	M	cmns-qtu:Measure	Measure	81	Arrangement	151
Occurrence	OCC	fib-fnd-dt-oc:Occurrence	Occurrence	78	ScalarQuantityValue	131
TemporalEntity	TE	cmns-dt:TemporalEntity	Document	57	Document	122
Document	DOC	cmns-doc:Document	TemporalEntity	57	Occurrence	119
ScalarQuantityValue	SQ	cmns-qtu:ScalarQuantityValue	ScalarQuantityValue	53	Measure	106
LegalConstruct	LC	fib-fnd-law-lcap:LegalConstruct	LegalConstruct	46	Reference	70
Reference	REF	cmns-doc:Reference	Reference	45	LegalConstruct	65
Facility	FAC	fib-fnd-plc-fac:Facility	Product	21	Account	59
Product	PRD	fib-fnd-pas-pas:Product	Service	20	Product	32
Account	ACT	fib-fbc-pas-caa:Account	Account	19	Service	19
Location	LOC	cmns-loc:Location	Location	7	Location	7
Service	SVC	cmns-org:Service	Facility	1	Grand Total	4183
			Grand Total	3351		



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Concept Hierarchy and Associations

A join of the Ultimate Supertype hierarchy and the 15 concepts table.

Concept	Mne	Entity	Subtype	Distance
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:Account	0
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:InvestmentOrDepositAccount	1
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:LedgerAccount	1
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:LoanOrCreditAccount	1
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:CustomerAccount	1
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:DepositAccount	2
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:InvestmentAccount	2
Account	ACT	fibonacci-pas-cao:Account	fibonacci-loan-ln-ln:LoanSpecificCustomerAccount	2

A join of the Subtype Associations and the concepts table.

Concept	Mne	Entity	Subtype	Distance	Associative_Entity	Stereotype
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:Account	0	cmns-ctdsg:appliesTo	child
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:Account	0	cmns-id:identifies	child
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:Account	0	cmns-org:manages	child
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:Account	0	cmns-org:provides	child
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:Account	0	cmns-rlcmp:playsRole	parent
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:Account	0	fibonacci-pas-cao:appliesToAccount	child
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:Account	0	fibonacci-pas-cao:hasBalance	parent
Account	ACT	fibonacci-pas-cao:Account	fibonacci-pas-cao:Account	0	fibonacci-pas-cao:hasCloseDate	parent

The tabs are useful for enterprise architects and other users to study how a concept fits into the model.

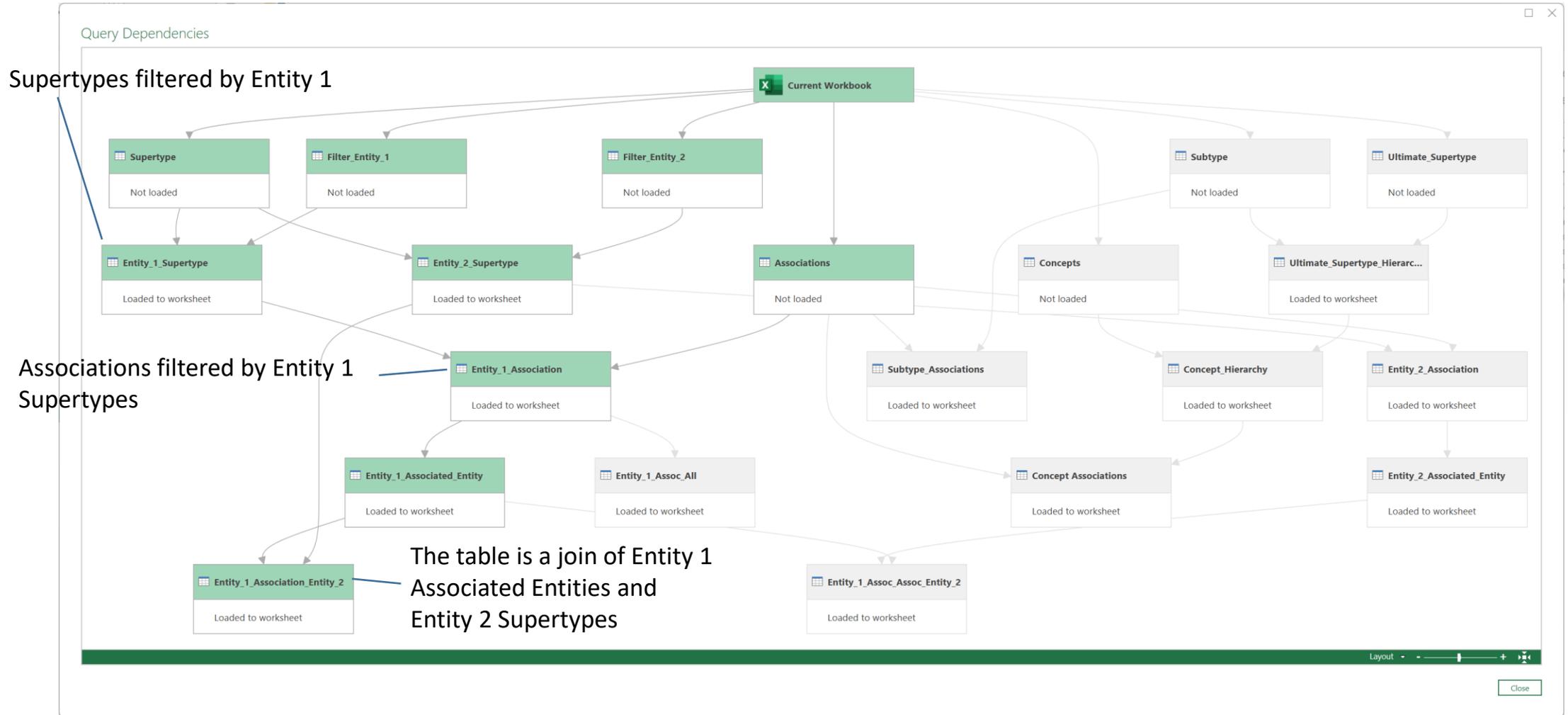


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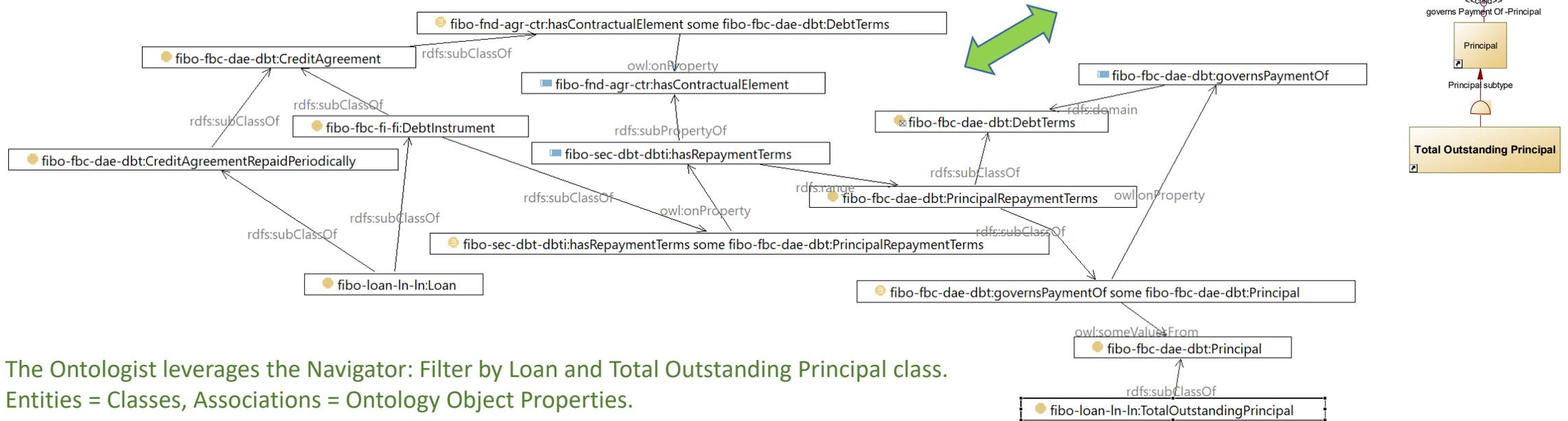
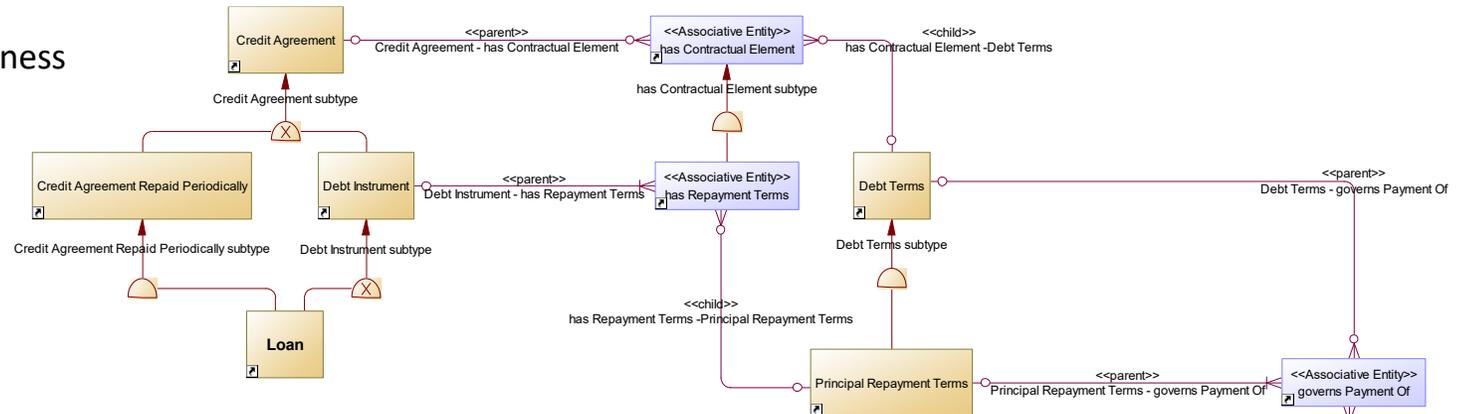
MS PowerQuery dependencies



Navigation for ontologists

Data Model and Ontology graph model the same Business Concepts and relations.

And it's even more challenging and time-consuming for the FIBO ontologist to find the right object properties and class restrictions between the Loan and its Principal.



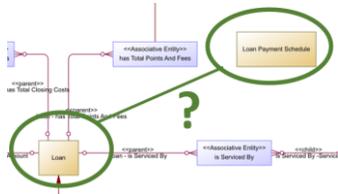
The Ontologist leverages the Navigator: Filter by Loan and Total Outstanding Principal class. Entities = Classes, Associations = Ontology Object Properties.



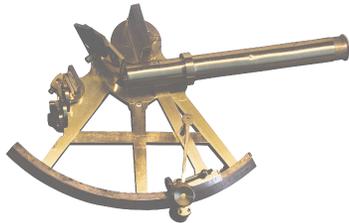
Summary and further study.



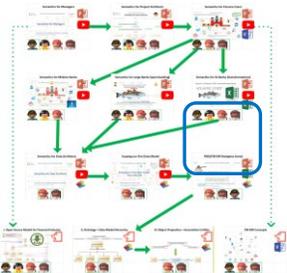
We discussed that Islands, Entities without relations to the rest of the model, are a defect. There are no islands in the FIBO or FIB-DM. And you must not scope entities without Association to the rest of your project model.



Finding the path between two scoped Entities can be time-consuming in the data modeling tool.



The FIBO/FIB-DM Navigator has MS Excel sheets populated with FIB-DM metadata. We sort and filter to quickly find Associative, even Intermediate Entities to include in the scope.



Semantics for Data Architects, Finance Users and the 15 fundamental Concepts, and Scoping a FIB-DM model are prerequisites for this advanced class.

Data Architects and Ontologists should also study the Hierarchy and Object Property = Association articles. The Configurable Ontology to Data model Transformation (CODT) derived the FIBO Data Model.

Advanced Financial Institutions use CODT to keep their customized ontologies and data models in sync.

<https://fib-dm.com/data-model-resources/>

