Version 1.2

December 2022

Introduction to the BIRD Logical Data Model (BIRD LDM)

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0. Version control

Version	Date	Comments	LDM reference
1.0	08/11/2021	Initial draft	1.0.0
1.1	22/11/2021	Completion of missing / previously not completed chapters (i.e., small and medium size enterprise (SME) related entities, Rating systems, Reference data). Version released internally only	1.0.1
1.2	16/12/2022	Incorporation of comments and suggestions for improvement provided by members of the Work Stream on Prototyping (formerly known as Work Stream on Testing) and of the temporary BIRD subgroup on logical data model and input layer (LDM/IL) review.	6.1.0

1. Introduction

The BIRD Logical Data Model (short BIRD LDM or LDM from here on) is a highly normalised data model describing the data necessary to fulfil the reporting requirements covered by the BIRD documentation. Its purpose is the logical description of the data, focussing on "what needs to be reported", and ensuring redundancy-free semantically integrated representation of the reporting requirements. The LDM does not necessarily describe how this data should be collected, stored, processed, or disseminated. It does not prescribe "how it needs to be reported or processed". The LDM follows the agreed BIRD LDM design principles. The BIRD Work Stream on Data Modelling (WS DM), in close collaboration with the BIRD Subgroups providing subject matter expertise on business various aspects, is responsible for the development and maintenance of this data model.

The LDM is the basis for the BIRD Input Layer (short BIRD IL or IL from here on) which acts as an implementation model for BIRD. An overview of the BIRD architecture and the location of the LDM therein may be found in the BIRD methodology page.

Currently, the LDM is documented (1) using SQL data modeler[1] and like all other formal aspects of the BIRD documentation (2) in the Single Data Dictionary (SDD) based on SMCube methodology. It is available on the BIRD website or the BIRD GitHub page.

[1] See https://www.oracle.com/database/technologies/appdev/datamodeler.html

This document is intended as an introduction to the LDM for business users without particular knowledge of data modelling methods. We recommend reading Annex 1: Introduction to (logical) data modelling because throughout the whole document we use so-called subviews. These subviews present subsets of the LDM and describe content in graphical format and the annex explains the underlying modelling methods and notation. This introductory document is limited to the most important aspects of the model. For further information we recommend exploring the LDM / ELDM html reports[2] or the LDM itself. Please be aware that the illustrations in the LDM / ELDM html reports differ slightly from the illustrations presented in this document regarding their notation[3].

We will use italic font with a capitalized first letter in this document for terms that are present in the LDM as an Entity type, an attribute or an allowed value to underline the richness of the LDM. For example, the term *Security* will be written using this format because of the existence of the Entity type *Security* in the LDM defined as a "… certificate attesting credit, the ownership of stocks or bonds".

Please be aware that some illustrations, comprise a large amount of information and therefore zooming in is required. **Printing of this document is not recommended**. Instead, we advise reading the online copies.

The following section of this document will provide the user with some context that is relevant to understand the content of the LDM. The content itself is described in the last section of this document, named Model aspects. At the end of the document, we have added an Annex trying to give a short Introduction to (logical) data modelling.

2. Providing some context

Before presenting the LDM in more detail we would like to provide the reader with some additional context that is relevant to understand the data (structures) documented in the LDM. The first relevant aspect is the *Reporting agent* and its relationship to the data (structures) described in the LDM. It is important to understand that the LDM is intended to represent data from the perspective of only one *Reporting agent*. Consequently, it does not describe a transaction, e.g., a loan, from a *Solo reporting agent's* perspective and from a *Consolidated reporting agent's* perspective at the same time. The second aspect that is relevant to understand the content of the LDM correctly is the fact that it represents a Snapshot at the Reference date. This is so fundamental to the model, that we have integrated this context into the model itself.

[2] For further information about the distinction between the Logical Data Model (LDM) and the Enriched Logical Data Model (ELDM) please see Derivation of concepts, association between the Logical Data Model (LDM) and the Enriched Logical Data Model (ELDM)

[3] For further information, please see Annex 1: Introduction to (logical) data modelling

2.1 The Reporting agent in the BIRD LDM and its data

In the LDM we distinguish between the following types of *Reporting agents*:

- *Consolidated reporting agent* (for *Accounting* and *Prudential consolidation groups*)
- *Solo reporting agent (including foreign branches)*
- *Solo, domestic reporting agent (excluding foreign branches)*
- *Institutional unit of foreign branches*

In the context of the *Consolidated reporting agent*, it is important to underline that consolidation logic, i.e., the logic to consolidate different *Parties* into one consolidated group based on their relationships to each other, is not covered by the LDM and therefore not part of the model. Consequently, consolidation logic needs to be applied before the LDM can be used. This applies to the volume of the data, e.g., inter-company transactions may not be relevant for consolidated reports, but also for the classification of the data. For example, the same loan might be assigned to different *Accounting classifications* if it is reported in a solo report, e.g., based on national Generally Accepted Accounting Principles (nGAAP), and in a consolidated report, e.g., based on International Financial Reporting Standard (IFRS) which also included the evaluation of numeric values, e.g., *Carrying amount*.

To underline this point, we will discuss different loans between a bank ("Bank A"), its *Branches*, *Subsidiaries* and customers. Let's assume Bank A has one *Branch* in the same *Country* as the bank itself is located ("Domestic branch") and another *Branch* that is located in a different *Country* ("Foreign branch"). Additionally, Bank A has two *Subsidiaries*, one located in the same *Country* ("Domestic subsidiary"), and one located in a different *Country* ("Foreign subsidiary"). These *Parties* will form a *Group* which we will denote by "Group A & its subsidiaries". Let us consider the situation in which Bank A provides loans to all these *Parties* as illustrated in the following picture:

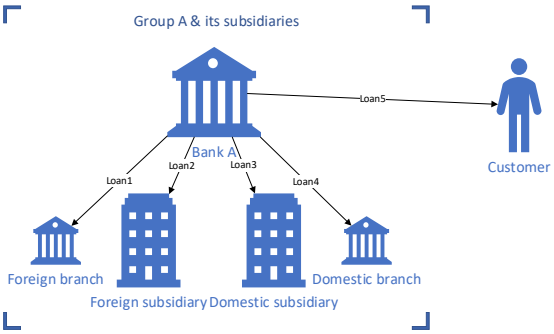

Figure 1: Bank A provides loans

Considering a consolidated report, like Financial Reporting (FINREP) according to European Banking Authority Implementing Technical Standard (EBA ITS), Group A & its subsidiaries is a *Consolidated reporting agent*. All loans between *Parties* involved in this *Group* are inter-company loans and therefore not

relevant for a consolidated report[4]. Consequently, only Loan5 between Bank A and its customer is relevant. The following picture indicates the situation, where the objects illustrated in green form the whole Group:

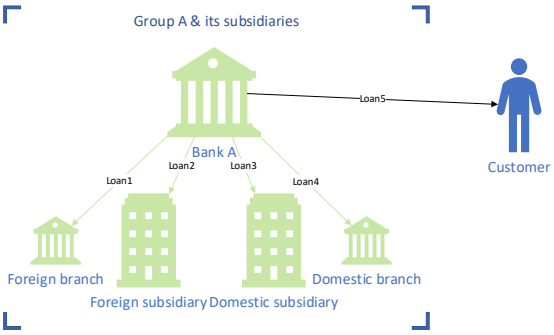

Figure 2: Group A and its subsidiaries as a Consolidated reporting agent

Considering a solo report, e.g., FINREP according to Regulation (EU) 2015/534[5], Bank A is considered a *Solo reporting agent (including foreign branches)*. Consequently, loans between Bank A and its (foreign and domestic) *Branches* are inter-company loans and are therefore not relevant for a solo report while loans between Bank A and its *Subsidiaries* (i.e., Loan2 & Loan3), as well as Loan5 to its customer are relevant. The following picture illustrates the situation:

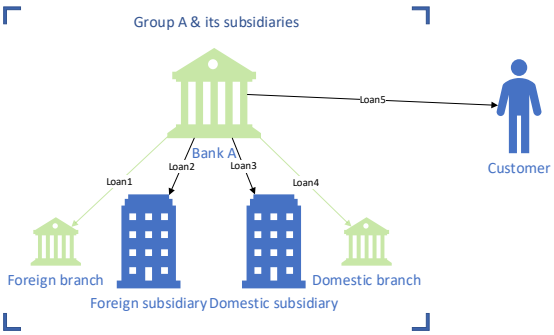

Figure 3: Bank A as a Solo reporting agent

Considering a solo, domestic report, e.g., Balance sheet items (BSI) according to Regulation (EU) 1071/2013[6], Bank A is considered a *Solo, domestic reporting agent (excluding foreign branches)*. In this setup, only loans between Bank A and its domestic *Branches* are inter-company Loans (i.e., Loan4) and are not relevant for a solo, domestic report. The following picture illustrates the situation:

[4] Exceptions may apply if consolidated reporting requirements include information about inter-company transactions

[5] See https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R0534

[6] See https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1071

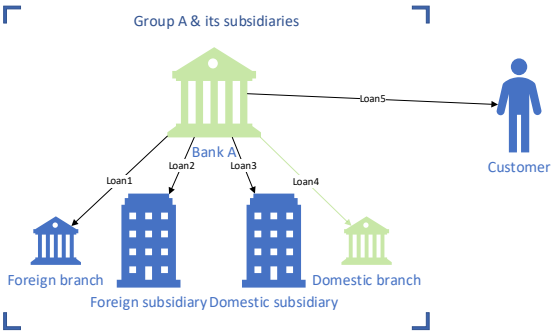

Figure 4: Bank A as a Solo, domestic reporting agent

Therefore, in this situation, the following Loans are relevant for reporting: Loan1, Loan2, Loan3, Loan5, and should be comprised in the data delivery into any implementation model based on the LDM.

Please be aware that not only the delivery of data, e.g., which loans are relevant for which *Reporting agent*, but also the associated values (numeric and enumerated) are not managed by the LDM and are consequently, the *Reporting agent's* responsibility.

2.1.1 Identification of relevant objects within the Reporting agent

Another very important piece of information is that the LDM is designed based on the assumption that relevant objects are univocally identified within the *Reporting agent*. What is meant by this statement is that, for example, all *Parties* relevant for reporting of a *Consolidated reporting agent* are represented in one Entity type in the LDM. Hence, harmonisation of different systems managing the same kind of data, e.g., *Parties* managed by Bank A and *Parties* managed by one of its *Subsidiaries*, is not in scope of the LDM. The same applies for the identification of other objects of the LDM like *Groups*, *Instruments*, *Credit facilities*, *Collateral*, *Securities*, and *Securitisations and other credit transfers*.

2.2 Snapshot at the Reference date

The LDM describes data (structures) at a specific point in time, i.e., the *Reference date*. This implies that historic data needs to be modelled in the LDM accordingly and cannot be accessed via functions like *Small and medium size enterprise (t-1)*, e.g., the *Small and medium size enterprise* classification of the previous years.

Please note that the *Reference date*, together with the *Reporting agent identifier* has been added as model context into the LDM. This means that all information stored within the model is part of the context of the model, as reported within the model itself. It will identify all data within the *Reporting agent*, by adding the *Reporting agent identifier*, and *Reporting date* to the primary key of all entity types.

3. Model aspects

Because of its defined scope describing relevant reporting requirements the LDM deals mainly with *Parties* involved in (financial) transactions. These transactions may be represented by *Instruments* or *Credit facilities* but also by *Security positions* which are held by an *Investor*. Additional aspects that are covered by the LDM are *Securitisation* structures and *Rating systems* as well as *Group* related information. Conceptually, these aspects and their relationships to each other may be illustrated as following:

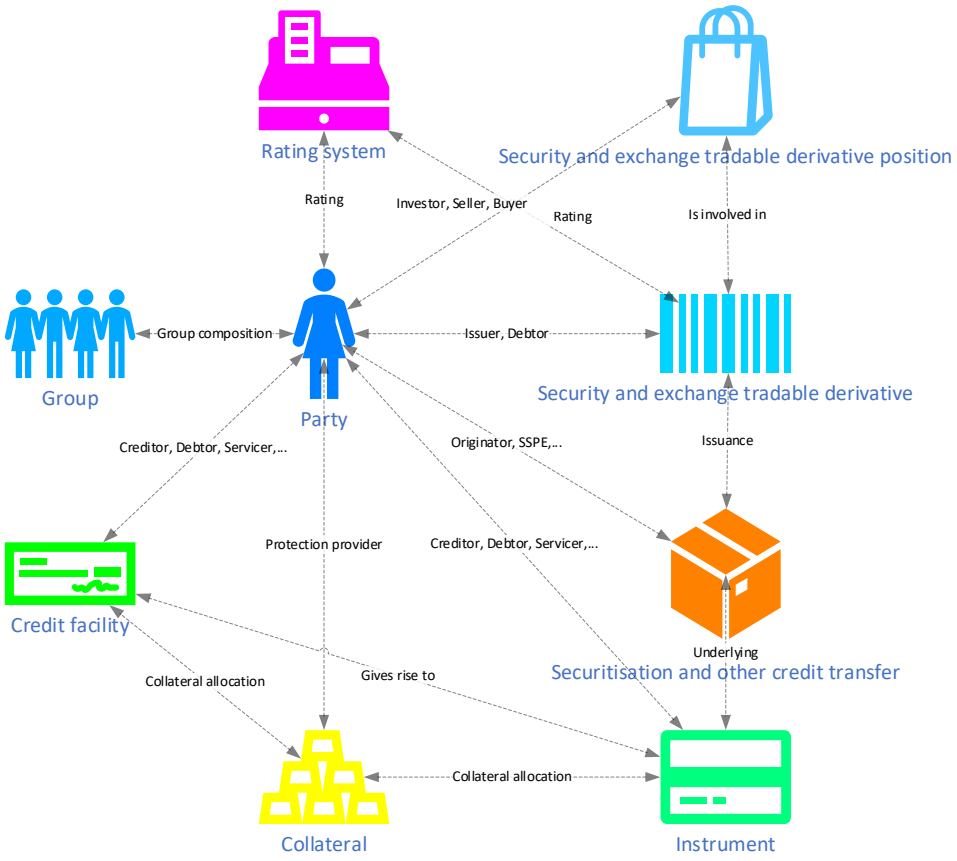

Figure 5: Conceptual model of the LDM

In the following sections we will provide the reader with additional information about each of these parts of the model, and their relationships to each other. In the LDM these different parts are illustrated using colours, which will also be used in this document:

- *Party* related entity types are blue
- *Instrument* related entity types are green
- *Credit facility* related entity types are light green
- *Collateral* related entity types are yellow
- *Security* related entity types are turquoise

- *Securitisation and other credit transfer* related entity types are orange
- *Rating model* related entity types are orchid
- *Non-financial asset*, *Non-financial liability* & *Cash on hand* related entity types are purple

Due to the introductory nature of this document, we omit certain details in graphical illustrations, like non-key attributes, if they are not necessary to understand the context at hand. The interested reader may find all the details, e.g., all attributes of a particular Entity type, in the LDM / ELDM html reports or directly in the LDM itself.

3.1 About this version (1.2)

3.1.1 Changes made in version 6.1.0

Of the many changes in the LDM, the following are the most impactful.

- Collateral subtypes have been added to explicitly model the AnaCredit requirement regarding type of valuation, type of protection and type of valuation approach.
- Exchange tradable derivatives are now included in the LDM.
- All reference data sets used in the LDM are now entity types in the model.
- The roles of credit facility have been removed; there was no reporting requirement for them.
- The context of the data that is subject to the LDM is now modelled in the LDM itself. This impacts almost every primary and foreign key.

3.1.2 Changes made previously in version 6.0.0 and earlier

This version of the document includes descriptions for the following aspects:

- Updates to wording and examples to align with the changes in the LDM
- entity types relevant for the derivation of the *Enterprise size*, see section Model aspects designed for the small and medium size enterprise classification
- A description of *Rating systems* in the LDM, see section Rating systems
- A description of *Reference data* in the LDM, see section Reference data
- New and more specific collateral types, with specific value attributes.

3.1.3 As of yet not modelled

Before presenting the content of the LDM to the reader, we would like to create awareness for known limitations and things that are not completed at this stage. Frameworks are prioritised annually by the BIRD Steering Group and are covered by the LDM in line with the BIRD Work Plan published in the ECB BIRD website.

Topics that are not modelled or where the design is incomplete are:

- *Securities* representing indexes and baskets, like *Securities* referring to the National Association of Securities Dealers Automated Quotations (NASDAQ). However, it was asserted that for the current reporting scope, this look-through is not required. The current structure is sufficient.
- *Security lending and borrowing transactions against a fee*, specifically the link to the fee (if required)
- *Synthetic securitisations involving Securitisation Special Purpose Entities (SSPEs).* Together with the ECB IReF team, an extensive review of everything related to securitisations is planned.
- Collateral taken into possession for *Instruments* and *Security positions*
- Identification of *Over the counter (OTC) credit default swaps* that are considered *Financial guarantees*
- Assignment of derived attributes and derived data entity types, e.g., *Type of instrument according to AnaCredit, Type of instrument according to EBA ITS*
- Assignment of correct technical data types for domains, e.g., the technical data type for date related attributes (and consequently columns in relational models) are specified as String / VARCHAR

3.2 Parties & Groups

The first section describing the LDM is dedicated to *Parties* & *Groups*. The first part of the section focuses on the *Party* model while the second describes the *Group* model and the interaction between these two parts of the LDM.

3.2.1 Parties

A *Party* in the LDM is defined as an "Entity of interest". This rather broad definition is intended to cover all *Parties* that are involved in transactions, directly or indirectly, and which are relevant to fulfil a *Reporting agent's* reporting obligation (with respect to the reporting requirements covered by the BIRD documentation). Examples are a *Credit institution's* customers like the *Debtors*, *Creditors*, *Servicers*, *Protection providers* of different contracts or transactions.

The interaction between this *Party* model and the other parts of the model is mainly established via so called *Party roles* which will be described in one of the following sections (see Party role). In short, *Party type* describe what the *Party* is, and *Party roles* describe what the *Party* does.

3.2.1.1. Party types

The different types of *Parties* are organised in the so-called Party (model) hierarchy. The root of this hierarchy is the entity type *Party* which is the most generic type comprising those attributes which are relevant for all different types of *Parties*, for example information about the location of a *Party*. The hierarchy

covers classifications of *Parties* which are needed to fulfil the reporting requirements in scope of the BIRD documentation.

On the top level, we distinguish between two types of *Parties*, (1) *Legal persons* and (2) *Organisational units* where the main distinction criteria is being able to acquire legal rights and obligations (which is possible for *Legal persons* but not for *Organisational units*). This situation is illustrated in the following picture.

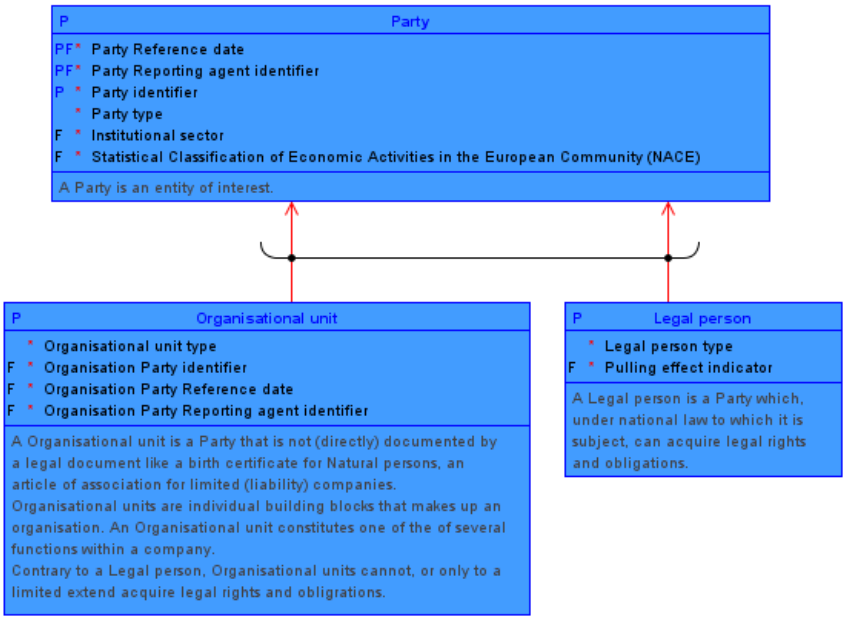

Figure 6: A Party is either a Legal person or an Organisational unit

Please note that the attribute *Party type* is a discriminator which reflects the subtypes of the Entity type *Party*. Consequently, it is limited to the allowed values *Organisational unit* and *Legal person*. We use discriminators consistently throughout the model so that every supertype (here the Entity type *Party*) has a reference to its subtypes (here *Non-registered party* and *Legal person*) via discriminator attributes[7]. Discriminators are not illustrated in a particular style or format (in the LDM), however they comprise the word “type”, for example *Party type*, *Legal person type*, *Legal person type by legal proceeding status*, and they are located directly following the primary key (in the above illustrated *Party* Entity type, the primary key is the attribute *Party identifier*)[8].

[7] Such discriminators are useful when describing specific subsets of an Entity, e.g. all *Legal persons* may be described by the content of the *Party* Entity where the *Party type* takes the value *Legal person*

[8] See also Introduction to (logical) data modelling for further modelling related information like the depiction of primary or foreign keys

3.2.1.2. Organisational unit types

As regards *Organisational units* we distinguish between *Branches*, *Investment vehicles / funds* or an *Other organisational units* as illustrated in the following picture:

Figure 7: Organisational unit hierarchy (full hierarchy)

According to the definition of the entity type *Branch*, "A Branch is an Organisational unit that is a division or office of a (large) business or organisation, operating locally or having particular function", it comprises foreign and domestic branches, however the representation of domestic *Branches* is optional and not required to fulfil specific reporting requirements.

Investment vehicles / funds that are not setup as *Legal entities*, but that are part of an *Organisation's* balance sheet, are represented using the entity type *Investment vehicles / funds*. Please note that such a distinction, between an *Organisation* and its *Investment funds / vehicles* which are part of the *Organisation's* balance sheet, allows to distinguish the *Organisations* own balance sheet from such *Investment vehicles / funds*.

Other organisational units comprise other dependent *Organisational units* which are neither *Branches* nor *Investment vehicles / funds*. For example, a kindergarten owned and managed by a city which is not a *Legal entity* would be considered an *Other organisational unit*[9].

3.2.1.3. Legal person types

As regards *Legal persons*, we distinguish between *Organisations* and *Natural persons*, as illustrated in the following picture:

[9] Examples and further information about such *Other organisational units* in Germany may be found here: https://www.vku.de/fileadmin/user_upload/Verbandsseite/Themen/Recht/180626_VKU_Digital-INFO_Rechtsformen_WEB.pdf?sword_list%5b%5d=reiche&no_cache=1. Please note that the document is in written in German.

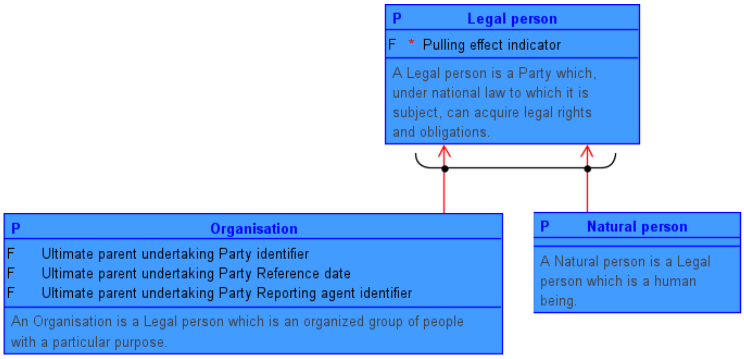

Figure 8: Organisation and Natural person as subtypes of Legal person

Natural persons are separated into *Self-employed natural persons* and *Non-self-employed natural persons* where for the former information about the *Balance sheet information*, *Annual turnover*, and *Number of employees* is relevant, while for the later it is not. The situation is indicated in the next picture:

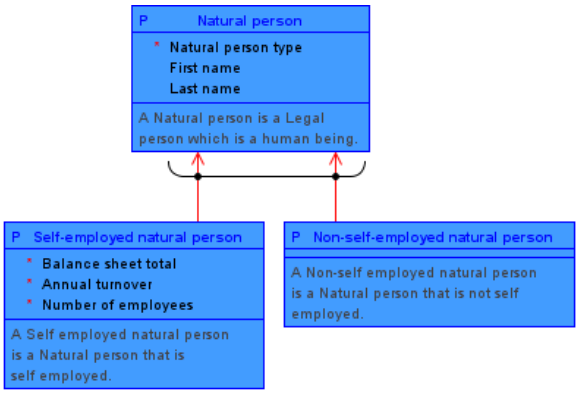

Figure 9: Self-employed natural person and Non-self-employed natural persons as subtypes of Natural person

As regards *Organisations* the situation is a little different, mainly because additional reporting requirements apply. For example, it is required to distinguish between *Organisations* with and without legal proceedings. To capture this information in the LDM we have applied so-called disjoint subtyping of the entity type *Organisation*, first by type into *International organisations and general governments* and *Central banks and private sector companies*, and second by legal proceeding status into *Organisation with legal proceedings* and *Organisation without legal proceedings*. The model design in the LDM is illustrated in the following pictures:

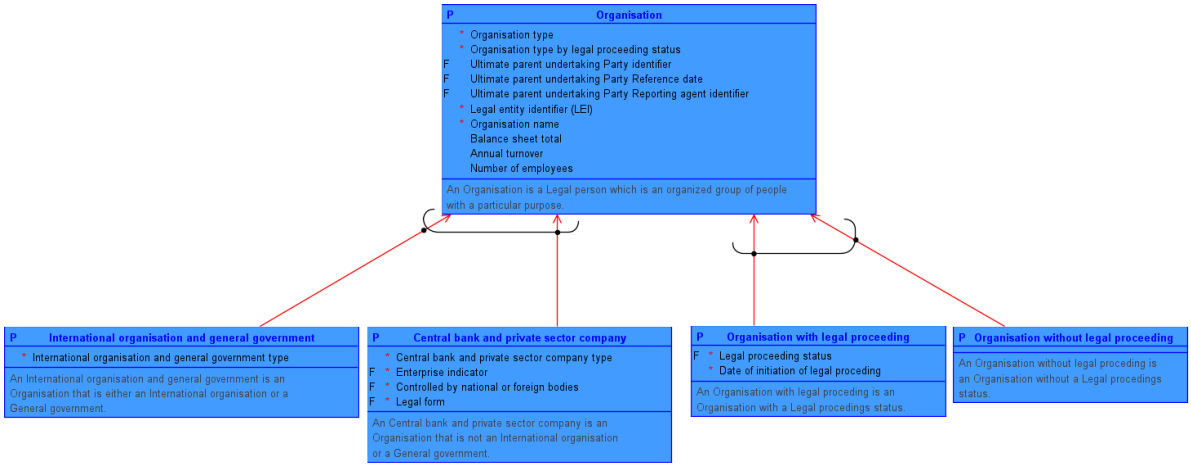

Figure 10: Organisation subtyped by type (International organisation and general government, Central bank and private sector company) and by legal proceeding status (Organisation with legal proceeding, Organisation without legal proceeding)

Please note the two black “arcs” indicating that subtyping by type is independent from subtyping by legal proceeding status. This modelling construct implies that every *Organisation* is either an *International organisation and general government* or a *Central bank and private sector company* and, at that same time, every *Organisation* is either an *Organisation with legal proceeding* or an *Organisation without legal proceeding*. Please note that the attributes *Legal proceeding status* and *Date of initiation of legal proceeding* are only present / applicable to *Organisation with legal proceeding* as logical dictates.

As the name indicates the type *International organisation and general government* can be separated into *International organisations* and *General government*. Regarding *General government* we distinguish between *Central government* and *State and local government and Social security fund*.

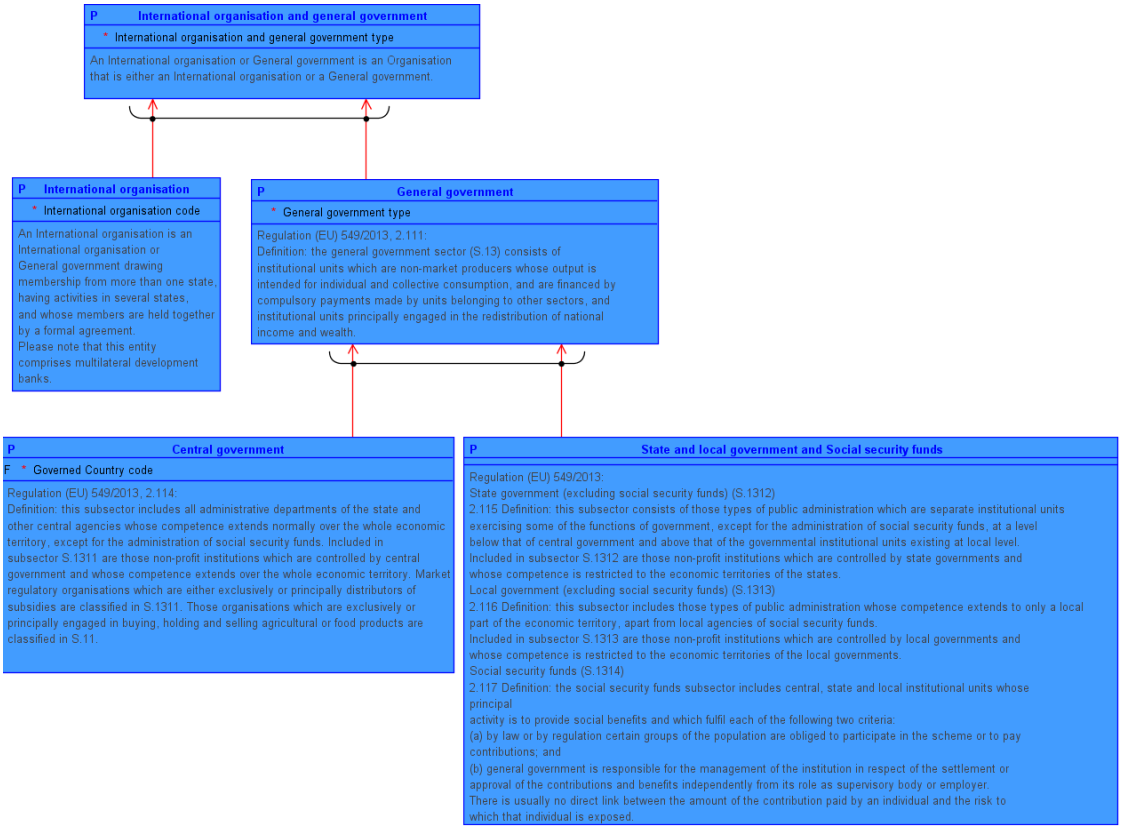

Figure 11: International organisation and general government hierarchy

The other side of *Organisation* is dedicated to *Central banks and private sector companies*. It comprises *Central banks* and all private sector organisations, mainly broken down into *Financial corporations* and *Non-financial corporations* where the former allows a distinction between *Central banks*, *Credit institutions* and *Other financial corporations*. The situation is illustrated in the following picture:

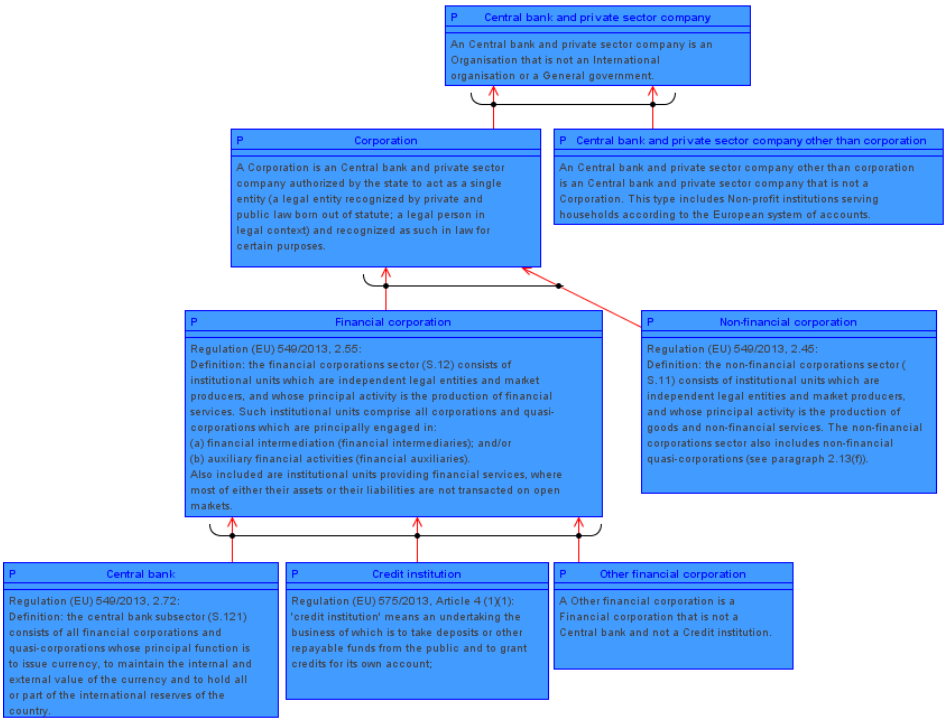

Figure 12: Central bank and private sector company hierarchy

3.2.1.4. Organisations & Organisational units

The fact that an *Organisation* may comprise one-or-many *Organisational units* is reflected in the LDM via a one-to-many (optional) relationship type between these entity types. The model design is indicated in the following picture:

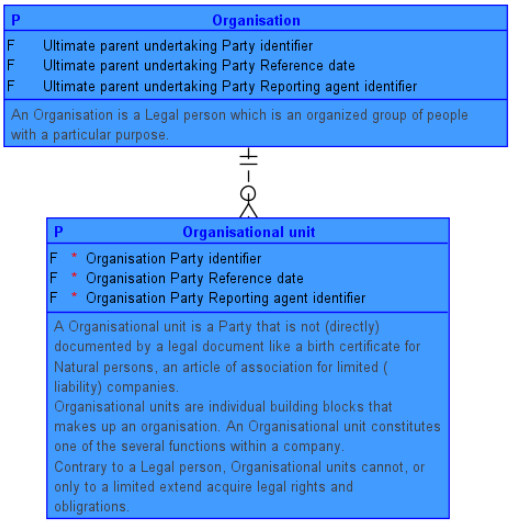

Figure 13: An Organisation comprises zero, one-or-many Organisational unit(s)

Please note that the relationship type is established on a specific subtype level (i.e., *Organisation* and *Organisational unit*) to restrict this relationship type to specific types. For example, it is not possible that a Natural person comprises *Organisational units*. This model design also ensures that every *Organisational unit* belongs to exactly one *Organisation*.

3.2.1.5. Private sector organisation's Immediate parent

An *Organisation's* holding structure might be rather complicated, and its representation is currently not in scope of the BIRD documentation. Therefore, to cover the *Immediate parent* reporting requirement given by AnaCredit, *Central banks and private sector companies* have a relationship type to the *Immediate parent* Entity. This very flexible construction allows to register one, or multiple *Immediate parents* for a *Central bank and private sector company* where one of them must be specified as the one relevant for AnaCredit, see *Immediate parent according to AnaCredit indicator*.

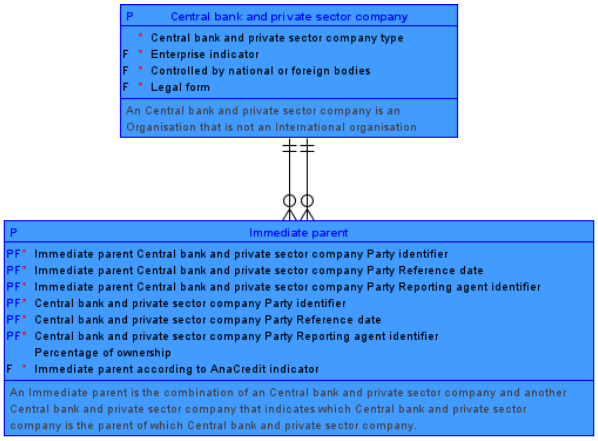

Figure 14: Other organisation having zero, one, or many Immediate parent(s)

3.2.1.6. Model aspects designed for the small and medium size enterprise classification

The *Party* model comprises information that is specifically designed for the derivation of the small and medium size enterprise classification according to Commission Recommendation 2003/361/EC[10]. This information is distributed among different entity types and attributes, namely the *Partner enterprise*, *Linked enterprise*, *Party previous period data*, the *Balance sheet total*, *Annual turnover* and *Number of employees* in *Self-employed natural person* and the *Enterprise indicator* in *Central bank and private sector company*.

Partner enterprises and *Linked enterprises* are constructs allowing to connect one *Central bank and private sector company* with another *Central bank and private company*. For example, a company ("Company A") has a relationship with another company ("Company B") that fulfils the definition of a linked enterprise according to Commission Recommendation 2003/361/EC, Article 3 (3). These two companies, which may

[10] The referenced recommendation does not apply to COREP.

be classified as *Central bank and private sector* company in the LDM, are connected via the entity type *Linked enterprise* where the former company is registered via its *Party identifier* and the later via the *Linked enterprise Party identifier*. Graphically, the situation is illustrated as following:

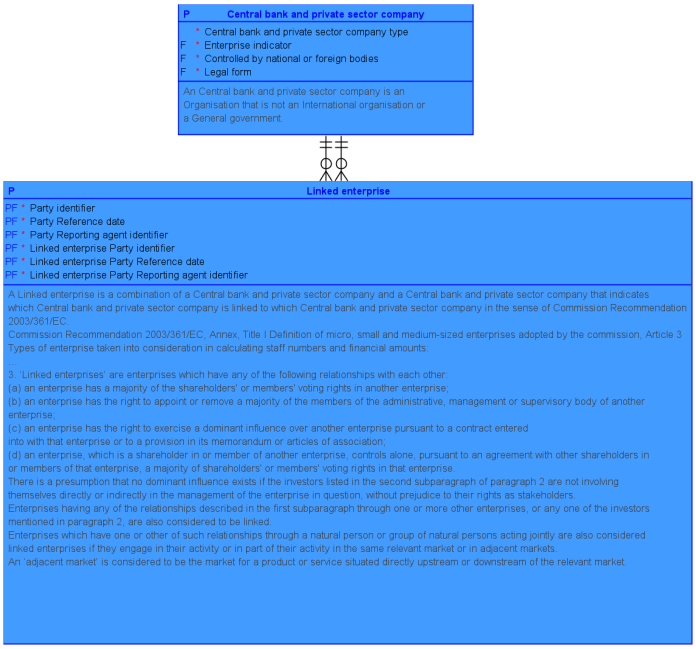

Figure 15: Central banks and private sector companies as Linked enterprises

In a tabular representation, the example may be illustrated as following:

Company A and Company B are both registered as *Central banks and private sector companies*.

Central bank and private sector company						
Party identifier	***…***	***Organisation name***	***Central bank and private sector company type***	***Enterprise indicator***	***Controlled by national or foreign bodies***	***Legal form***
company_a	…	Company A	Corporation	Enterprise	National private controlled	Ltd (UK)
company_b	…	Company B	Corporation	Enterprise	National private controlled	Ltd (UK)
…	…	…	…	…	…	…

Table 1: Company A & Company B registered as private sector companies

The link between these two Parties would be established via the *Linked enterprise* Entity type.

Linked enterprise	
Party identifier	***Linked enterprise Party identifier***
company_a	company_b
…	…

Table 2: Company A & Company B as Linked enterprises

The same approach is chosen for *Partner enterprises*.

As *Self-employed natural persons* may also be classified as *Small and medium sized enterprises*, the associated Entity type comprises the attributes *Balance sheet total*, *Annual turnover*, and *Number of employees*, as indicated in the following picture:

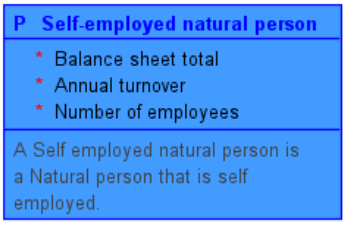

Figure 16: Balance sheet total, Annual turnover, and Number of employees applicable for Self employed natural persons

Because not all companies are enterprises according to Commission Recommendation 2003/361/EC, e.g., universities or non-profit research centres, the attribute *Enterprise indicator*, applicable to *Central banks and private sector companies* allows to distinguish between *Parties* that should and *Parties* that should not be considered as an enterprise.

Since the *Enterprise size* classification is dependent on previous period data[11], the Entity type *Party previous period data* comprises the assigned *Enterprise size* of the previous year.

3.2.1.7. Party role

The role concept is an important model construct applied in the LDM. A role differs from a type because the role tells you what it does, where a type tells you what it is. In the context of the Party model, it allows a *Party* to act in multiple roles – do multiple things - in so-called *Party roles*. For example, a specific *Party* may act in the *Party role* of *Creditor* to a *Loan* and in the *Party role* of a *Deposit taking corporation* (similar to the *Debtor*) in a *Deposit*. Currently, the LDM comprises around 30 *Party roles*.

We will try to explain the role concept applied for *Parties* given the following example: The *Reporting agent* is the debtor of an *Other loan* and at the same time, this *Reporting agent* is also the *Issuer* of a specific *Security*. The relevant model design in the LDM is illustrated in the following picture:

[11] See Commission Recommendation 2003/361/EC, Article 4 (2)

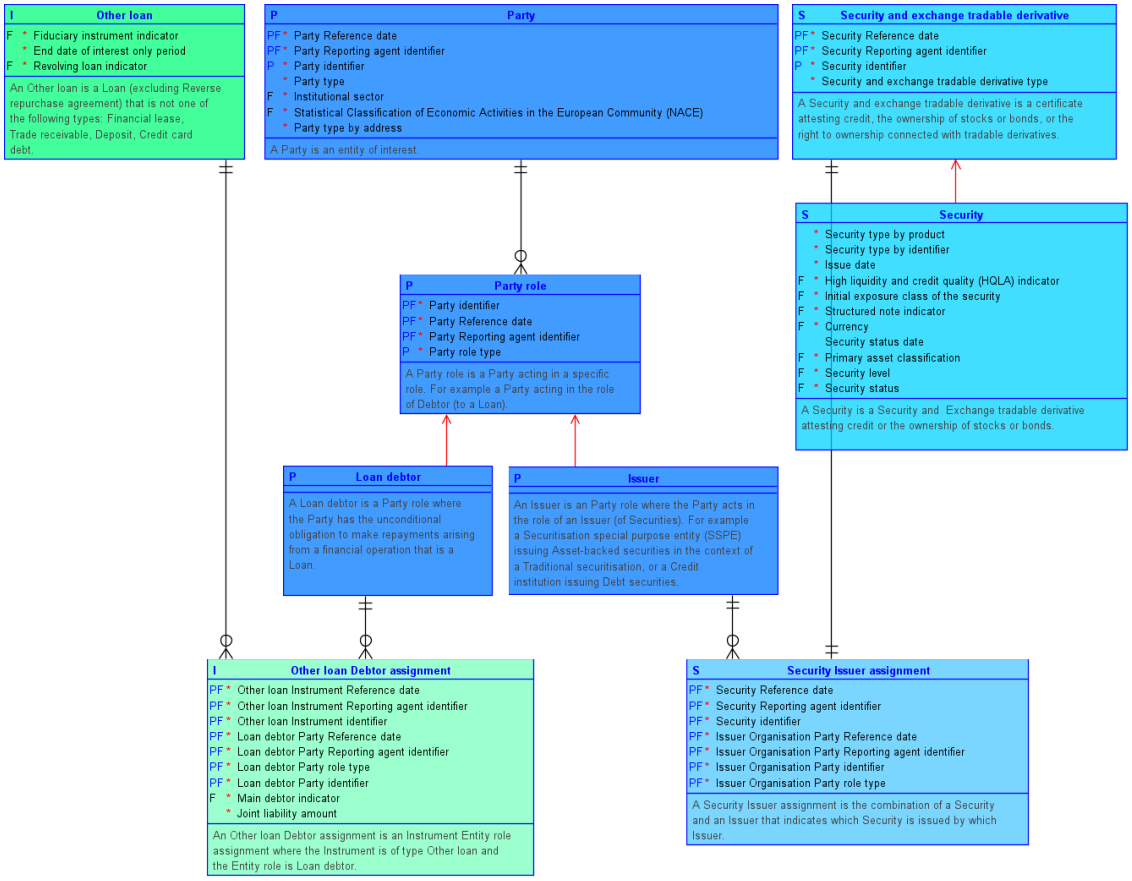

Figure 17: Party acting in the Party role Loan debtor of an Other loan and as Issuer of a Security

The interpretation of this picture is that a *Party* acts, optionally, in multiple *Party roles*, in this case it acts in the roles *Loan debtor* and *Issuer*. The *Loan debtor* role allows the *Party* to be assigned as the debtor of an *Other loan* while the *Issuer* role allows the assignment to a *Security*, specifying that the *Party* is the Issuer of a particular *Security*.

In terms of data, we may consider the following content of the *Party* entity type:

Party identifier	Country code	...
Reporting agent	Germany	...
Some customer	Austria	...
...	...	...

Table 3: Reporting agent and Some customer as instances of the Party Entity type

The entity type *Party role* allows to specify in which roles a *Party* acts. In our example, the *Reporting agent* would act in the roles *Loan debtor* and *Issuer*:

Party identifier	Party role type
Reporting agent	Issuer
Reporting agent	Loan debtor

…	…

Table 4: The Reporting agent acting in the Party roles Loan debtor and Issuer

On the other hand, we have the *Other loan* which may be indicated as following:

Instrument identifier	Currency	…
Other loan provided to the Reporting agent	Euro	…
…	…	…

Table 5: Other loan provided to the Reporting agent

And the link between the *Reporting agent* (acting as a *Loan debtor*) and this *Other loan*:

Other loan Instrument identifier	Loan debtor Party identifier	Loan debtor Party role type
Other loan	Reporting agent	Loan debtor
…	…	…

Table 6: Other loan Debtor assignment linking the Reporting agent (acting in the role Loan debtor) to the Other loan

In a similar fashion, the *Security* may be indicated as following:

Security identifier	Currency	…
Security issued by the Reporting agent	Euro	…
…	…	…

Table 7: Security issued by the Reporting agent

with the link between the *Reporting agent* (acting as an *Issuer*) and this *Security* completing the example:

Security identifier	Issuer Party identifier	Issuer Party role type
Security issued by the Reporting agent	Reporting agent	Issuer
…	…	…

Table 8: Security issuer assignment linking the Reporting agent (acting in the role Issuer) to the Security

Please note the cardinality[12] of the relationship type from *Other loan* to *Other loan Debtor assignment* indicating that in case of an *Other loan*, the LDM allows multiple *Debtors*. For other *Instruments*, e.g., *Credit card debt*, the LDM allows only one *Debtor*.

Applying this role concept allows us to use business language and therefore makes the LDM easier to understand by business users, e.g., we use the roles *Buyer* and *Seller* for *Securities financing transactions (SFTs)* instead of *Creditor* and *Debtor*. Another advantage of this approach is to explicitly specify which roles are involved in which transactions, e.g., a *Security* is issued by an *Issuer*, a *Security position* is the investment of an *Investor*.

[12] Further information about the cardinality may be found in the Annex: Introduction to (logical) data modelling

3.2.1.8. Other party codes

In the LDM a *Party* is identified by its *Party identifier*, however in banks' environments the situation might not be as clean but there may exist multiple identifiers. The functionality to assign additional codes to a *Party* if provided by the entity types *Other party code* and *Party code identifier*. A *Party* has zero, one-or-many Other party code(s), where an Other party code is the combination of a *Party* and a *Party code identifier*. Possible *Party code identifiers* are *Legal Entity Identifier (LEI)*, *Register of Institutions and Affiliates Data base code (RIAD code)* or *Oesterreichische Nationalbank Identnummer (OeNB Identnummer)*. The following picture illustrates the design:

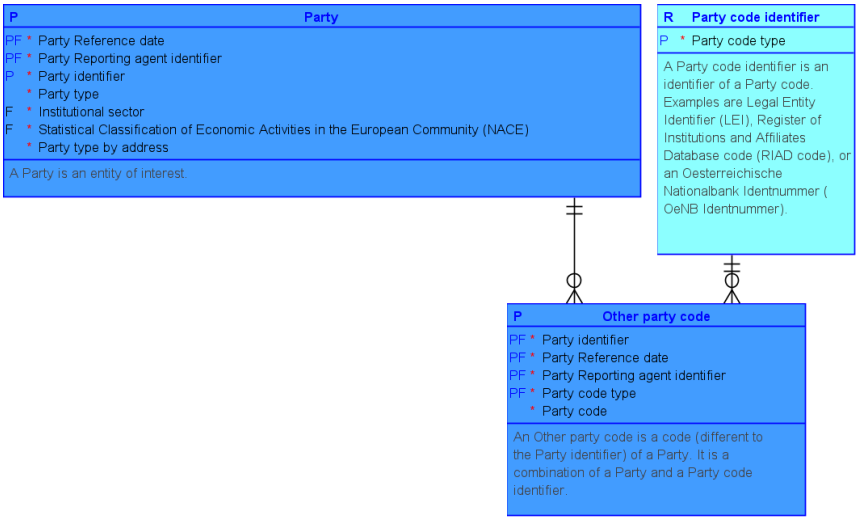

Figure 18: Party has zero, one-or-many Other party code(s)

3.2.1.9. Summary – Party model

Remarks:

- Every entity type that is relevant to fulfil the *Reporting agent's* reporting obligations (covered by the BIRD documentation) is a *Party* in the LDM
- There exist different types of *Parties*, depending on their nature which are reflected in the Party (model) hierarchy; examples are *Natural person*, *Central bank* or *Credit institution*
- Different types of *Parties* may have different attributes or allowed values of attributes assigned to them; for example, the *Institutional sector* for a *Central bank* is restricted to the allowed value *Central banks (S121)* while this value is not applicable for any other *Party type* like *Natural person* or *Non-financial corporation*
- Relationship types are established for specific types, for example, an *Organisational unit* is a part of an *Organisation*
- Party roles state what the *Party* can do

- Relationship types with other aspects of the model are mainly established via *Party roles*; examples are a *Party* acting as a *Debtor* to a *Loan (excluding repurchase agreement)*

3.2.2 Groups

Some reporting requirements require information about a collection of *Parties*. In the LDM, such a collection of *Parties* is called a *Group*, examples for different types of *Groups* are *Accounting consolidation group, Prudential consolidation group*, *Institutional unit of foreign branches* or *Subsidiaries, joint ventures and associates*.

3.2.2.1. Interactions between Parties & Groups

The composition of a specific *Group* regarding its involved *Parties* is designed differently for different *Groups* based on the given (output) requirements. The main reason is that for different *Groups* there exist different (output) requirements. For example, an *Institutional unit of foreign branches* is a concept that is used in AnaCredit to merge all foreign *Branches* located in one *Country* into one *Group*, i.e., the *Institutional unit of foreign branches*. The only relevant information in terms of reporting is the composition, i.e., which *Branches* are comprised in the *Institutional unit of foreign branches*, and therefore the connection between *Institutional unit of foreign branches* and *Branch* is a simple one-to-many relationship type.

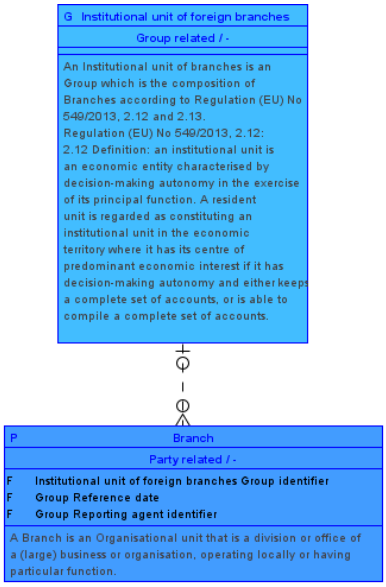

Figure 19: Institutional unit of foreign branches comprising one-or-many Branch(es)

Please note the optionality on the source side of the relationship type (i.e., the *Institutional unit of foreign branches* side) indicating that a *Branch* does not necessarily have to be comprised in an *Institutional unit of foreign branches*, e.g., if it is a domestic *Branch*.

For *Subsidiaries, joint ventures and associates* there are additional reporting requirements in place, see for example FINREP template Scope of the group: “entity-by-entity” (F40.01). Consequently, the LDM needs to capture additional information which cannot be stored in the relationship type establishing the connection between the *Group Subsidiaries, joint ventures and associates* and *Other organisation* and its involved *Parties*. In this case the additionally required information is managed in the entity type *Subsidiaries, joint ventures and associates Other organisation assignment*.

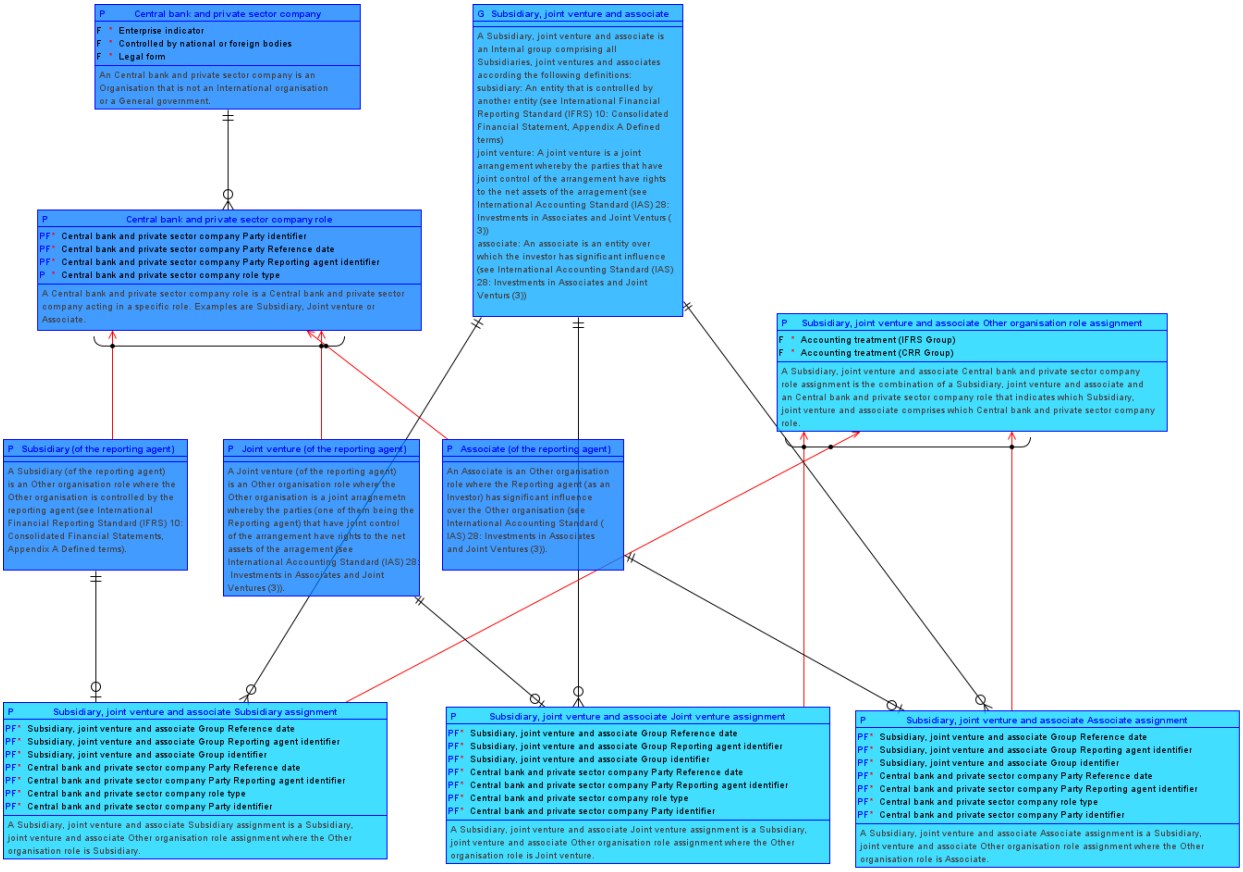

Figure 20: Subsidiary, joint venture and associates and their relationship type to other Parties

The underlying idea is that a *Central bank and private sector company* may be a *Subsidiary*, a *Joint venture* or an *Associate* of the *Reporting agent*. If so, such a private sector company would act in the dedicated role which allows it to be registered in *Subsidiary, joint venture and associate*.

3.2.2.2. Summary – Group model

Remarks:

- A *Group* is a collection of *Parties*; examples are *Internal consolidation groups*, *Institutional unit of foreign branches*, and *Subsidiaries, joint ventures and associates*

- The consolidation process is not in scope of the BIRD LDM, data must be prepared accordingly before populating the LDM (or an implementation model based on the LDM)
- Depending on the given (output) requirements the relationship type between a *Group* and its involved *Parties* might be modelled as a simply (one-to-many) relationship type, like in the case of the *Institutional unit of foreign branches*, or a dedicated Entity type, like in the case of *Subsidiaries, joint ventures and associates*

3.3 Instruments & Credit facilities

Instruments and *Credit facilities* represent products establishing a relationship between a financial institution and its customer. The main reason for the high-level classification into these two types is based on the fact that *Instruments* may arise from *Credit facilities*. Alternatively, *Instruments* may be originated directly as a consequence of a *Financial contract*.

The following sections provide information about *Instruments* & *Credit facilities* in the context of the LDM.

3.3.1 Instruments

An *Instrument* in the LDM is defined as "… a product that establishes a financial relationship between a bank and its customer. In the context of accounting such a financial relationship may be considered a financial asset or a financial liability or an off-balance sheet item." This definition aims to capture all products that are setup individually between a customer and the *Reporting agent* which are identifiable on their own – contrary to a *Security position* where a *Reporting agent* may hold 100 of *Debt securities* and these *Debt securities* are indistinguishable, meaning that you cannot distinguish between the first of the 100 *Debt securities* and the second. Examples of instruments are *Loans*, *Deposits* or *Financial guarantees*.

Instruments may, as already mentioned above, arise either directly from a *Financial contract* or arise as a result of a *Credit facility*. This distinction represents the first breakdown of *Instruments* by their origin, into *Instrument resulting directly from a financial contract* and *Instrument resulting from a Credit facility*. The following picture illustrates the model design:

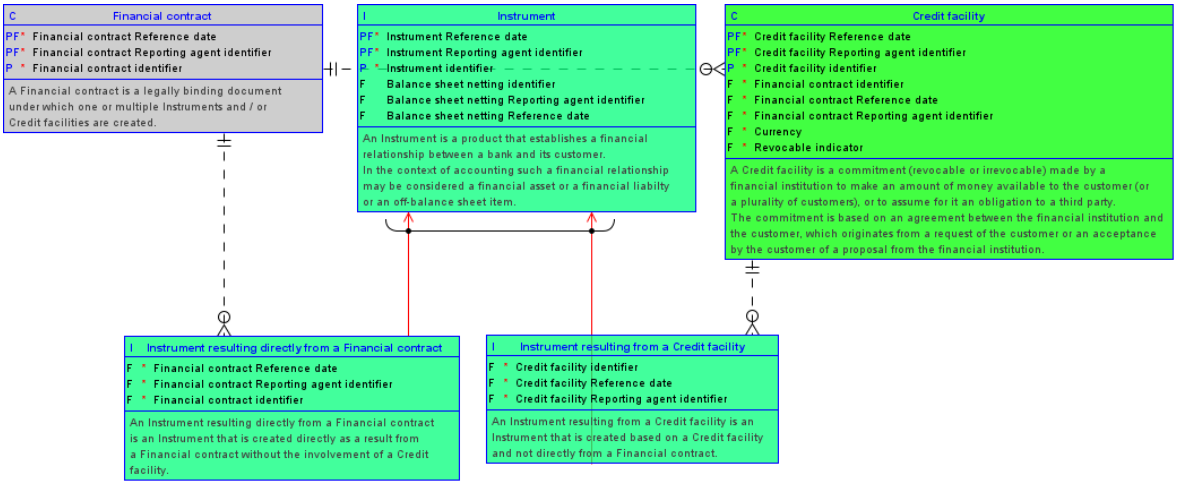

Figure 21: Instrument type by origin

Please note that the LDM comprises business rules specifying that an *Instrument resulting directly from a financial contract* requires a *Financial contract identifier* mandatorily, while an *Instrument resulting from a credit facility* requires a *Credit facility identifier* mandatorily.

On the other hand, different reports require a breakdown by product classifications, therefore Instruments are also classified into the following categories: *Loans (excluding repurchase agreements)*, *Advances*, *Securities financing transactions (SFTs)*, *Off-balance instruments* (which includes *Financial guarantees*, *Other commitments* (other than *Credit facilities*)) and *Over the counter (OTC) derivatives*.

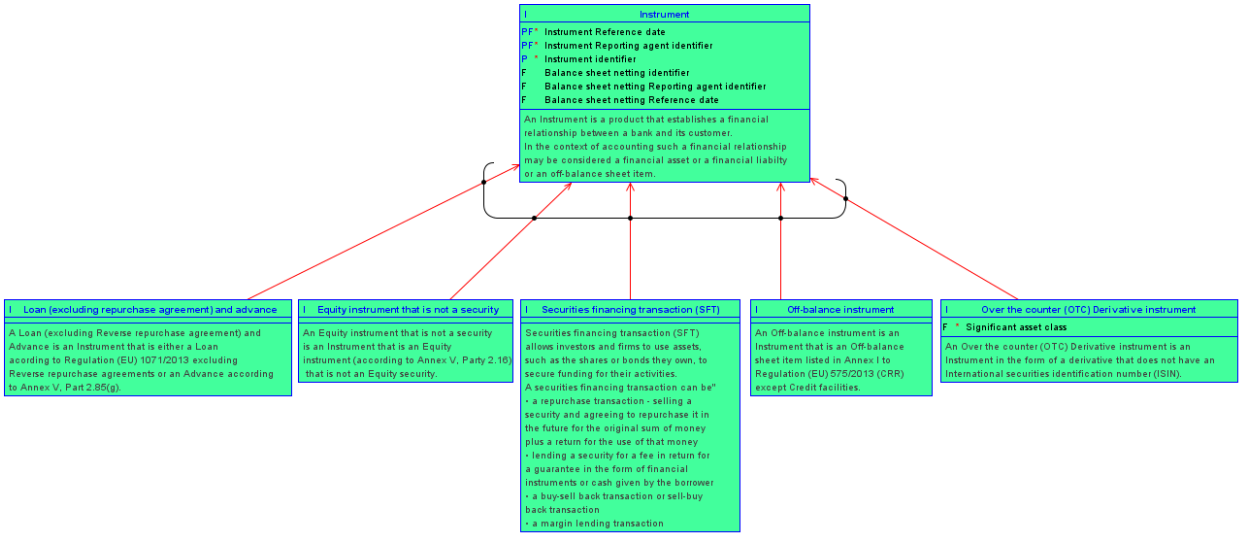

Figure 22: Instrument type by product

Please be aware that these two different breakdowns, i.e., by product and by origin, apply in parallel. Therefore, an *Instrument* may be a *Loan (excluding repurchase agreement) and advance* and an *Instrument resulting from a credit facility* at the same time.

3.3.1.1. Instrument roles

It is important to note that, the classification into those product types is completely independent from the assignment to the balance sheet. Therefore, the Entity type *Deposit* in the LDM represents *Deposits* that are assets of the *Reporting agent* and *Deposits* that are liabilities of the *Reporting agent*. For the distinction between assets and liabilities we use a role concept, similarly as for *Parties*. The idea is that an *Instrument* may act in different roles (so-called *Instrument roles*) simultaneously. Unfortunately, the situation with *Instruments* is a little bit more complex than the situation with *Parties* and requires additional subtypes to handle this complexity.

The first level of *Instrument roles* in which an *Instrument* may act in are:

- *Financial asset instrument*,
- *Financial liability instrument*,
- *Off-balance sheet item given instrument*,
- *Off-balance sheet item received instrument*,
- *Collateral received instrument,* and
- *Collateral given instrument*

The following picture indicates the first level of the underlying model design:

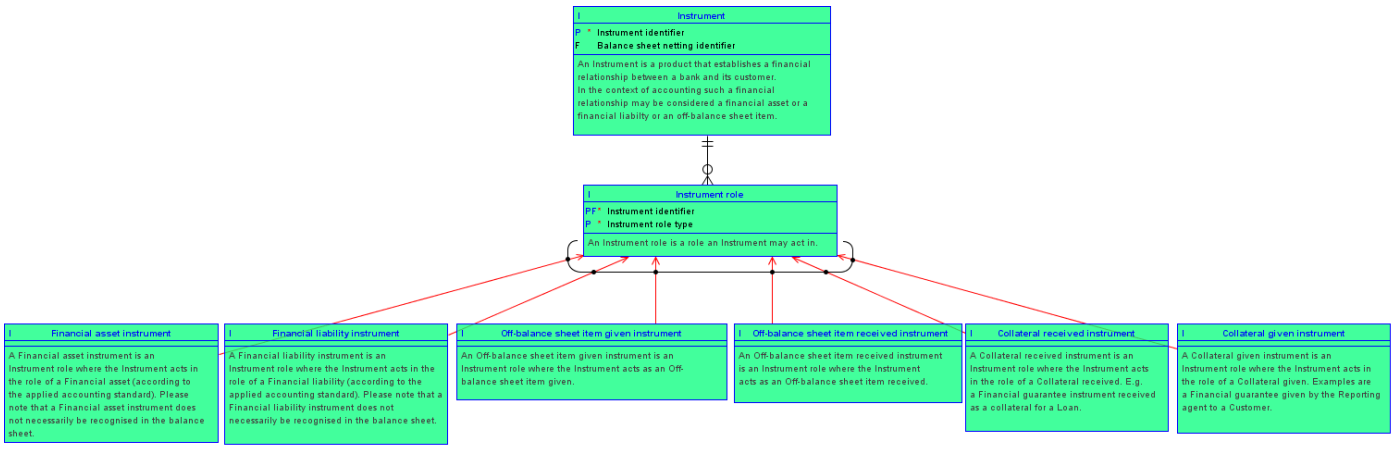

Figure 23: Instrument roles (1st level)

An *Instrument* may act in zero, one-or-many of these roles at the same time, for example a *Deposit* that is used as *Collateral* for a *Loan* may act in the role *Financial liability instrument* and *Collateral received instrument*.

3.3.1.2. Financial asset & liability instrument roles

We would like to stress that the roles *Financial asset instrument* and *Financial liability instrument* do not necessarily imply that an *Instrument* acting in such an *Instrument role* is recognised in the balance sheet. Cases where *Instruments* acting in such a role that are not recognised in the balance sheet are *Instruments* subject to off-setting agreement[13]. To identify an *Instrument* which is recognised in the balance sheet we require an additional layer of subtyping. For example, a *Financial asset instrument* is either a *Balance sheet recognised financial asset instrument*, or a *Non-balance sheet recognised financial asset instrument* (and a similar approach for *Financial liability instruments*) which is illustrated in the next picture:

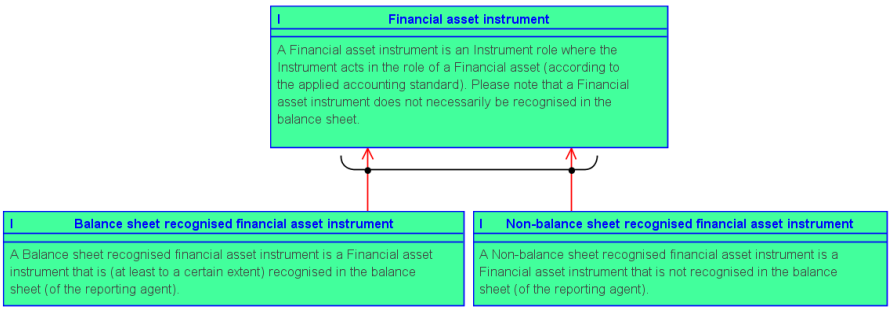

Figure 24: Balance sheet recognised financial asset instrument and Non-balance sheet recognised financial asset instrument as subtypes of Financial asset instrument

Therefore, only *Instruments* acting in the role *Balance sheet recognised financial asset instrument* are recognised in the balance sheet (of the *Reporting agent*). The same argument applies to *Instruments* acting in the role *Balance sheet recognised financial liability instrument*.

As regards *Balance sheet recognised financial asset instruments* there is also a distinction between International Financial Reporting Standard (IFRS) and national Generally Accepted Accounting Principles (nGAAP), namely the subtypes *Balance sheet recognised financial asset instruments according to IFRS and Balance sheet recognised financial asset instruments according to nGAAP.* The main rationale is that requirements are different for IFRS and nGAAP. The following picture illustrates the model design:

[13] See for example International Accounting Standard 32 (IAS 32)

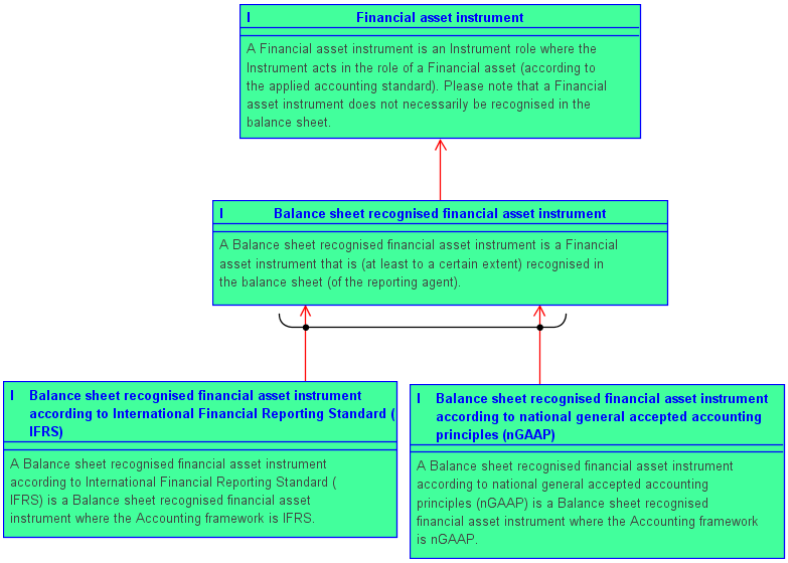

Figure 25: distinction between IFRS and nGAAP Balance sheet recognised financial asset instruments

Regarding *Balance sheet recognised financial liability instruments* we distinguish between *Fair valued*[14] *balance sheet recognised financial liability instruments* and *Non-fair valued balance sheet recognised financial liability instruments*.

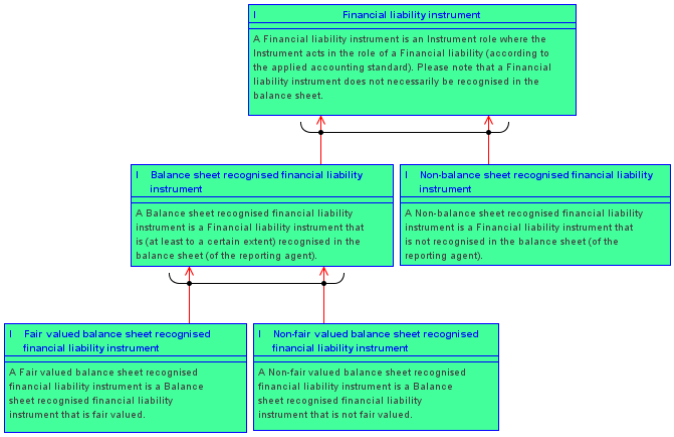

Figure 26: distinction between Fair valued and Non-fair valued balance sheet recognised financial liability instruments

The complete *Instrument role* hierarchy regarding *Financial asset instruments* and *Financial liability instruments* is as following:

[14] Please note that we are referring to Fair value according to International Financial Reporting Standard (IFRS) 13

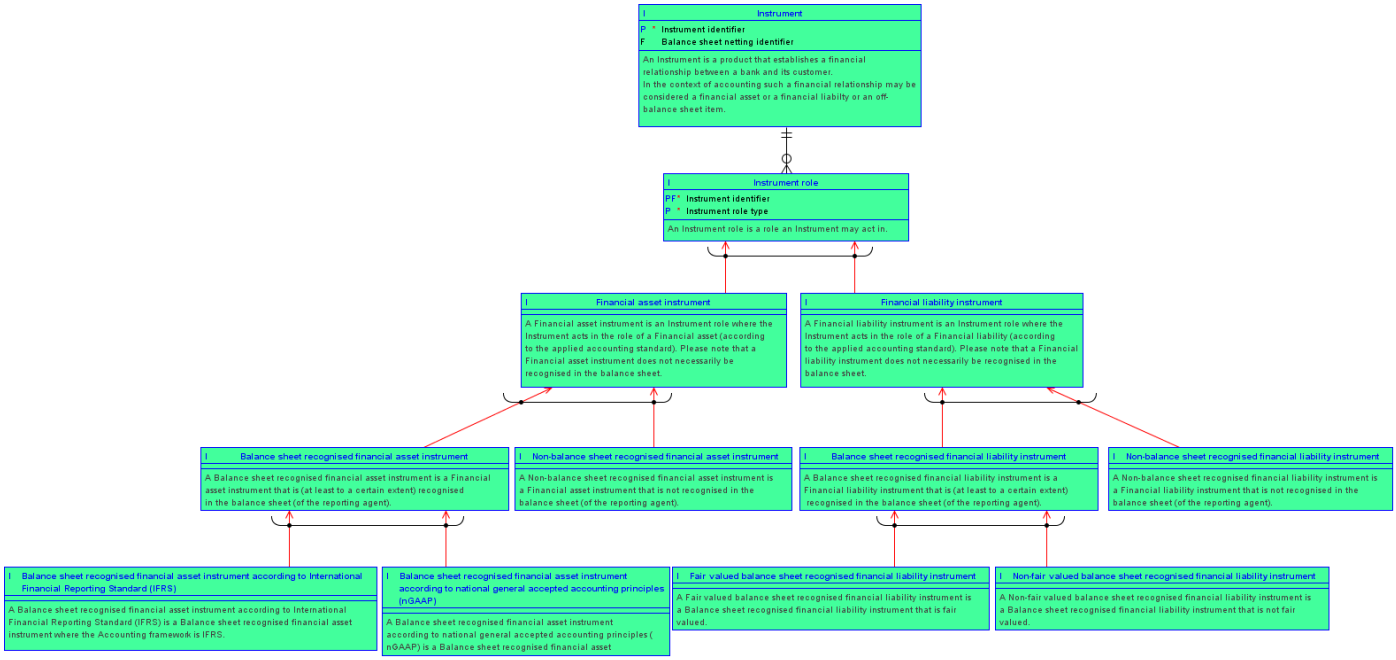

Figure 27: Instrument role hierarchy

3.3.1.3. Default status (of an individual Instrument)

Regulation (EU) 575/2013, Article 178 Default of an obligor, states that "In case of retail exposures, institutions may apply the definition of default […] at the level of an individual credit facility rather than in relation to the total obligations of a borrower". Consequently, the *Default status* is, in principle, applied on the *Party* level. However, for *Financial asset instruments* which are classified as retail exposures it is possible to apply an individual assessment. To specify that such an individually assessed *Default status* is only applicable to a certain subset of all *Financial asset instruments* subtyping is required. Therefore, we apply an additional layer of subtyping to *Financial asset instruments*, namely subtyping by CRR, Article 123 (Retail exposure) into *Potential retail exposure class financial asset instruments* and *Non-retail exposure financial asset instruments*. For the former an individual assessment may be applied while for the late the *Default status* is determined by the *Default status* of the associated *Debtor*. The distinction between these types is illustrated in the following picture:

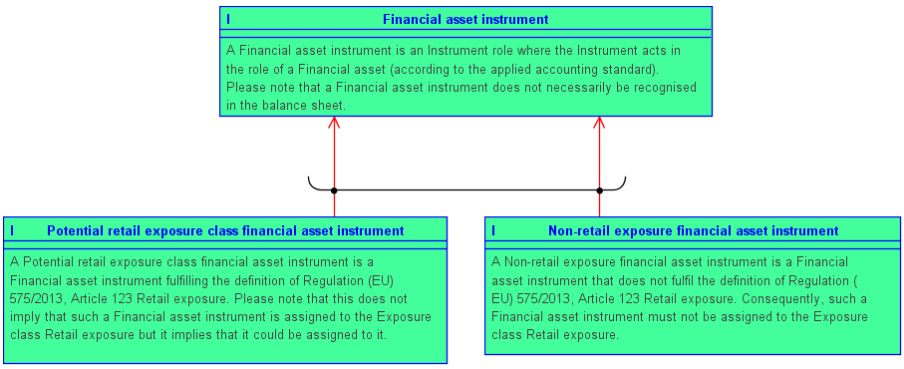

Figure 28: Potential retail exposure class financial asset instrument and Non-retail exposure financial asset instrument as subtypes of Financial asset instrument

The right-hand side of the inheritance relationship type, i.e., *Non-retail exposure financial asset instruments*, comprises performing and non-performing *Financial asset instruments*. Because certain attributes only apply to performing, while other attributes only apply to non-performing *Financial asset instruments*, we distinguish between *Performing non-retail exposure class financial asset instruments* and *Non-performing non-retail exposure class financial asset instruments*, as illustrated in the next picture:

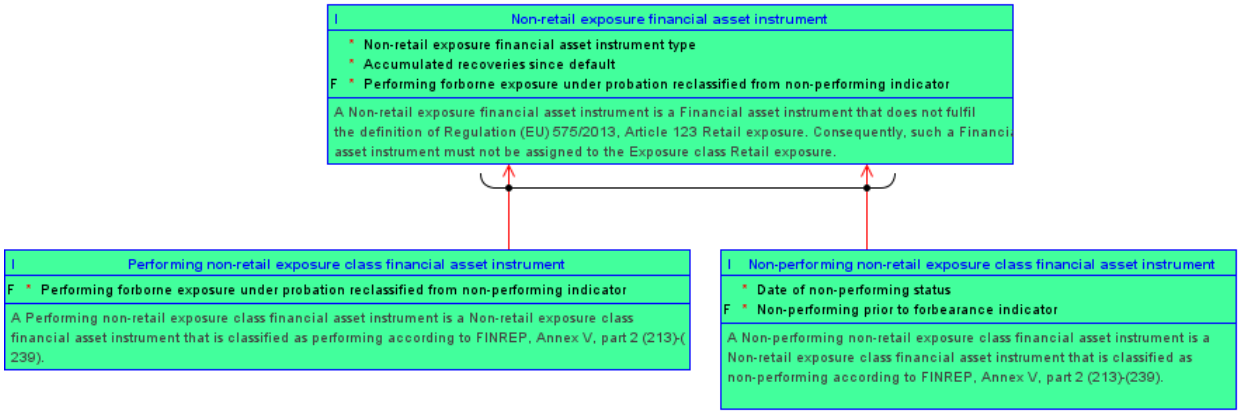

Figure 29: Performing and Non-performing non-retail exposure class financial asset instruments as subtypes of Non-retail exposure financial asset instrument

Potential retail exposure class financial asset instruments may or may not be classified as retail exposures. For those that are classified as retail exposures, an individual assessment may be applied. A distinction between those *Potential retail exposure class financial asset instruments* where an individual assessment is applied, and those where a *Debtor* based approach is applied will support the assignment of relevant attributes, specifically the *Default status* which is only applicable for those where an individual assessment is applied. The next picture indicates the next level of subtyping:

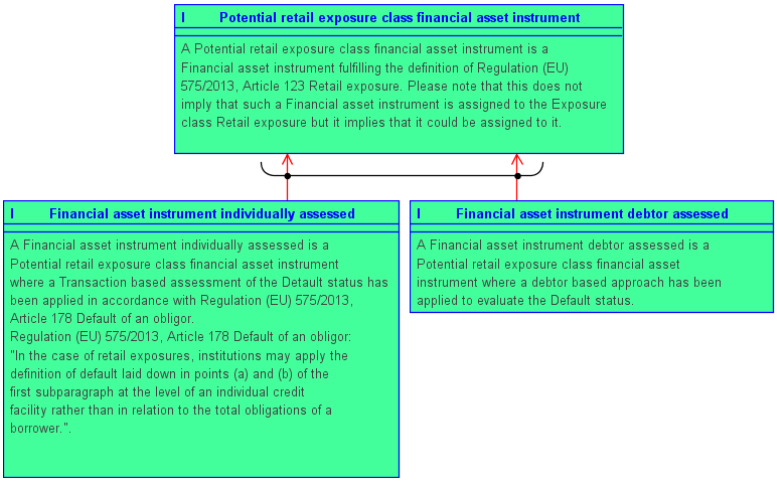

Figure 30: Distinction of Potential retail exposure class financial asset instruments where an individual assessment or a debtor-based assessment is applied

Because the *Default status type*, the *Date of default status*, the *Accumulated recoveries since default*, and the *Non-performing prior to forbearance indicator* are attributes that are only applicable to defaulted *Financial asset instruments individually assessed*, another level of subtyping allows us to assign these attributes to *Default financial asset instrument individually assessed*.

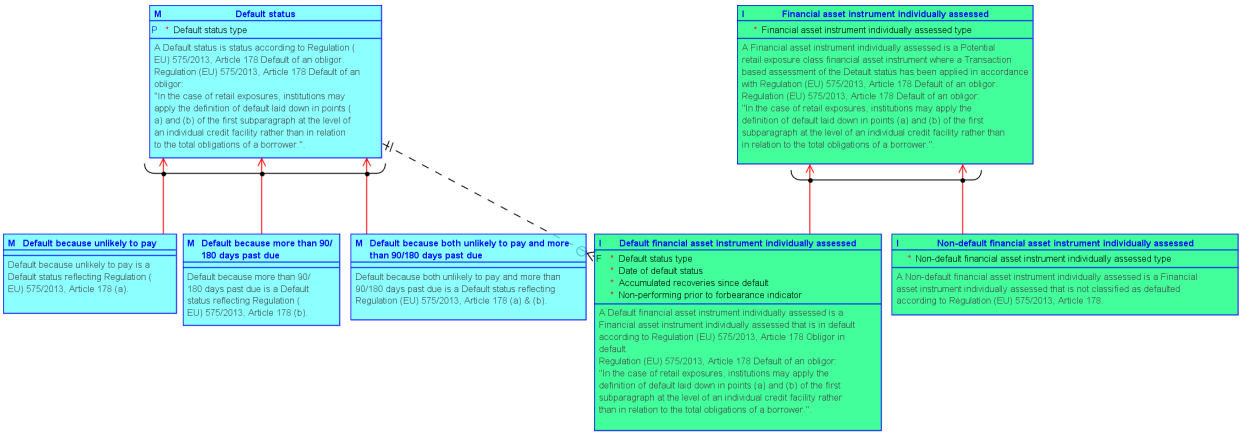

Figure 31: Default financial asset instrument individually assessed and Non-default financial asset instrument individually assessed as subtypes of Financial asset instrument individually assessed

For the sake of completeness, please find here the complete model design for default and performing related information:

Figure 32: Financial asset instrument hierarchy with respect to default and performing related information

3.3.1.4. Renegotiation & forbearance measures

As regards renegotiation & forbearance measures, first we distinguish between *Renegotiated* and *Non-renegotiated financial asset instruments*.

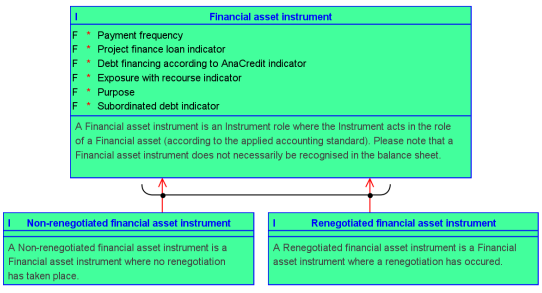

Figure 33: Renegotiated and Non-renegotiated financial asset instruments as subtypes of Financial asset instrument

Because not all renegotiations result in forbearance measures, we apply another level of subtyping accordingly. Only for *Renegotiated financial asset instruments with forbearance measures* the *Forbearance*

measure type and the *Date of forbearance measure* are relevant, while for *Renegotiated financial asset instruments without forbearance measures* this is not the case. The following picture illustrates the model design:

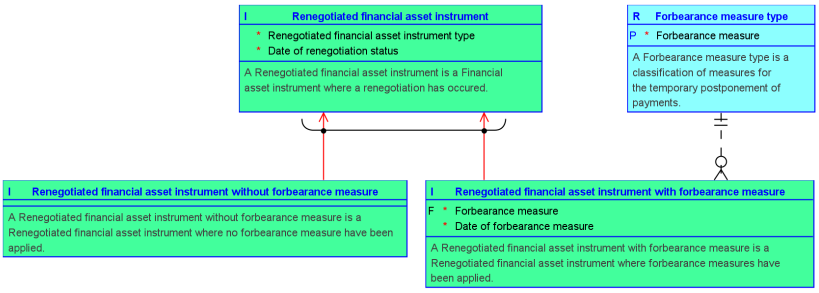

Figure 34: Renegotiated financial asset instruments with and without forbearance measures as subtypes of Renegotiated financial asset instrument

The resulting model design for renegotiation and forbearance related information is illustrated in the next picture:

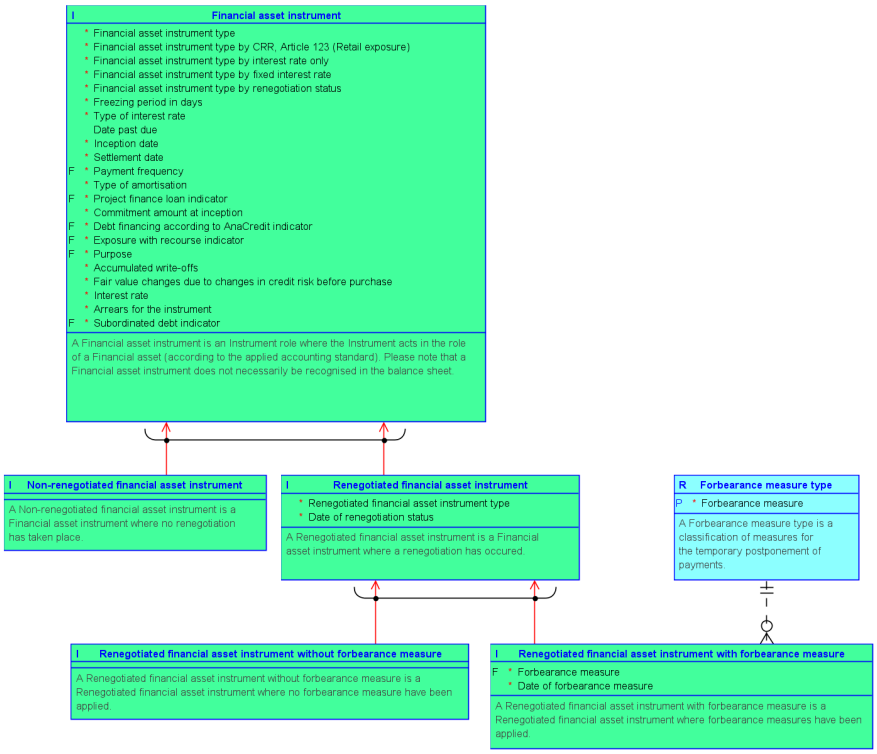

Figure 35: Financial asset instrument hierarchy with respect to renegotiation and forbearance related information

3.3.1.5. Interest rate related information

Regarding *Interest rate* related information, we distinguish along interest-only / non-interest-only types and fixed interest / non-fixed interest types. The first set of subtypes is relevant because the End date of interest-

only period is only applicable to *Interest-only financial asset instruments*, for *Non-interest-only financial asset instruments* this is not the case.

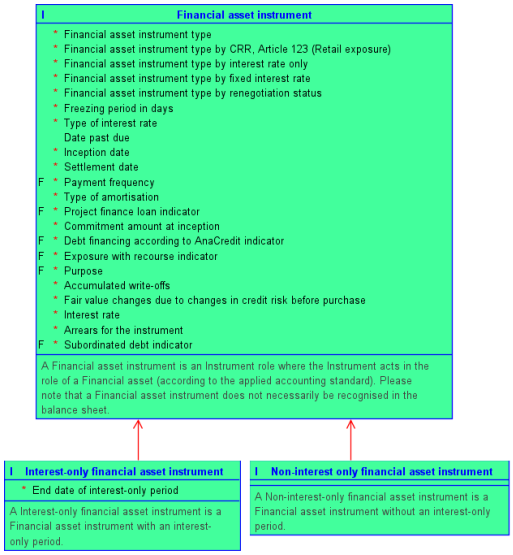

Figure 36: Interest-only financial asset instruments and Non-interest-only financial asset instruments as subtypes of Financial asset instrument

The distinction into *Fixed interest financial asset instruments* and *Non-fixed interest financial asset instruments* allows to assign the attributes *Reference rate*, *Interest rate cap*, *Interest rate floor*, and *Interest rate spread / margin* only to *Non-fixed interest financial asset instruments* because for the other type these concepts do not apply.

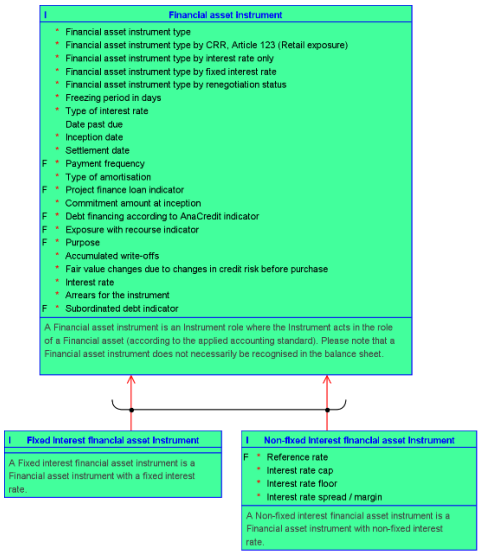

Figure 37: distinction of Financial asset instruments regarding fixed interest

The resulting model design for *Interest rate* related information is shown in the following picture:

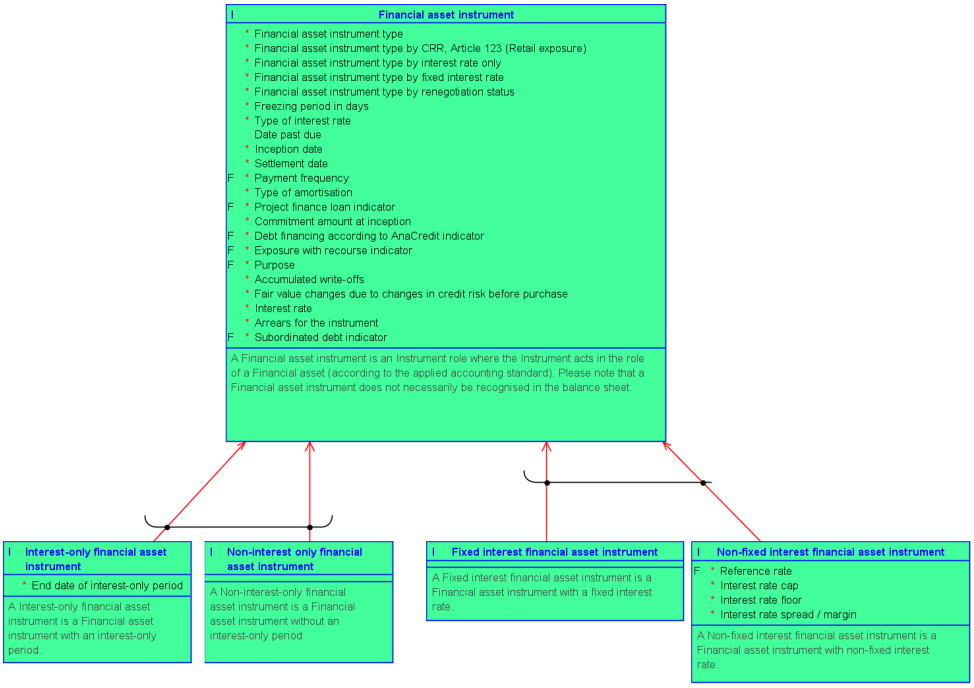

Figure 38: Financial asset instrument hierarchy with respect to interest rate related information

3.3.1.6. Collateral received instrument role

As indicated in Figure 23: Instrument roles (1st level), an *Instrument* may act in the role *Collateral received instrument*. Such a *Collateral received instrument* may protect an *Instrument* or a *Credit facility*, for example a *Deposit* acting as a *Collateral received instrument* for a *Loan*. The many-to-many relationship type resulting from the fact that, one *Instrument* may be protected by multiple *Collateral received instruments* and one *Collateral received instrument* may protect multiple *Instruments*, is established via the entity type *Instrument Collateral received instrument assignment*. The same kind of link is established between *Collateral received instruments* and *Credit facilities* because the argument hold for *Credit facilities* too. The resulting model design is illustrated in the next picture:

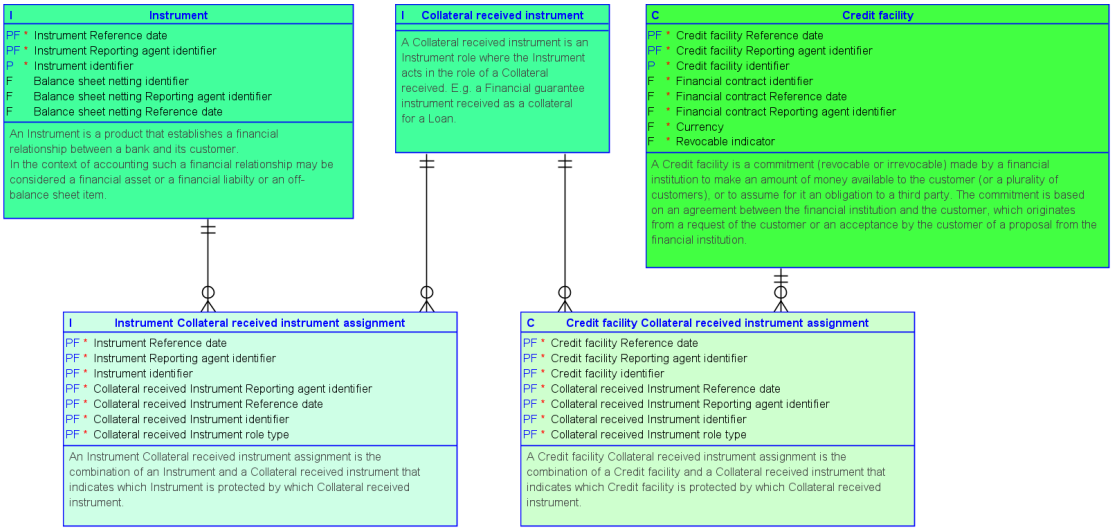

Figure 39: Collateral received instrument protecting Instruments and / or Credit facilities

3.3.1.7. Instrument types

The following section provides additional information about the different *Instrument types by product*.

3.3.1.8. Loans (excluding repurchase agreements) and advances

The breakdown of *Loans (excluding repurchase agreements) and advances* is a mixture of AnaCredit and FINREP output requirements considering European System of Accounts (ESA)[15] classification. The first level distinction allows to identify *Loans (excluding repurchase agreements)* and *Advances*.

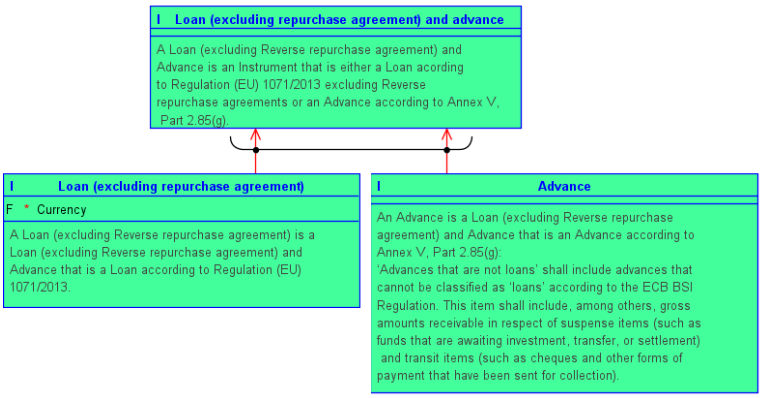

Figure 40: Loans (excluding repurchase agreement) and Advances as subtypes of Loans (excluding repurchase agreements) and advances

Advances are broken down into *Suspense items*, *Transit items* and *Other advances*.

[15] See https://ec.europa.eu/eurostat/documents/3859598/5925693/KS-02-13-269-EN.PDF/44cd9d01-bc64-40e5-bd40-d17df0c69334

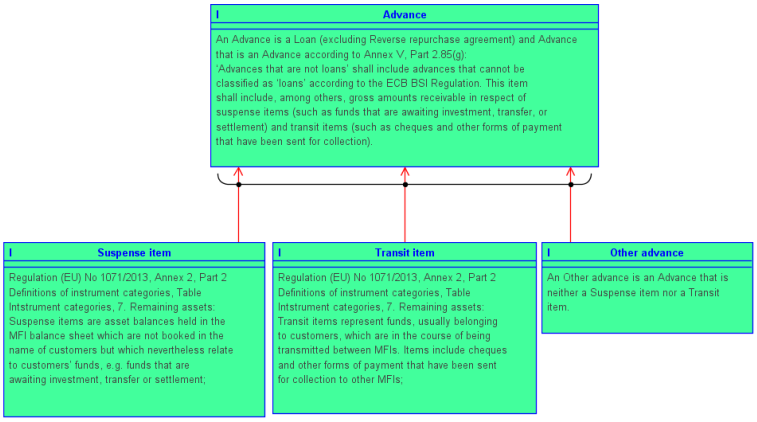

Figure 41: Suspense, Transit items and Other advances as subtypes of Advances

Loans (excluding repurchase agreements) are separated into the following classifications: *Financial leases*, *Trade receivables*, *Deposits*, *Credit card debt*, and *Other loans*.

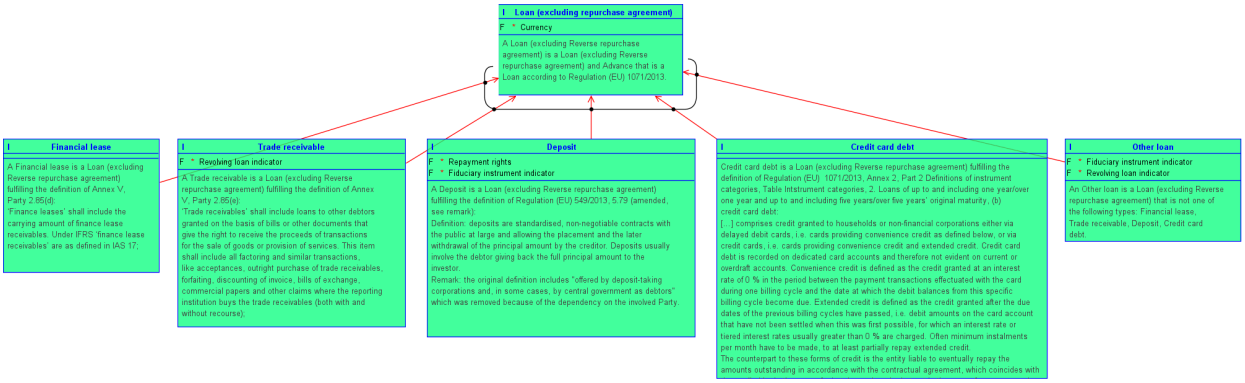

Figure 42: Financial leases, Trade receivables, Deposits, Credit card debt, and Other loans as subtypes of Loans (excluding repurchase agreements)

3.3.1.9. Trade receivables

As regards *Trade receivables* we distinguish between *Factoring* and *Other trade receivables*.

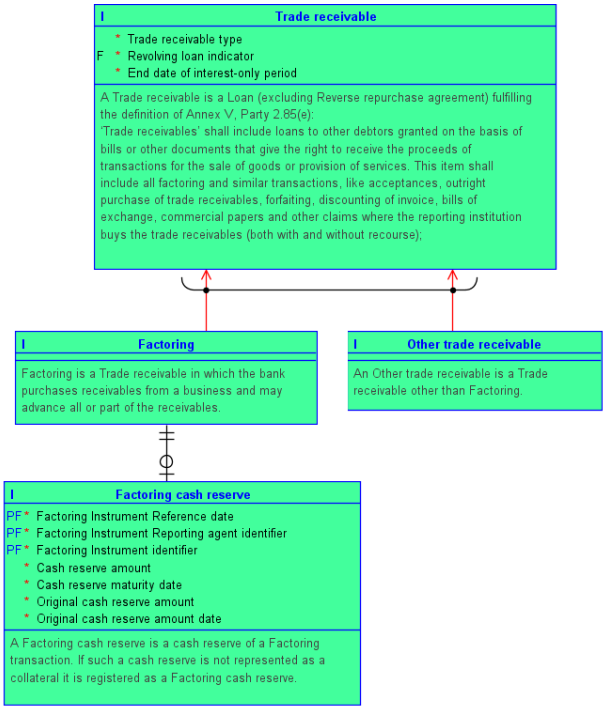

Figure 43: Factoring and Other trade receivables as subtypes of Trade receivables

A cash reserve in a *Factoring* operation needs to be reported as a protection according to AnaCredit reporting requirements. Because sometimes such a cash reserve is not registered as a *Collateral* the entity type *Factoring cash reserve* comprises required information about these reserves to fulfil AnaCredit reporting requirements.

3.3.1.10. Deposits

Deposits are subject to a distinction into *Overnight deposits* and *Other deposits* where the former is again separated into *Transferable deposits* and *Other overnight deposits* and the later into *Deposits with agreed maturity* and *Deposits redeemable at notice*. The model design is illustrated in the following picture:

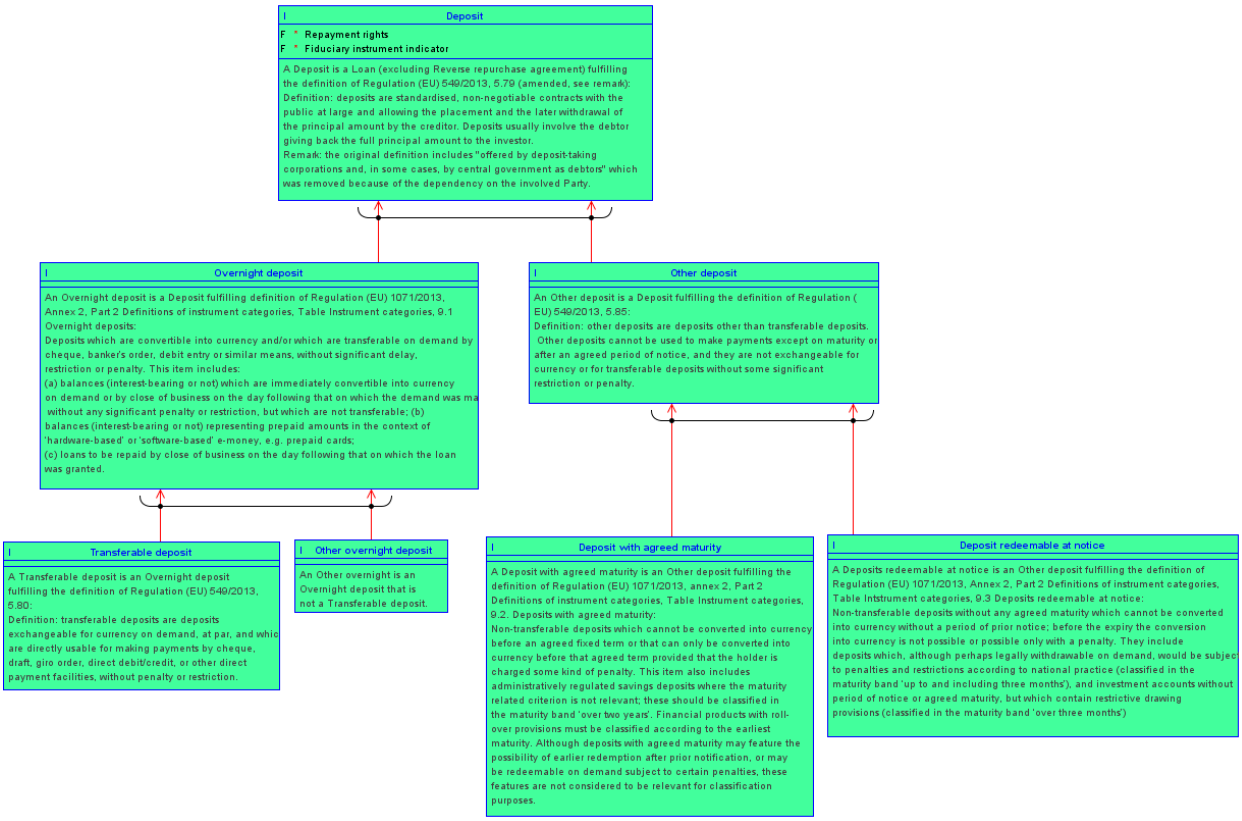

Figure 44: Deposit hierarchy

For the sake of completeness, we have added the complete *Loan (excluding repurchase agreement) and advance* hierarchy in the next picture:

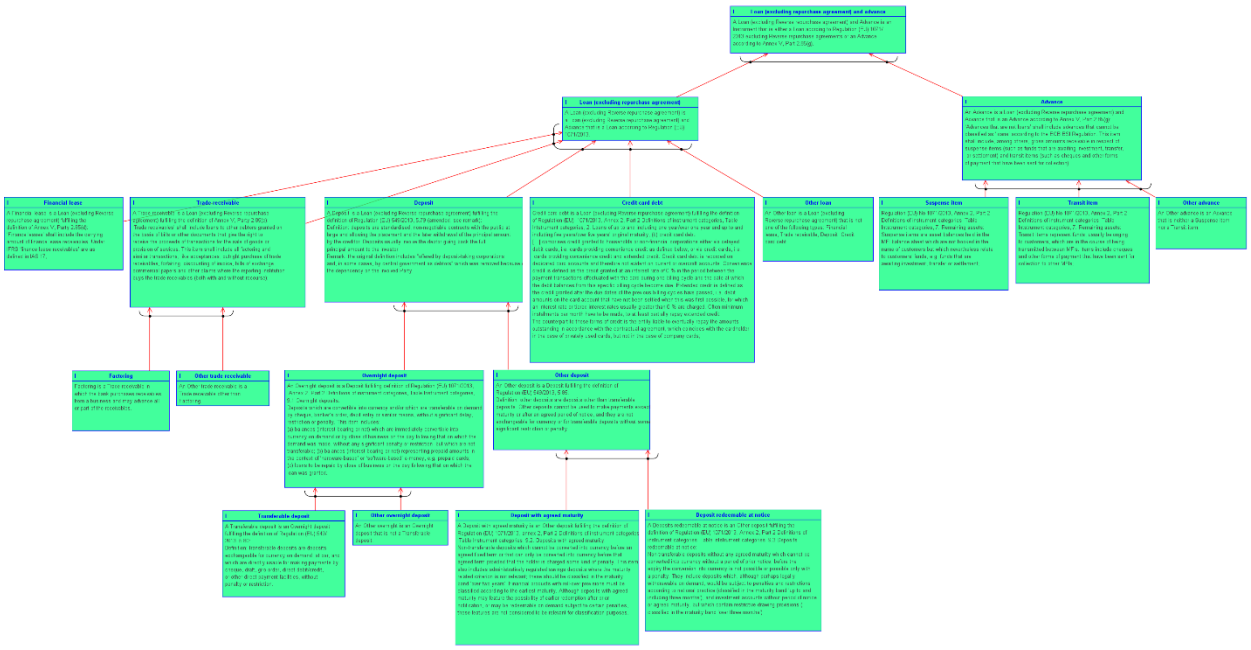

Figure 45: Loan (excluding repurchase agreement) hierarchy

Please note that we have consciously separated *Repurchase agreements* from *Loans* – which is why they are labelled *Loans (excluding repurchase agreements)* – because their structure differs from other loan structures, specifically because of the existence of the *Cash* and *Security leg*. A more detailed description of *Repurchase agreement instrument* may be found in section Repurchase agreements.

3.3.1.11. Securities financing transactions (SFTs)

Repurchase agreements are not the only products having a two-leg structure and therefore they have been classified together with other *Security* lending transactions into *Securities financing transactions (SFTs)*. These SFTs comprise products where at least one *Security* is borrowed or lent, specifically *Repurchase agreements*, *Security against security borrowing and lending transactions* and *Security against a fee borrowing and lending transactions* as illustrated in the following picture:

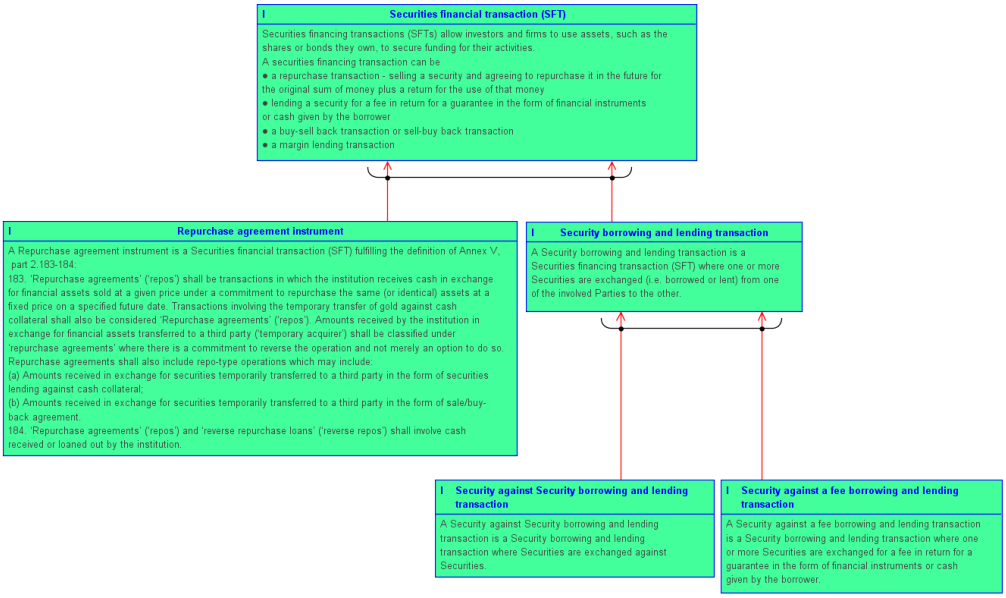

Figure 46: Repurchase agreement instruments, Security against Security borrowing and lending transactions and Security against a fee borrowing and lending transactions as subtypes of Securities financial transaction (SFT)

Additional details about these types may be found in the following subsections.

3.3.1.12. Repurchase agreements

Regarding *Repurchase agreements*, we distinguish between *Term repurchase agreement instruments* and *Open repurchase agreement instruments* where the former has a specified *Legal final maturity date* while for the later the closing date is defined on demand with a given notice period. The overall structure of Repurchase agreements is illustrated in the following picture:

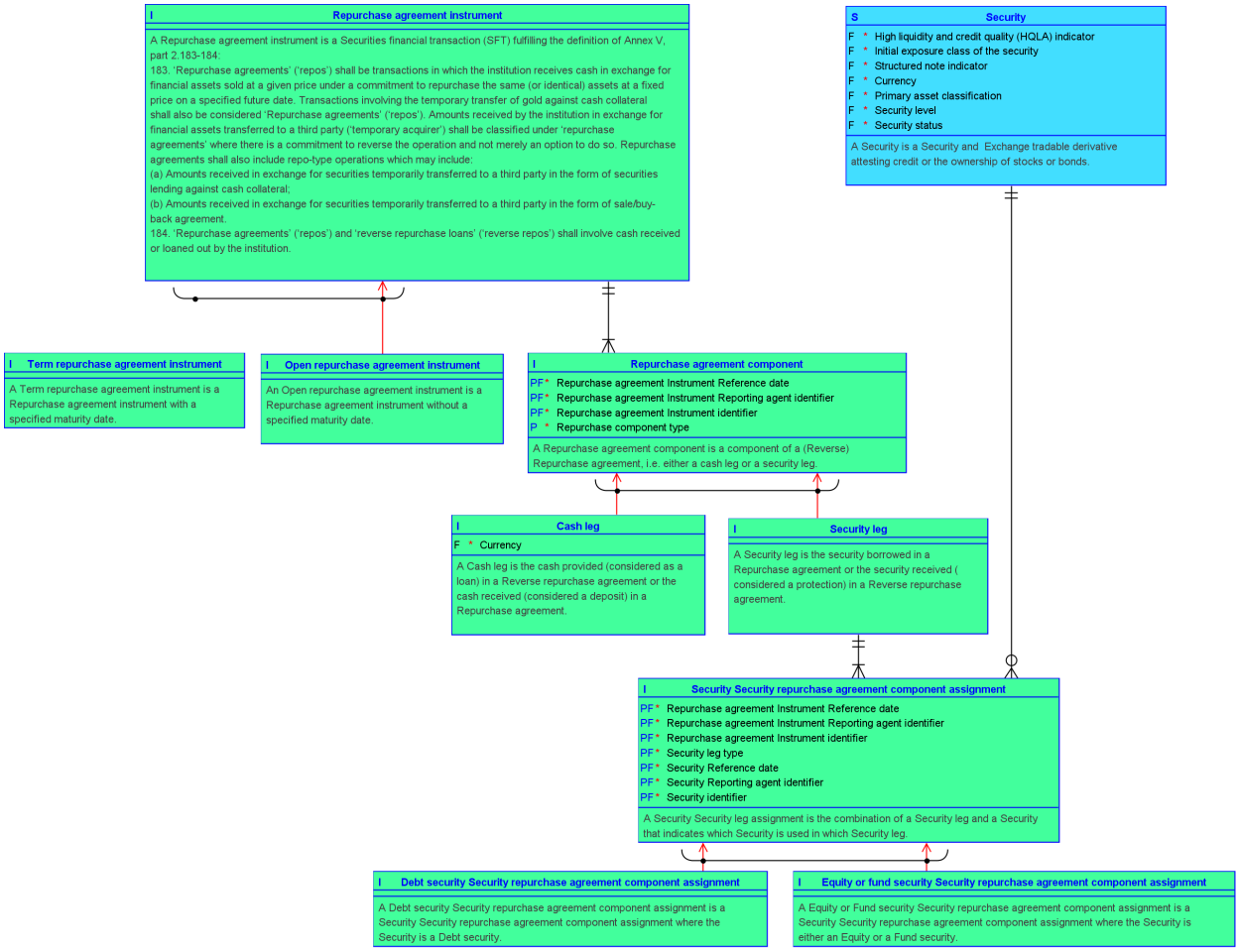

Figure 47: Repurchase agreement instruments

Repurchase agreement instruments have two so-called *Repurchase agreement components*, one being the *Cash leg* and the other being the *Security leg*. While the *Cash leg* holds information that is attributed to the reverse repurchase agreement as a loan or the *Repurchase agreement* as a *Deposit* (e.g., the *Currency*) as regards reporting the *Security leg* is connected to the *Security* entity type. This connection is established via the *Security-Security repurchase agreement component assignment* which allows to link one *Security leg* with many *Securities* and vice-versa.

The *Party roles* involved in a *Repurchase agreement instrument* are *Buyer* and *Seller*.

3.3.1.13. Security borrowing and lending transactions

Security borrowing and lending transactions cover transactions involving the exchange of Securities. We distinguish between *Security against Security borrowing and lending transactions* and *Security against a fee borrowing and lending transactions*. In such a Security borrowing and lending transaction one-or-many Securities are borrowed and / or lent. This link to the *Securities* is established via the entity type *Security*

borrowing and lending transaction component which also comprises the information if the specific Security is borrowed (in case of a *Security borrowing component*) or lent (in case of a *Security lending component*).

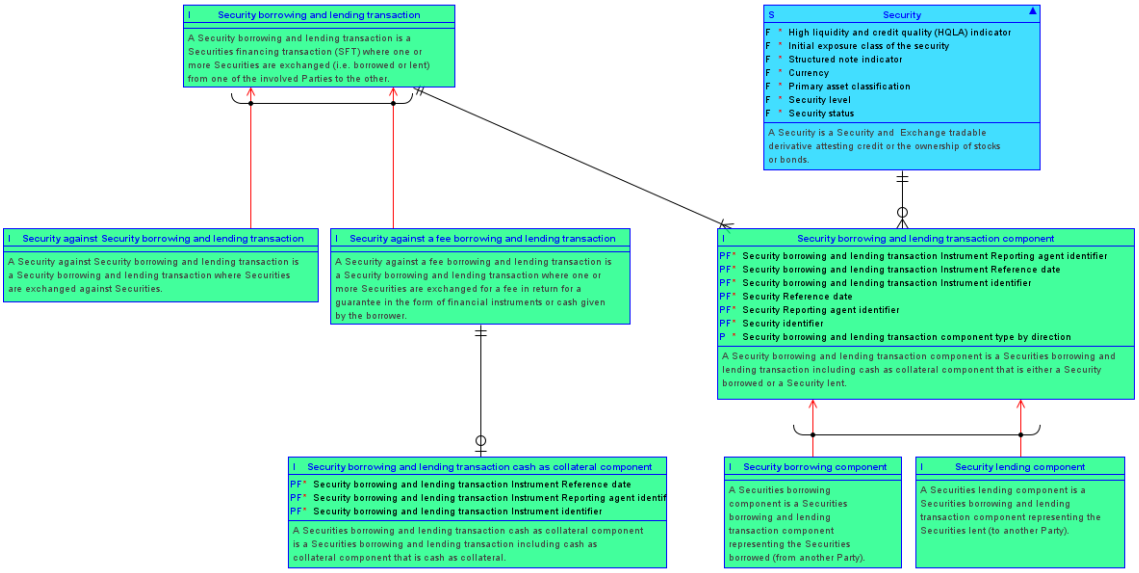

Figure 48: Security borrowing and lending transactions

The involved *Party roles* in a *Security borrowing and lending transaction* are *Borrower* and *Lender*.

3.3.1.14. Off-balance instruments

Another classification of Instruments is so called Off-balance sheet instruments. This classification consists of *Financial guarantees* and *Other commitments (other than credit facilities)* which reflects Off-balance sheet items listed in Annex I of Regulation (EU) 575/2013 (CRR).

These types of *Instruments* must not act in *Instrument roles* representing assets or liabilities.

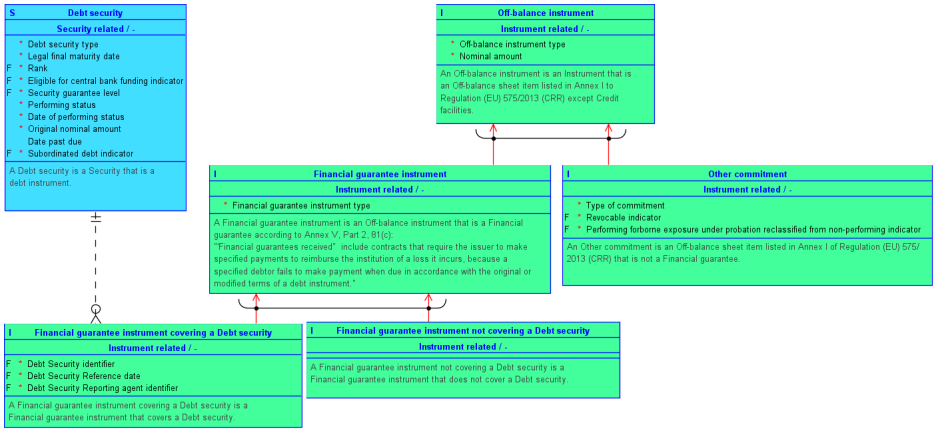

Figure 49: Off-balance instruments

As indicated in the picture above we distinguish between *Financial guarantee instruments covering debt securities* and *Financial guarantee instruments not covering debt securities* because the former has a mandatory link to the *Debt security* which is guaranteed while the later does not.

3.3.1.15. Over-the-counter (OTC) derivatives

In the field of derivatives one of the main distinguishing criteria is if a derivative was traded over the counter (OTC) or on an exchange therefore classifying derivatives into *Over-the-counter (OTC) derivatives* and *Exchange tradable derivatives*. While the later has similarities to *Securities*, e.g., an *International Security Identification Number (ISIN)*, the former is better reflected as an *Instrument* mainly because of its characteristic of being an individual agreement between two *Parties*. Consequently, *OTC derivatives* have been modelled as *Instruments*. The following picture illustrates the OTC derivative hierarchy:

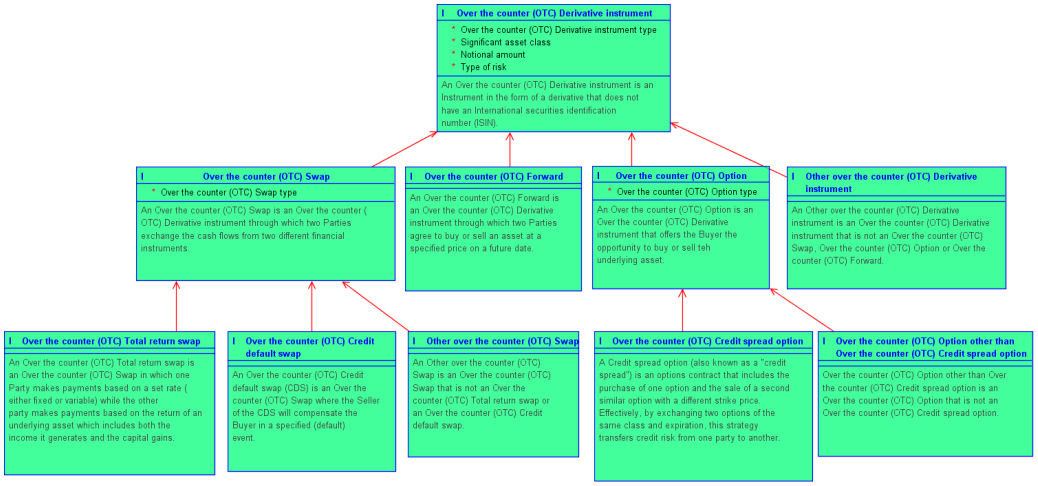

Figure 50: OTC derivative hierarchy

The main distinction criterium for *OTC derivative instruments* is the *OTC derivative instrument type*, i.e., *Swap*, *Forward*, *Option*, and *Other OTC derivative instrument*. Additional subtypes have been implemented for *Swaps* and *Options*, namely *Total return swap*, *Credit default swap* and *Other OTC swap* and *Credit spread option* and *OTC Option other than OTC Credit spread option*.

The involved *Party roles* in an *OTC derivative instrument* are *Buyer* and *Seller*.

3.3.1.16. Over-the-counter (OTC) derivatives in hedging operations

Derivatives may be used to hedge specific portfolios, e.g., hedging a United States Dollar (USD) portfolio against downside risk (for a long position) or upside risk (for a short position). The LDM covers operations like this (i.e., hedging operations) only result based, meaning that the LDM represents only the result of such a hedge broken down onto the individual components (i.e., *Instruments* or *Security positions*) of the portfolio (that is the target of the hedging operation). The following picture illustrates the situation for OTC derivatives:

Figure 51: OTC derivative as a hedge

The interpretation of this picture is as following: An *OTC derivative instrument* is an *Instrument*. Such an *OTC derivative instrument* may act in the *OTC derivative as a hedge role* (which is an *OTC derivative role* and therefore only applicable to *OTC derivative instruments*). Acting in this role allows the *OTC derivative as a hedge* to connect to all *Instruments* and *Security positions* that are affected by this hedging operation. As shown in the picture, this construction allows identifying the *Instruments* (and *Security positions*) which are affected by the hedging operations.

3.3.1.17. Equity instruments that are not securities

The last *Instrument type (by product)* that will be discussed in this chapter is *Equity instruments that are not securities*. These instruments are defined as “An Equity instrument that is not a security is an Instrument that is an Equity instrument (according to Annex V, part 2.16) that is not an Equity security.”. This definition aims to capture investments in limited companies or similar structures.

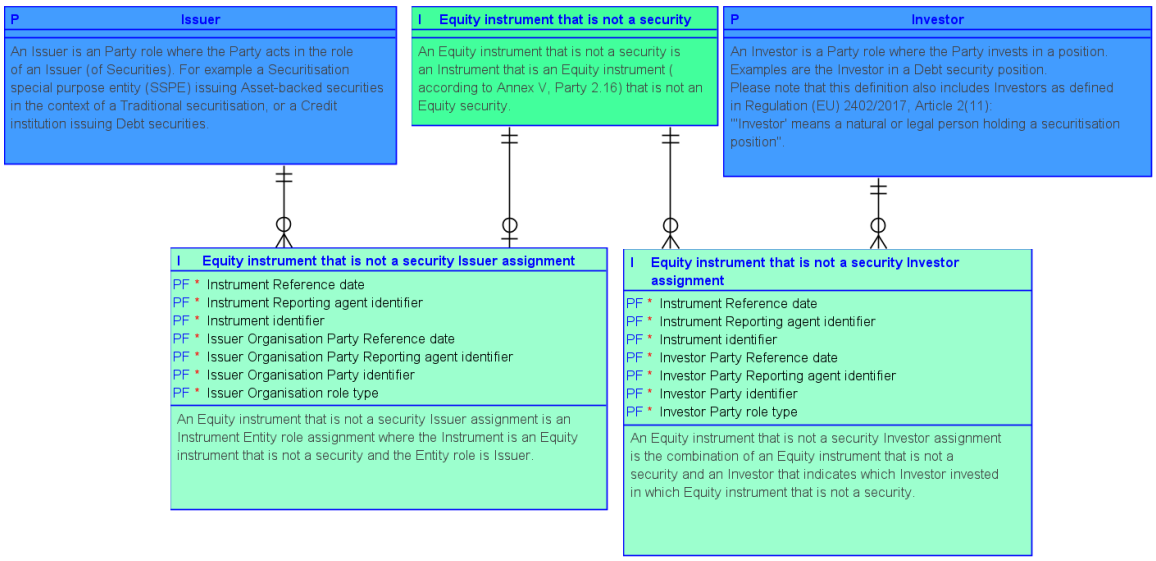

Figure 52: Equity instrument that is not a security and its Issuer and Investor(s)

The involved Party roles are *Investor* and *Issuer*.

3.3.1.18. Instruments & Parties

As already described in section Party role, *Parties* interact with other parts of the model via *Party roles*. Because business language improves readability different *Party roles* are involved in different *Instrument types*, the following list gives an overview which *Party roles* are mainly involved in which *Instrument type*:

- *Depositor* and *Deposit taking corporation* for *Deposits*
- *Lessee* and *Lessor* for *Financial lease*
- *Buyer* and *Seller* for *Repurchase agreement instruments* and *Over-the-counter (OTC) derivative instruments*
- *Borrower* and *Lender* for *Security against security borrowing and lending transactions* and *Security against a fee borrowing and lending transactions*
- *Assigned debtor* and *Factor* for *Factoring (operations)*
- *Loan debtor* and *Creditor* for other *Instrument types* than the ones listed above

It is important to note that these assignments *of Party roles* to *Instruments* are static in the sense that they do not change over time. For the sake of clarity, let's consider a *Credit card debt* with involved *Parties* being a *Credit institution* acting as the *Creditor* and one of its customers acting as a *Loan debtor*. Assuming that a transaction based on this *Credit card debt* is reversed at a later point in time resulting in a debit balance for the *Credit institution*, i.e., the *Credit card debt* becomes a liability of the *Credit institution* to the customer, in the LDM the involved assignment of *Party roles* will not change, i.e., the *Credit institution* will still act in

the role *Creditor* and the customer will still act in the role *Loan debtor*, although in the described situation the *Credit institution* owns a certain amount to the customer.

3.3.1.19. Instruments & Collateral

Instruments may be protected by *Collateral*. While we will discuss the representation of *Collateral* in more detail in section Collateral we will describe the relationship type between these concepts already in this section.

The relationship type between *Instruments* and *Collateral* is of type many-to-many, one *Instrument* may be protected by many *Collaterals* while one *Collateral* may be used by many *Instruments*. Therefore, this relationship type is modelled via an entity type establishing this relationship type, mainly because additional information belonging to this relationship type is required, e.g., the *Protection allocated value*. From a modelling perspective we distinguish between two cases: (1) Collateral in the form of an Instrument, e.g., a Deposit or (2) Collateral that is not already represented as an Instrument.

In the first case, the relationship type between the protected *Instrument* and the *Instrument* protecting the other Instrument is established via the Entity type *Financial asset instrument Collateral received instrument assignment* which allows to assign many *Financial asset instruments* to many *Collateral received instruments*. This situation is already accurately described in section Instrument role and therefore we will not repeat it here again.

In the second case, where *Collateral* is not already represented as an Instrument such Collateral is registered in an entity type having the same name. Such *Collateral* can be assigned to *Instruments* via the entity type *Instrument Collateral assignment* establishing a many-to-many relationship type as indicated in the following picture:

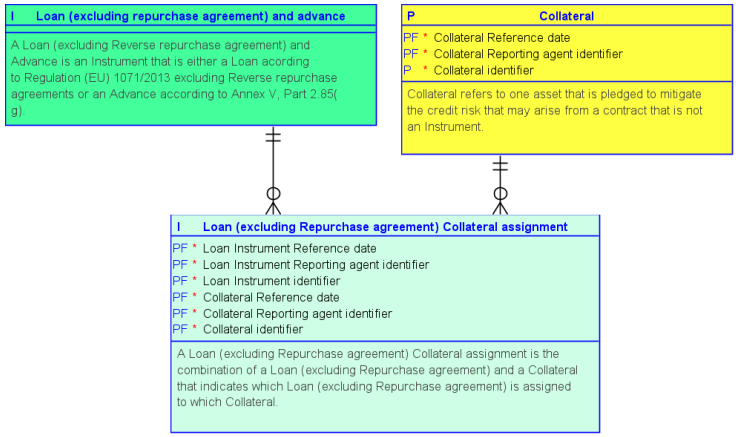

Figure 53: Loan (excluding repurchase agreement) and advance protected by Protection item(s)

This construction allows assigning a *Loan and advance* to many *Collateral* and vice-versa.

3.3.1.20. Summary – Instrument model

Remarks:

- *Instruments* cover a broad range of products, the main criteria being that they are individual products between the involved parties which are identifiable, e.g., *Loans*, *Deposits*, *Financial guarantees, Over-the-counter (OTC) derivatives*
- *Instrument* classification by product reflects output requirements, e.g., *Credit card debt* is a requirement from AnaCredit and FINREP
- *Repurchase agreements* are not modelled as *Loans* because, from a data structure perspective, they are more similar to *Security financing transactions (SFTs)*
- Instruments interact with *Parties* via *Party roles*, for different *Instruments*, different *Party roles* are applied, e.g., *Depositor* and *Deposit taking corporation* for *Deposits*
- An *Instrument* exists independently from its balance sheet assignment (asset vs. liability), such an assignment is represented by specific roles, namely *Balance sheet recognised financial asset instrument and Balance sheet recognised financial liability instrument*
- *Instruments* may act in different *Instrument roles* like *Financial asset instrument, Financial liability instrument*, *Collateral received instrument*, *Collateral given instrument*
- *Instruments* may be connected to one, or many *Collaterals*, e.g., a *Loan* protected by a *Real estate protection*
- *Instruments* may be subject to *Asset pools*
- *OTC derivatives* may be used to hedge a portfolio, this situation is represented in the LDM by a link between the *OTC derivative* and the *Instruments* which are hedged
- *Deposits* and *Financial guarantee instrument* may be linked to *Tranches in synthetic securitisations without involvement of an SSPE*

3.3.2 Credit facilities

A *Credit facility* in the LDM is defined as "… a commitment (revocable or irrevocable) made by a financial institution to make an amount of money available to the customer (or a plurality of customers), or to assume for it an obligation to a third party. The commitment is based on an agreement between the financial institution and the customer, which originates from a request of the customer or an acceptance by the customer of a proposal from the financial institution."

3.3.2.1. Credit facilities & Parties

Like for *Instruments*, *Credit facilities* interact with the Party model of the LDM via *Party roles*, i.e., a *Party's* interaction with a *Credit facility* is established via *Party roles*, e.g., *Creditor*. The following Party roles are relevant for Credit facilities:

- *Creditor*, being the *Party* providing the *Credit facility*
- *Debtor*, being the *Party* to which funds are made available (by the *Creditor*)
- *Servicer*, being the *Party* servicing the *Credit facility*

3.3.2.2. Credit facilities & Instruments

When an amount from a *Credit facility* is drawn an *Instrument* is created (which reflects the drawn amount). Therefore, a *Credit facility* may be associated with (one-or-many) *Instruments*. This situation is reflected in the LDM by a one-to-many relationship type between *Credit facility* and *Instrument resulting from a credit facility* as illustrated in the following picture:

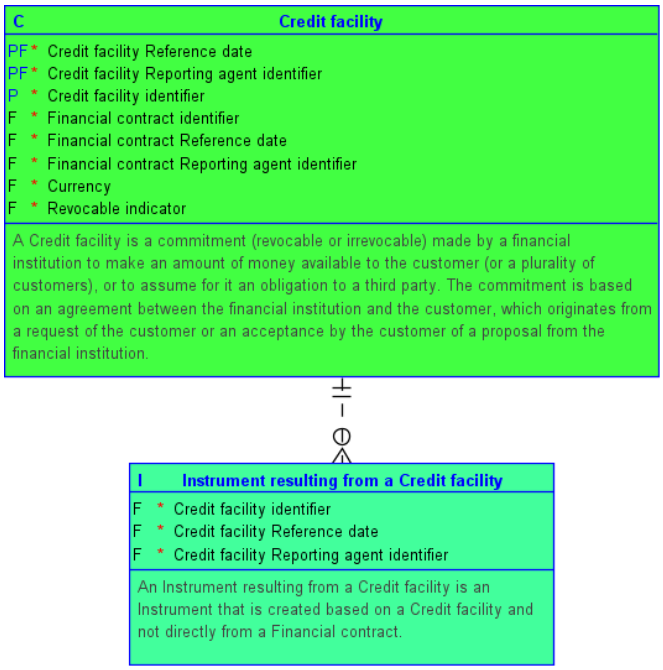

Figure 54: Instrument resulting from a credit facility

It is important to underline that, in such a case, the attributes of the *Credit facility* describe the features of the *Credit facility*, e.g., the attribute *Currency* in the entity type *Credit facility* refers to the *Currency* of the *Credit facility*, not to a *Currency* of any underlying *Instrument*.

3.3.2.3. Credit facilities & Collateral

Similar to *Instruments* (see Instruments & Collateral), a *Credit facility* may be protected by multiple *Collateral* while one *Collateral* may protect multiple *Credit facilities*. In the LDM, this many-to-many relationship type is reflected by the entity types *Credit facility Collateral assignment* and *Credit facility Collateral received instrument assignment*. The former established the connection between *Credit facilities* and *Collateral* that is already registered as an *Instrument* (and therefore acts in the role *Collateral received instrument*) and the later the connection to other *Collateral*.

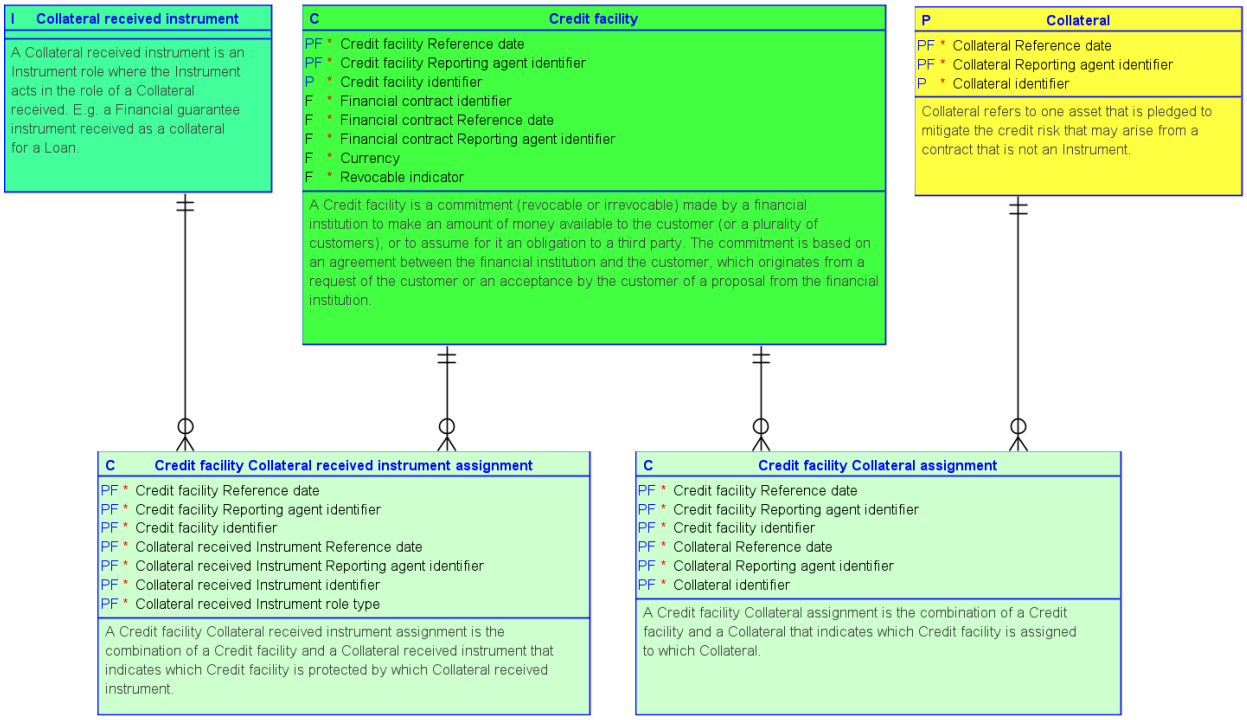

Figure 55: Credit facility protected by Collateral received instrument(s) and / or Collateral

3.3.2.4. Summary – Credit facilities

Remarks:

- From an accounting perspective, *Credit facilities* are *Off-balance sheet items given* or received, which is reflected in the *Credit facility roles* a *Credit facility* may act in
- *Credit facilities* are connected to *Parties* via *Party roles*, e.g., *Creditor*, *Debtor*
- When a *Credit facility* is drawn, an *Instrument* is created to reflect the drawn amount; this *Instrument* may then be considered a *Financial asset* (in case of an *Off-balance sheet item given*) or a *Financial liability* (in case of an *Off-balance sheet item* received).
- *Credit facilities* may be used in *Traditional securitisations* as liquidity support to a *Securitisation Special Purpose Entity (SSPE)*

3.4 Collateral

In the LDM, *Collateral* is “an asset that is pledged to mitigate the credit risk that may arise from a contract that is not an Instrument”. Examples are *Real estate collateral* or *Security collateral* for a Loan. As the definition indicates, *Collateral* does not include *Instruments*, for example *Financial guarantee instruments*,

as these products have already been covered in the Instrument hierarchy via the *Instrument role* (see previous section).

3.4.1 Collateral value

The way to valuate the collateral differs with the type of collateral. Some types are valued at fair value, where others are against market value or use the notional amount. The type of valuation approach is also restricted with regards to the type of collateral. The possible combinations are made as explicit as possible in the LDM for collateral. The AnaCredit regulation and supporting documents in the AnaCredit Reporting Manuals specify which type of protection value should be used for which type of collateral.

3.4.2 Types of Collateral

As regards the types of *Collateral* we distinguish between *Financial collateral* and *Physical collateral*.

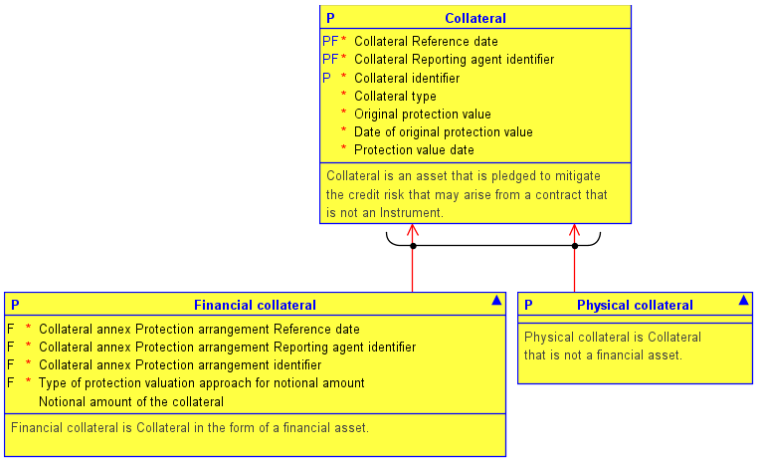

Figure 56: Financial and Physical collateral as subtypes of Collateral

3.4.3 Financial collateral

Financial collateral comprises *Life insurance policy pledged collateral, Trade receivable collateral, Security collateral*, *Currency collateral* and *Other financial collateral* as illustrated in the next picture:

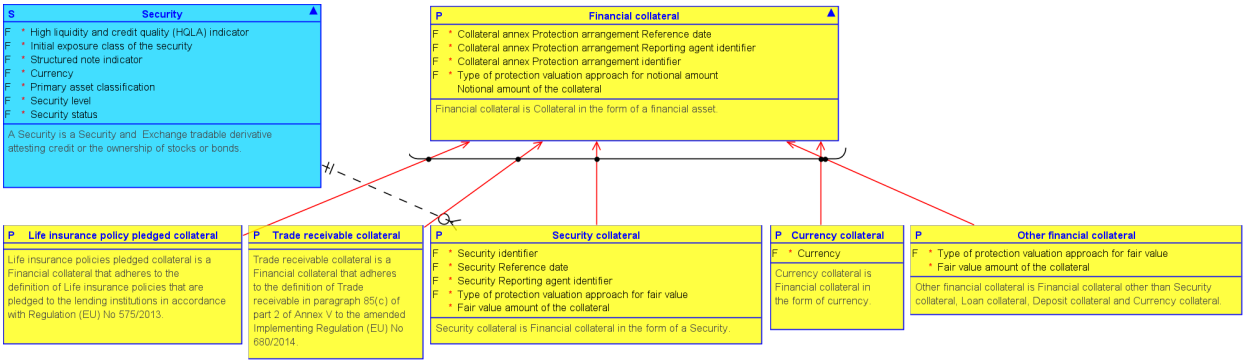

Figure 57: different subtypes of Financial collateral including the link to Securities for Security collateral

As indicated in the picture, *Security collateral* includes a link to a *Security*, i.e., the *Security* that has been registered as a *Collateral*. Please note that this model design implies that, in case different *Securities* are provided as *Collateral*, each one of them must be registered as a different *Security collateral*.

The *Financial collateral* is valued with its notional amount as indicated with the attribute *Notional amount of the collateral.* The subtypes *Security collateral* and *Other financial collateral* are valued at fair value, as noted by their attribute *Fair value amount of the collateral*. The specific type of valuation approach to be used is to be found in the attribute *Type of protection valuation approach for fair value.*

3.4.4 Physical collateral

As regards *Physical collateral*, we distinguish between *Registered collateral* and *Non-registered collateral* where the main distinction criterium is, as indicated in the names of the entity types, the registration of the *Collateral*.

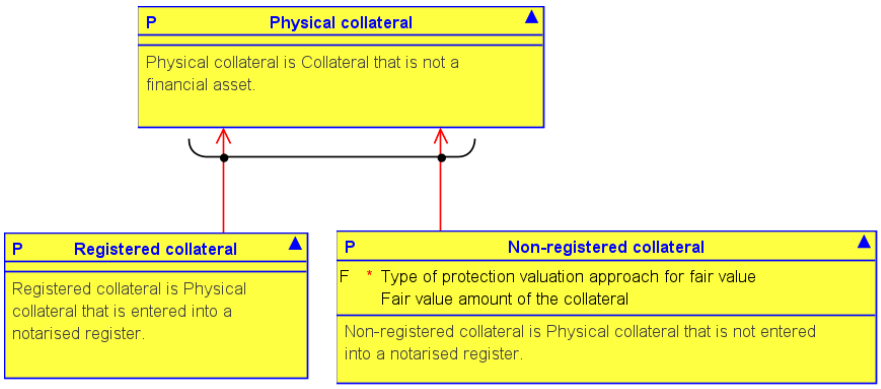

Figure 58: Registered and Non-registered collateral as subtypes of Physical collateral

Aircraft, *Real estate* and *Ship collateral* are considered *Registered collateral*. All *Non-registered collateral* is valued with its *Fair value amount of the collateral* attribute, whereas some *Registered collateral* are not. Therefor the value attribute for those is modelled at a lower subtyping level.

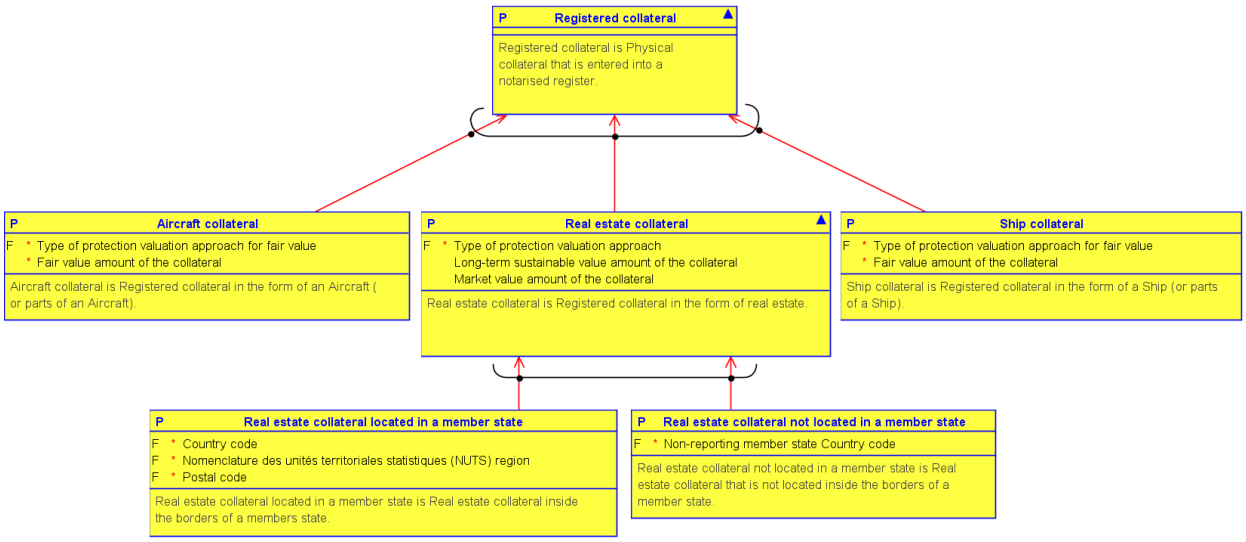

Figure 59: Aircraft, Real estate and Ship collateral as subtypes of Registered collateral

Regarding *Real estate collateral*, it is the only subtype of *Physical collateral* that is valued differently than the other subtypes of *Physical collateral.* Where both *Aircraft collateral* and *Ship collateral* are valued according to fair value, *Real estate collateral* is valued either according to Long-term sustainable value, or according to its market value. This is reflected in the two value attributes *Long-term sustainable value amount of the collateral* and *Market value amount of the collateral*.

We separate between *Real estate collateral located in a member state* and *Real estate collateral not located in a member state*, mainly because of the different in underlying reporting requirements, i.e., for *Real estate collateral located in a member state* the *Postal code* is required, while for *Real estate collateral not located in a members state* the *Non-reporting members state Country code* is sufficient.

Non-registered collateral, on the other hand, comprises all other types of *Physical collateral* like *Machinery and equipment collateral* or *Commodity collateral*.

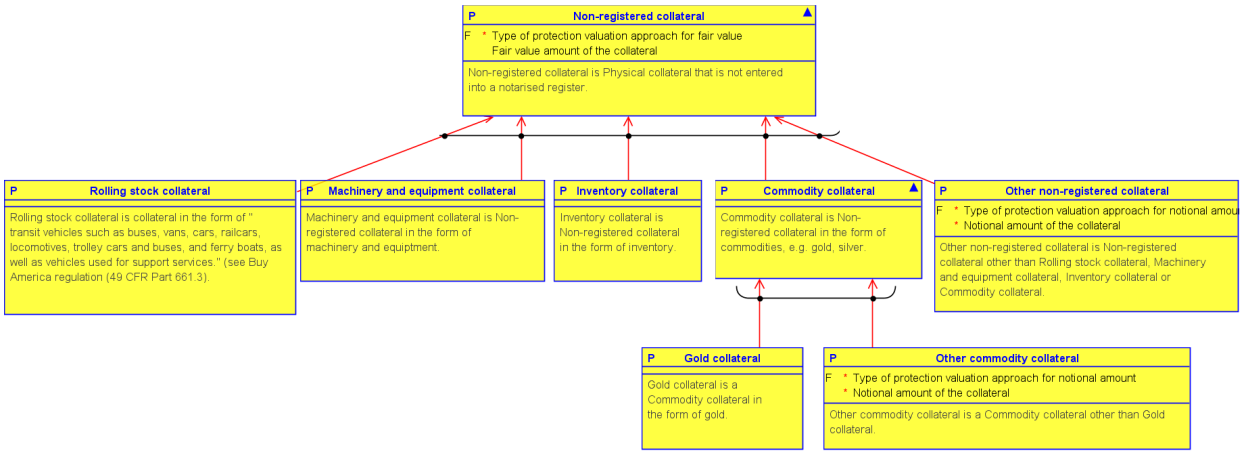

Figure 60: Non-registered collateral

Please note that *Gold collateral* is considered a *Commodity collateral* in the LDM.

3.4.5 Summary – Collateral model

Remarks:

- The *Collateral* hierarchy comprises only *Collateral* that is not already present in the form of an *Instrument*, i.e., a *Deposit* received as a *Collateral* is not part of the *Collateral* hierarchy
- The *Collateral* hierarchy distinguishes between *Financial collateral* and *Physical collateral*
- *Security collateral* has a link to the associated Security
- *Real estate collateral* is separated into *Real estate collateral located in a member state* and *Real estate collateral not located in a member state*
- *Collateral* can be linked to *Loans (excluding Repurchase agreement)* or *Credit facilities*
- The value of the collateral is spread out over its subtyping hierarchy in order to capture requirement from AnaCredit that the type of protection value (in AnaCredit terms) depends on the type of collateral.

3.5 Securities & Security positions, Exchange tradable derivatives & Exchange tradable derivative positions

In the LDM, a *Security and exchange tradable derivative* is defined as "…a certificate attesting credit, the ownership of stocks or bonds, or the right to ownership connected with tradable derivatives.". This definition covers *Debt securities*, *Equity securities*, *Fund securities* and *Exchange tradable derivatives*. Reference data Reference data information about such *Securities and exchange tradable derivatives* is represented in the *Security and exchange tradable derivative* hierarchy. On the first level of the hierarchy, we distinguish between *Securities* and *Exchange tradable derivatives*, as indicated in the following picture:

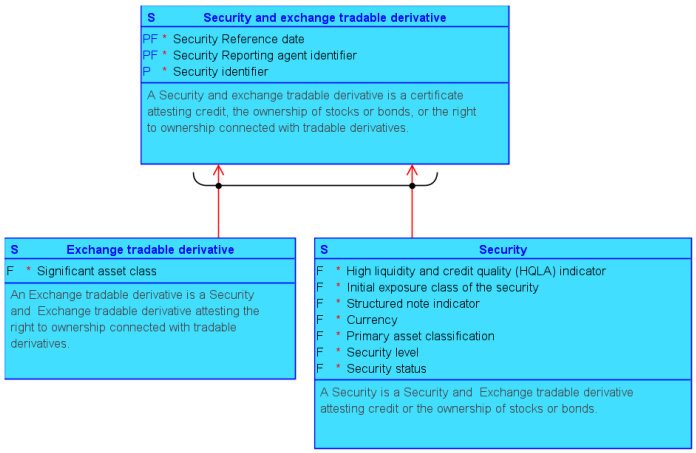

Figure 61: Securities and exchange tradable derivatives

3.5.1 Exchange tradable derivatives

Exchange tradable derivatives are standardised derivatives traded at an exchange. We distinguish between *Exchange tradable options* and *Exchange tradable futures*.

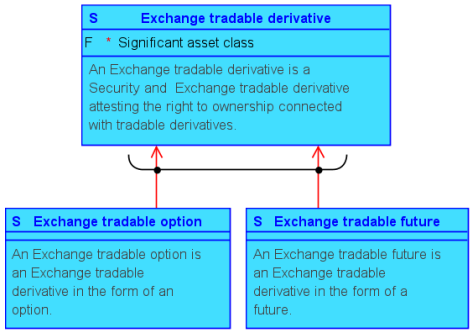

Figure 62: Exchange tradable options and futures as subtypes of Exchange tradable derivative

For *Exchange tradable derivatives* the involved *Party role* is *Issuer*.

3.5.2 Securities

On the *Security* side, the hierarchy comprises multiple levels, mainly because different types of *Securities* have different features. The first level provides a distinction by type, into *Equity and fund securities* and *Debt securities*, and by identifier into *Securities* with an *International securities identification number (ISIN)* and *Securities* without ISIN.

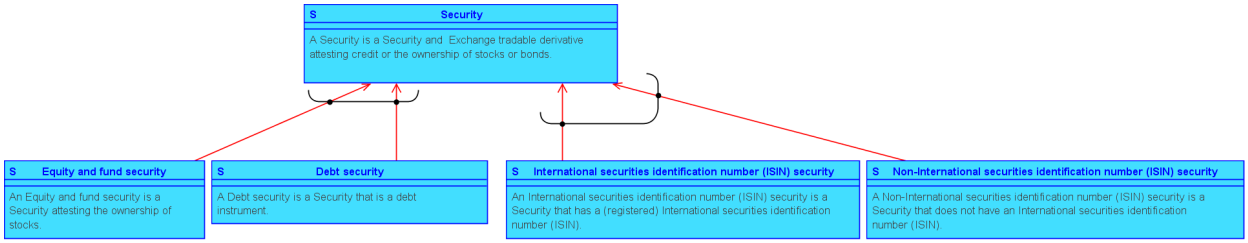

Figure 63: Security subtyped by type (Equity and fund security, Debt security) and identifier (ISIN, non-ISIN)

Please be aware that, similar to the situation with *Organisations*, we apply disjoint subtyping on this level, i.e., a *Debt security* can be an *International securities identification number (ISIN) security,* or a *Non-International securities identification number (ISIN) security* and an *International securities identification number (ISIN) security* can be an *Equity and fund security* or a *Debt security*.

As regards the distinction by type, the rationale for this distinction is that *Debt securities* have features that are not applicable to *Equity and fund securities*, e.g., a *Legal final maturity date*.

We distinguish between *Equity securities* and *Fund securities* as allowed subtypes of *Equity and fund securities* as indicated in the following picture:

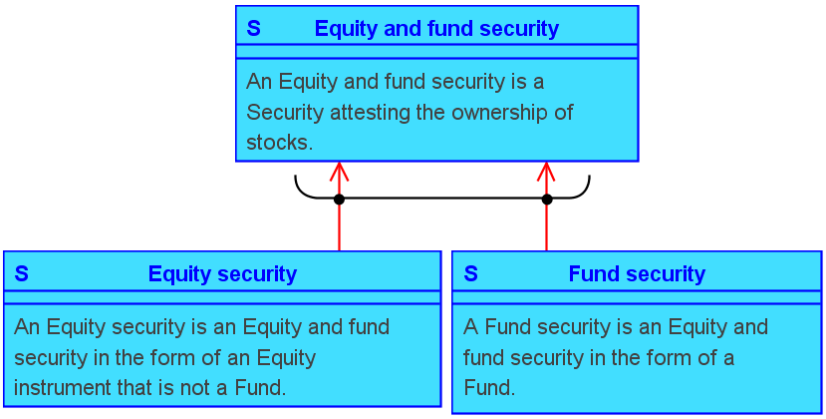

Figure 64: Equity security and Fund security as subtypes of Equity and fund security

Debt securities, on the other hand are classified into *Debt securities with underlying assets* and *Debt securities without underlying assets* where the former is again subtyped into *Covered bonds* and *Asset backed securities*. The main reason for the later subtyping is that a *Covered bond* results from a *Covered bond program* similar as an *Asset backed security* results from a *Traditional securitisation*, and having these subtypes as individual entity types allows us to specify such business rules as part of the model.

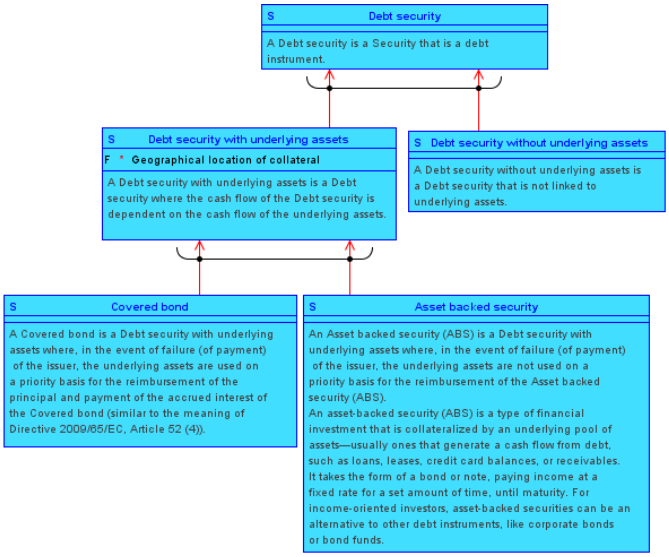

Figure 65: Debt security hierarchy

The relevant *Party role* for *Securities* (in general) is *Issuer* and for *Debt securities* also the role *Debtor* is relevant.

3.5.3 Debt securities issued (by the Reporting agent)

Debt securities issued (by the Reporting agent) are represented as a combination of a *Debt security* and an *Accounting classification for liabilities*. The main reason for a different design between *Debt securities positions* held (by an *Investor*), see the next chapter, and *Debt securities issued (by the Reporting agent)* is that information about the *Investors* of issued *Debt securities* may not be available. Additionally, the reporting requirements regarding *Debt securities issued* are limited compared to the requirements for *Debt security positions* held by the *Reporting agent*.

The LDM design for *Debt securities issued* is illustrated in the following picture:

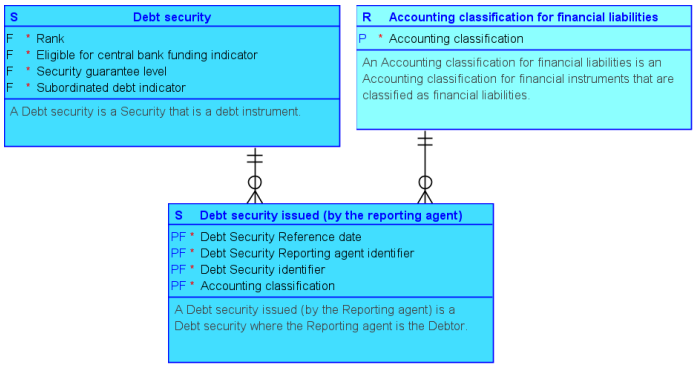

Figure 66: Debt security issued as the combination of a Debt security and an Accounting classification for financial liabilities

As regards *Debt securities issued*, we distinguish between *Fair valued debt securities issued* and *Non-fair valued debt securities issued* as specific information, like the *Fair value*, is only applicable to *Fair valued debt securities issued*.

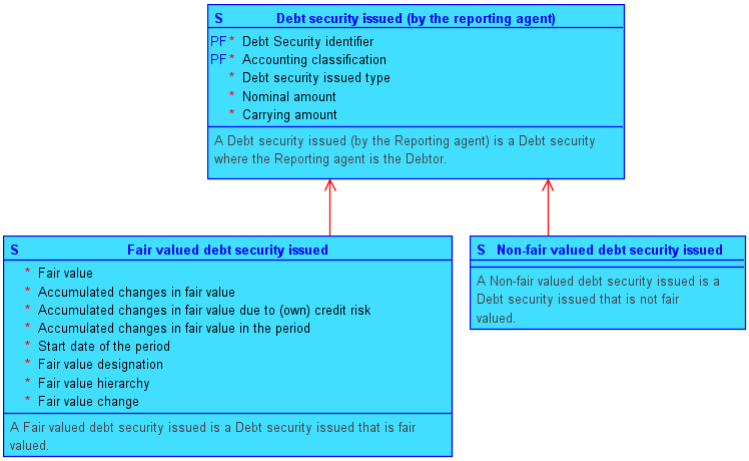

Figure 67: Fair valued debt security issued and Non-fair valued debt security issued as subtypes of Debt security issued

3.5.4 Securities & Security positions

An investment into a *Security* is called a *Security position*. It is the combination of a *Security*, e.g., an Austrian government bond, and an *Investor*. An excerpt of the LDM illustrating this situation is presented in the following picture:

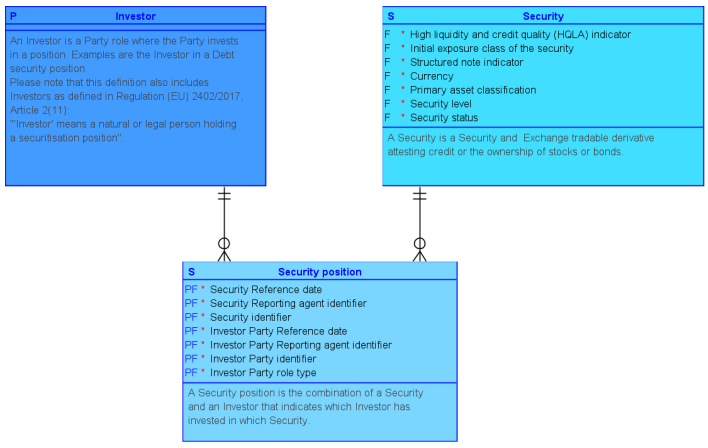

Figure 68: Security position as the composition of an Investor and a Security

This design represents a many-to-many relationship type between *Investors* and *Securities*, i.e., an *Investor* may hold many *Securities* while a *Security* might be held by many *Investors*, reflecting underlying reporting requirements.

We distinguish between *Long security positions* and *Short security positions* where the former represents positions where "… the Investor holds the Security position" and the later positions where "… the Investor (i.e., the holder of the Security position) sells the Security first with the intention to repurchase it or covering it later (at a lower price)".

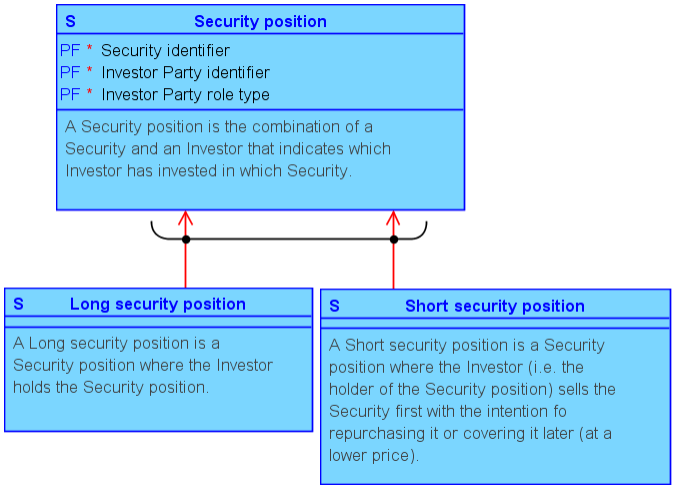

Figure 69: Distinction of Security position into Long and Short security position

3.5.4.1. Short security positions

Short security positions reflect positions that are recognised on the liabilities side of the balance sheet. They are assigned to either *Held for trading* or *Trading financial assets* depending on the applied accounting standard.

The "direct counterparty" according to Regulation 680/2014, Annex V, part 2.44 (d)[16] may be derived via the connection between the *Short security position* and *Instruments*, like *Repurchase agreement instruments* or *Securities borrowing and lending transactions*, referring to that same *Security*. The involved *Parties* in those transactions are the direct counterparties of the short positions for *Party* related classifications.

3.5.4.2. Long security positions

Long security positions represent all *Securities* of the same type held by a particular *Investor*, e.g., the *Reporting agent*. They are not necessarily recognised in the balance sheet of the *Investor*. Examples, for such *Security positions* that are not recognised in the balance sheet, are *Securities* received via reverse repurchase agreements or *Securities borrowing and lending transactions* because the receiver of the Securities does not gain all the risks and rewards and therefore an activation in the balance sheet is not

[16] "for short positions, the counterparty of the securities borrowing transaction or reverse repurchase agreement;"

justifiable. Consequently, a *Long security position* may exceed the amount of the involved *Securities* that is recognised in the balance sheet.

The reader may visualise such a Long security position as indicated in the following table[17]:

Security identifier	Investor Party identifier	Investor Party role	Nominal amount
Austrian government bond	Reporting agent	Investor	100
German government bond	Reporting agent	Investor	200
…	…	…	…

Table 9: Examples of different Long security positions

The content of this table may be described as: The *Reporting agent* being an *Investor* holds Austrian government bonds with a *Nominal amount* of 100 and German government bonds with a *Nominal amount* of 200.

To evaluate if a *Long security position* is recognised in the balance sheet, we first need to assess whether this position is assigned to the *Trading book* or the *Banking book* (which is reflected in the entity type *Prudential portfolio*). The combination of such a *Long security position* and a *Prudential portfolio* is named *Long security position Prudential portfolio assignment* which is indicated in the following picture:

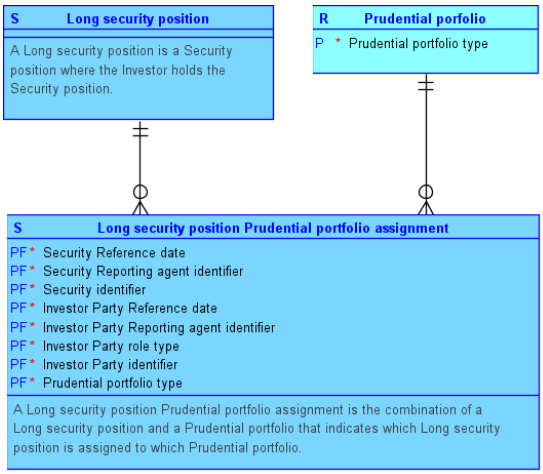

Figure 70: Long security position Prudential portfolio assignment as the combination of a Long security position and Prudential portfolio

Consequently, such a *Long security position Prudential portfolio assignment* is a *Long security position* assigned to a specific *Prudential portfolio*. It may be understood as indicated in the following table:

Security identifier	Investor Party identifier	Investor Party role	Prudential portfolio	Nominal amount
Austrian government bond	Reporting agent	Investor	Trading book	30

[17] Please note that columns illustrated in green are part of the primary key, i.e., it is not possible to have two records with the same values in all those columns; for example, there must not be another record with {Security identifier = Austrian government bond, Investor Party identifier = Reporting agent and Investor Party role = Investor}.

Austrian government bond	Reporting agent	Investor	Banking book	50
German government bond	Reporting agent	Investor	Trading book	70
German government bond	Reporting agent	Investor	Banking book	120
…	…	…	…	…

Table 10: Examples of different Long security position Prudential portfolio assignments

The first two records of this table may be interpreted as: The *Reporting agent* as an *Investor* holds Austrian government bonds with a *Nominal amount* of 30 in the *Trading book* and with a *Nominal amount* of 50 in the *Banking book*. Please note that in our example, the *Nominal amount* of the *Long security position* differs from the *Nominal amount* of the *Long security position Prudential portfolio assignment*.

Therefore, the assignment (of a *Long security position*) to a *Prudential portfolio* is a further breakdown of the *Long security position* into its components. The same method is applied to the resulting *Long security position Prudential portfolio assignment* with respect to the assignment to *Accounting classifications*. The associated model design is illustrated in the following picture:

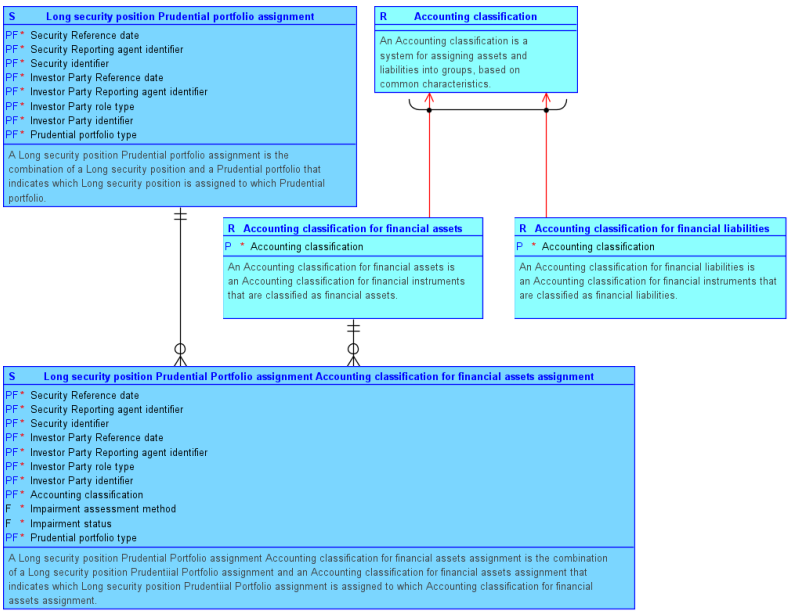

Figure 71: Long security position Prudential portfolio assignment Accounting classification assignment as the combination of a Long security position Prudential portfolio assignment and an Accounting classification

In a similar fashion as before, readers may imagine the content of such a *Long security position Prudential portfolio assignment Accounting classification for assets assignment* as indicated in the following table:

Security identifier	Investor Party identifier	Investor Party role	Prudential portfolio	Accounting classification	Nominal amount
Austrian government bond	Reporting agent	Investor	Trading book	Financial assets held for trading	30
Austrian government bond	Reporting agent	Investor	Banking book	Financial assets at amortised cost	20
Austrian government bond	Reporting agent	Investor	Banking book	Financial assets designated at fair value through profit or loss	30
German government bond	Reporting agent	Investor	Trading book	Financial assets held for trading	70
German government bond	Reporting agent	Investor	Banking book	Financial assets at amortised cost	120
…	…	…	…	…	…

Table 11: Examples of different Long security position Prudential portfolio assignment Accounting classification assignments

Please note that this is a breakdown of *Long security position Prudential portfolios* with respect to *Accounting classifications* (for assets), for example the second and third record of this table are reflected in the second record of Table 10: Examples of different Long security position Prudential portfolio assignments.

3.5.4.3. Long security positions & Exposure class

A *Long security position* that is assigned to a *Prudential portfolio* (i.e., a *Long security position Prudential portfolio assignment*) may be assigned to one-or-many *Exposure classes*. This situation is reflected in the Entity type *Long security position Prudential portfolio assignment risk data*. As illustrated in the next picture, this Entity type allows to assign multiple *Exposure classes* to a *Long security position Prudential portfolio assignment*.

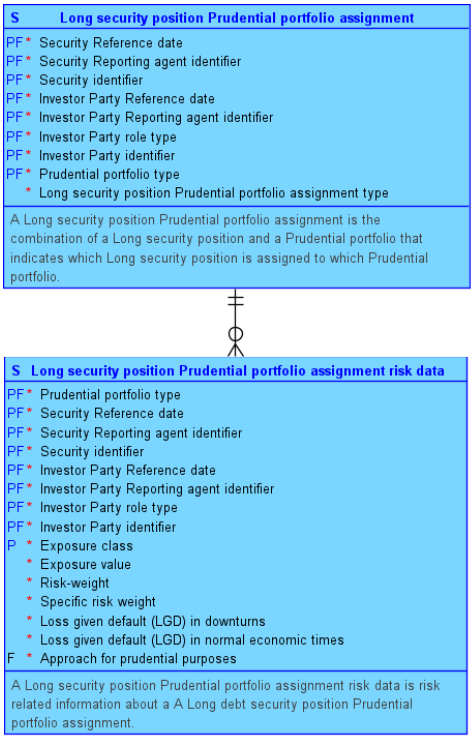

Figure 72: Long security position Prudential portfolio assignment is assigned to zero, one-or-many Exposure classes

3.5.5 Exchange tradable derivative positions

A position in a derivative that can be traded on the open market through an exchange is called an *Exchange tradable derivative position*. It brings together information of the *Party roles* of the *Buyer* and the *Seller*.

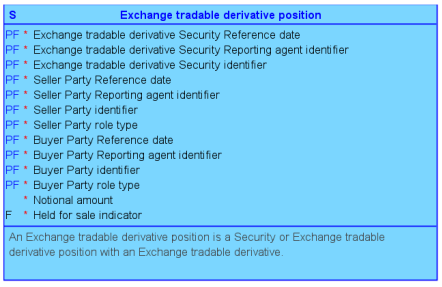

Figure 73: Exchange tradable derivative position

3.5.6 Exchange tradable derivative position roles

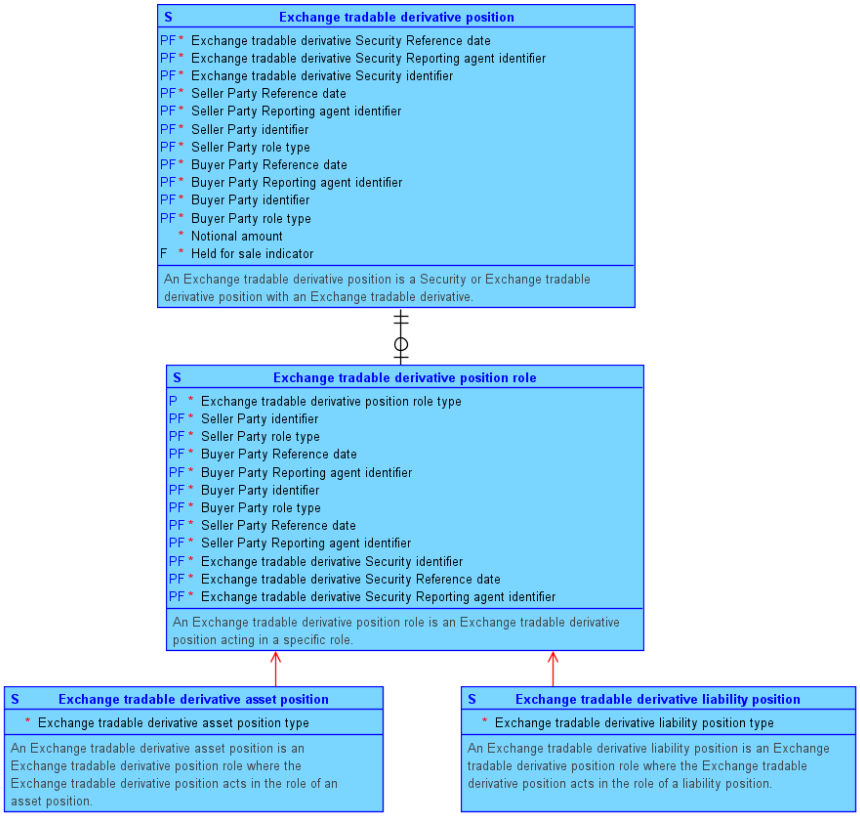

Figure 74: Exchange tradable derivative position roles for asset and liability positions

We apply the role concept to the *Exchange tradable derivative position* because it can be either a liability position or an asset position. Hence the two subtypes *Exchange tradable derivative asset position* and *Exchange tradable derivative liability position*. This distinction will make sense when we dive deeper into the subtypes of the asset and liability position roles of the ETDs.

3.5.6.1. Exchange tradable derivative asset position roles

On the asset side we have either *Balance sheet recognised exchange tradable derivative asset positions* or *Non-balance sheet recognised exchange tradable derivative asset positions*. And in case the ETDs are recognised on the balance sheet, there is the requirement for extra information that is captured in its attributes. These are information like the *Fair value* and the *Accounting classification*. This is captured in the figure below.

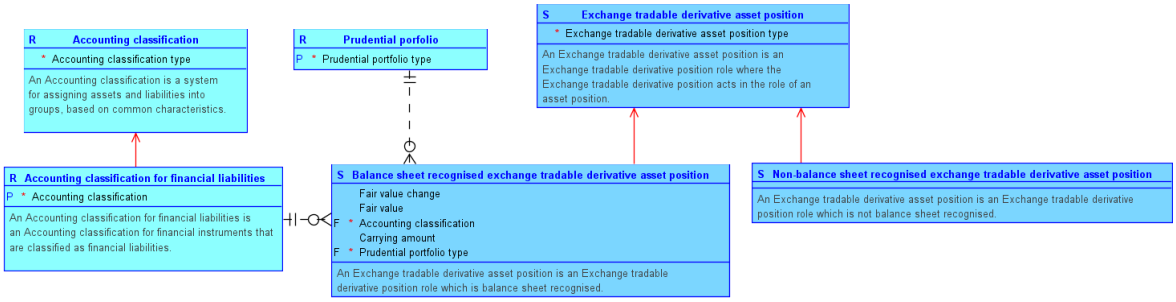

Figure 75: Exchange tradable derivative asset position roles

3.5.6.2. Exchange tradable derivative liability position roles

On the liability side we expand the *Balance sheet recognised exchange tradable derivative liability position* into the position that is according to fair value and the position that is not according to fair value, as can be seen in the figure below.

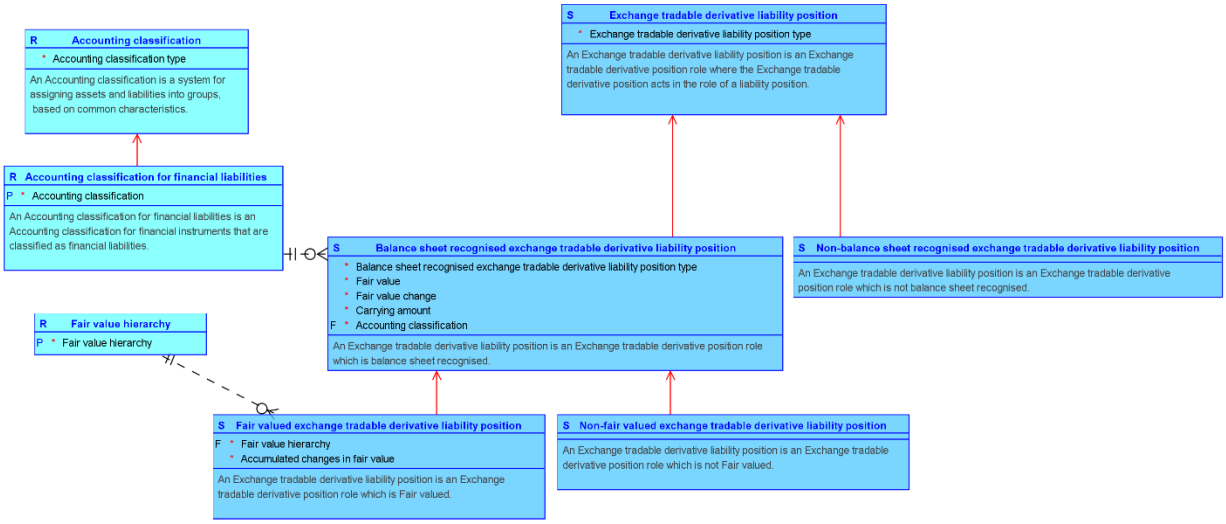

Figure 76: Exchange tradable derivative liability position roles

3.5.7 Summary – Securities & Security positions, Exchange tradable derivatives & Exchange tradable derivative positions

Remarks:

- The entity type *Securities and exchange tradable derivatives* holds reference data about *Securities and exchange tradable derivative*s, e.g., the *Legal final maturity date* of a *Debt security*
- *Security and exchange tradable derivative positions* are modelled as combinations of *Securities and exchange tradable derivatives* and *Investors*
- We distinguish between Long and *Short security positions*

- *Long security positions* may comprise *Securities* that are not recognised in the balance sheet
- *Long security positions* are further broken down by *Prudential portfolio* and *Accounting classification*
- *Long security positions* assigned to a *Prudential portfolio* may be assigned to one-or-many *Exposure classes*
- The entity type *Exchange tradable derivative position* makes it possible to capture information on the asset side and the liability side of an ETD.

3.6 Securitisation and other credit transfers

Securitisations and other credit transfers covers operations like *Traditional securitisations*, *Synthetic securitisations*, *Covered bond programs* and *Credit transfers other than securitisations and covered bond programs*. These operations have in common that they involve an *Asset pool* underlying to the operation, e.g., the underlying assets to a *Traditional securitisation* or a *Covered bond program*, and a link to another product, e.g., an *Asset backed security* in case of a *Traditional securitisation* or a *Covered bond* in case of a *Covered bond program*.

In the LDM, such *Securitisations and other credit transfers* are modelled as individual operations, e.g., a *Traditional securitisation*, that establish the link between the underlying assets (as part of the *Asset pool*) and the resulting product of the operation, e.g., the *Asset backed security*.

3.6.1 Asset pools, Loans & Security positions

In the LDM, the underlying *Asset pool* is modelled as an individual Entity type. Currently, it is possible to register *Loans (excluding repurchase agreements)* and *Debt securities* in such an *Asset pool*. Other types of underlying assets are not modelled at this stage.

3.6.1.1. Loans (excluding repurchase agreements) being part of an Asset pool

If a *Loan (excluding repurchase agreement)* is part of an *Asset pool* this *Loan* needs to be registered in the Entity type *Asset pool Loan (excluding repurchase agreement) assignment*. This Entity type establishes the many-to-many relationship type between *Loans* and *Asset pools*. The situation is illustrated in the following picture:

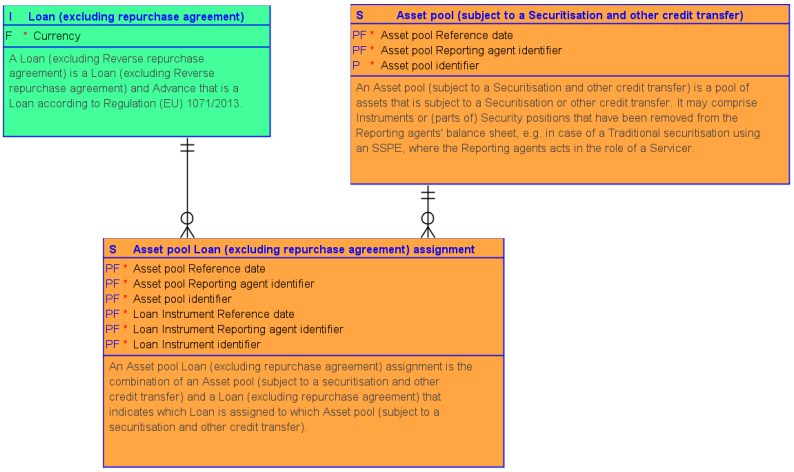

Figure 77: Assignment of Loans to Asset pools

Please note that it is possible to assign a *Loan* to multiple *Asset pools*, because theoretically this situation is possible. The attribute *Percentage transferred* in *Asset pool Loan (excluding repurchase agreement) assignment* allows to register the percentage of the *Loan* that has been transferred.

3.6.1.2. Security positions being part of an Asset pool

Similar to *Loans*, also *Debt securities* positions may be subject to an assignment of an *Asset pool*. Because of the nature of *Security positions* being aggregates the assignment of such a *Debt security position* to one-or-many *Asset pools* is different to the assignment of Instruments (to such an *Asset pool*). The model design is illustrated in the following picture:

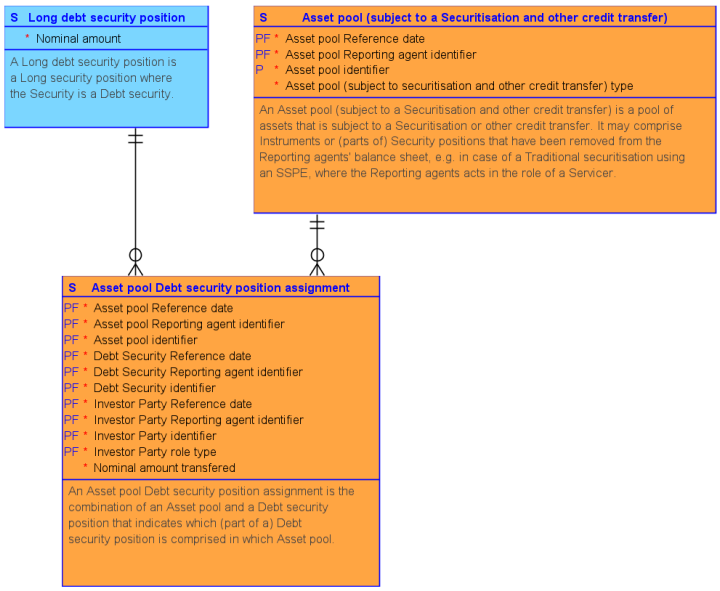

Figure 78: Assignment of Long security position Prudential portfolio assignments to Asset pools

This design allows to assign portions of a *Long debt security positions* to *Asset pools*.

3.6.2 Traditional securitisations

In the LDM, a *Traditional securitisation* is defined according to Regulation (EU) 2402/2017, Article 2 (9) as "…a securitisation involving the transfer of the economic interest in the exposures being securitised through the transfer of ownership of those exposures from the originator to an SSPE or through sub-participation by an SSPE, where the securities issued do not represent payment obligations of the originator."

As already described in the previous sections an *Asset pool* comprises the underlying assets, which are either *Loans* or *Debt securities*. This *Asset pool* is linked to the *Traditional securitisation* which comprises *Tranches in a traditional securitisation*. Each of these *Tranches in a traditional securitisation* refers to the associated *Asset backed security* being the result of the *Traditional securitisation*. The design is illustrated in the following picture:

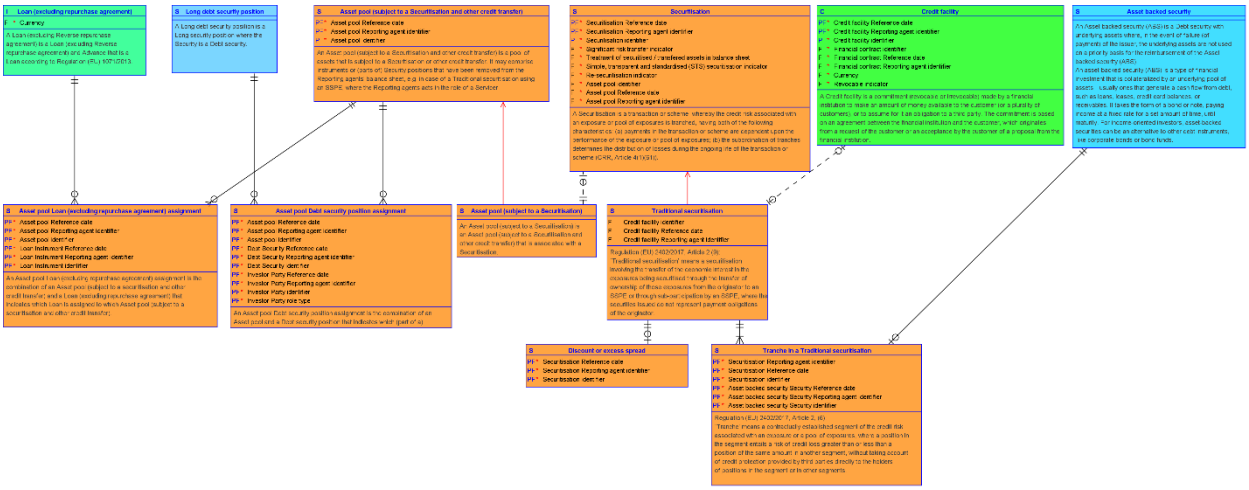

Figure 79: A Traditional securitisation in the LDM

3.6.2.1. Traditional securitisations & Credit facilities for liquidity support

Credit facilities are sometimes used to provide liquidity support for *Traditional securitisations*. This situation is reflected in the LDM via a relationship type between *Credit facility* and *Traditional securitisation*, as illustrated in the following picture:

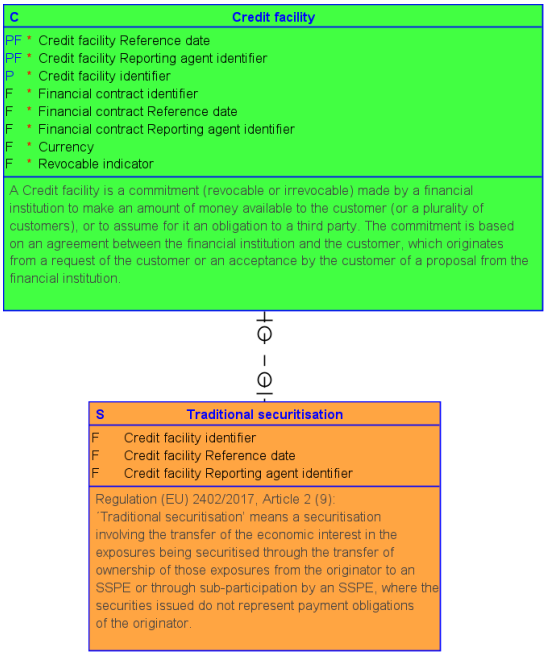

Figure 80: Credit facility as liquidity support in a Traditional securitisation

3.6.3 Synthetic securitisations

From a business perspective, a *Synthetic securitisation* is quite different to a *Traditional securitisation*. While in a *Traditional securitisation* the main purpose is to remove the underlying assets from the *Originator's* balance sheet, the purpose of a *Synthetic securitisation* is to protect the underlying assets. Therefore, *Investors* in a *Synthetic securitisation* are *Protection providers* and they do so in the form of *Financial guarantees* or *Deposits*.

The structure of Synthetic securitisations in the LDM is illustrated in the following picture:

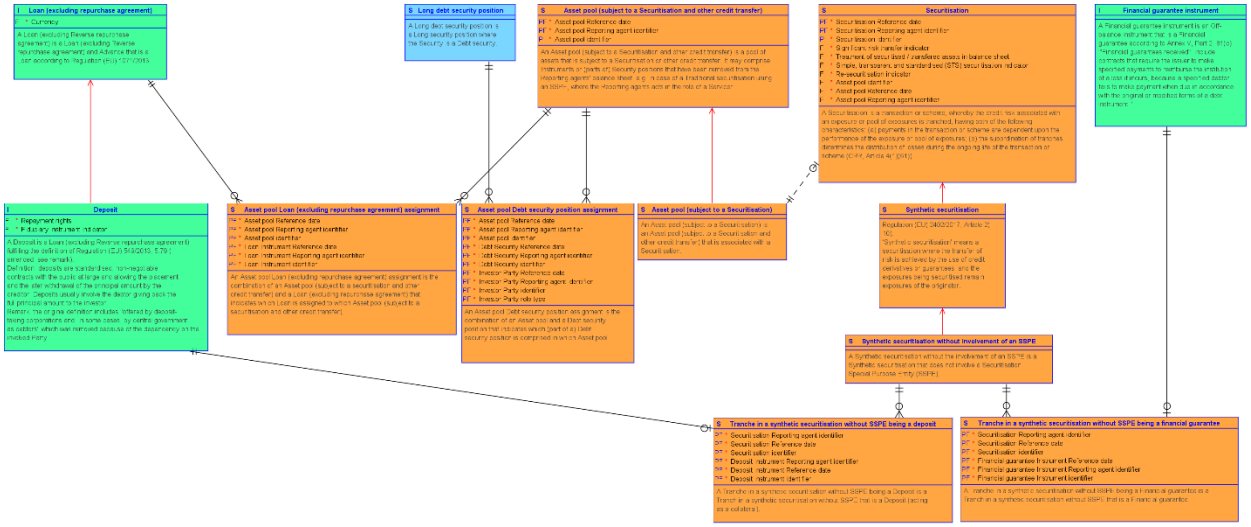

Figure 81: A Synthetic securitisation without involvement of an SSPE in the LDM

Please note that, at this stage only *Synthetic securitisations without Securitisation Special Purpose Entities (SSPEs)* are modelled.

3.6.4 Covered bond programs

Covered bond programs are very similar to *Traditional securitisations* from a (data) structural perspective, i.e., via the *Covered bond program*, assets comprised in an *Asset pool* are linked to *Covered bonds*. The main difference between a *Traditional securitisation* and a *Covered bond program* is the subordination of the underlying assets. While in a *Traditional securitisation*, in case of insolvency / bankruptcy of the *Issuer* the *Investors* have access to the *Issuer's* assets according to a certain ranking, in case of a *Covered bond program* the *Investor* has a right on the underlying assets subject to the *Covered bond program*. The structure of *Covered bond programs* in the LDM is indicated in the following picture:

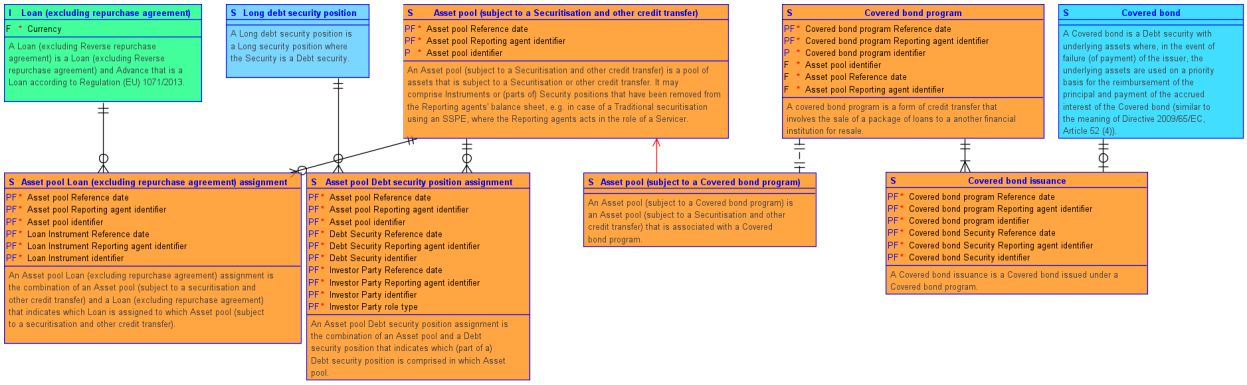

Figure 82: A Covered bond program in the LDM

3.6.5 Credit transfers other than securitisations and covered bond programs

Credit transfers other than securitisations and covered bond programs refers to credit transfers other than *Securitisations* and *Covered bond programs*.

Please note that this part of the model is incomplete, and its description will be added when the model design is finalised.

3.6.6 Summary – Securitisation and other credit transfer

Remarks:

- *Securitisations and other credit transfers* cover *Securitisations*, *Covered bond programs* and *Credit transfers other than securitisations and covered bond programs*
- *Asset pools* consist of *Instruments* or *Debt security positions*
- *Securitisations* and *Covered bond programs* are modelled as operations establishing a connection between the underlying assets (as part of an *Asset pool)* and the result of the operation, e.g., *Asset backed securities* or *Covered bonds*
- *Traditional securitisations* may involve *Credit facilities* as liquidity support

3.7 Cash on hand, Non-financial assets & Non-financial liabilities

Cash on hand, *Non-financial assets* & *Non-financial liabilities* represent information that is modelled as aggregates. This information is located in the balance sheet hierarchy of the model and not coupled with the other parts of the model at this stage.

The main reporting requirements for these aggregates are arising from FINREP which implies the identification of two aspects: (1) aggregates which are classified as Non-current assets and disposal groups classified as held for sale[18] (or short *Held for sale*) and (2) aggregates which represent Collateral taken into possession[19]. For such *Non-financial assets* that have been taken into possession it is also required to distinguish between taken into possession during and before the period. Consequently, the design of the aggregates in the LDM need to account for these reporting requirements.

The information if an aggregate is Held for sale was designed by making the attribute *Held for sale indicator* part of the primary key of relevant entity types, for example the Entity type *Goodwill*:

[18] See, for example: FINREP Balance Sheet Statement [Statement of Financial Position]: Assets (F01.01)

[19] See, for example: FINREP Collateral obtained by taking possession during the period (held at the reference date) (F13.02.1)

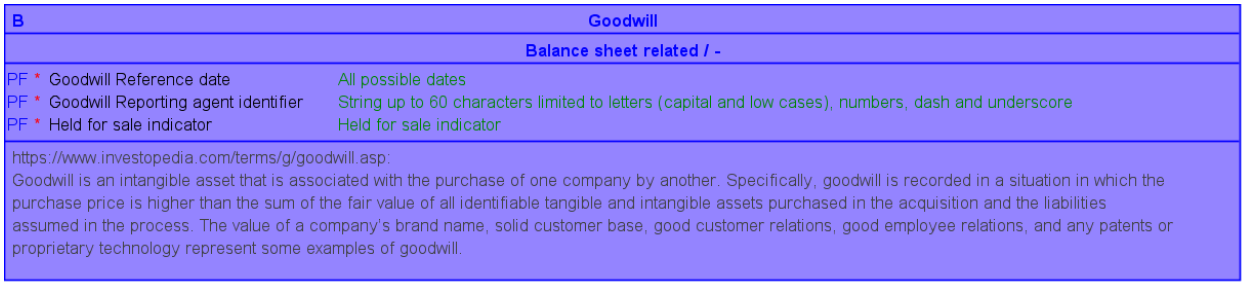

Figure 83: Held for sale indicator being the primary key of the Entity type Goodwill

This design allows to distinguish between *Goodwill* that is *Held for sale* and *Goodwill* that is *not Held for sale* where the former will be assigned to the classification Non-current assets and disposal groups classified as held for sale and the later will not.

The second aspect required a more elaborate design, we will illustrate it given the example of Investment property.

We need to distinguish between *Investment property taken into possession* and *Investment property not taken into possession*. This distinction is established via subtyping. *Investment property taken into possession* needs to be subtyped again to distinguish between *Investment property taken into possession before the period* and *Investment property taken into possession during the period*. The resulting design is illustrated in the following picture:

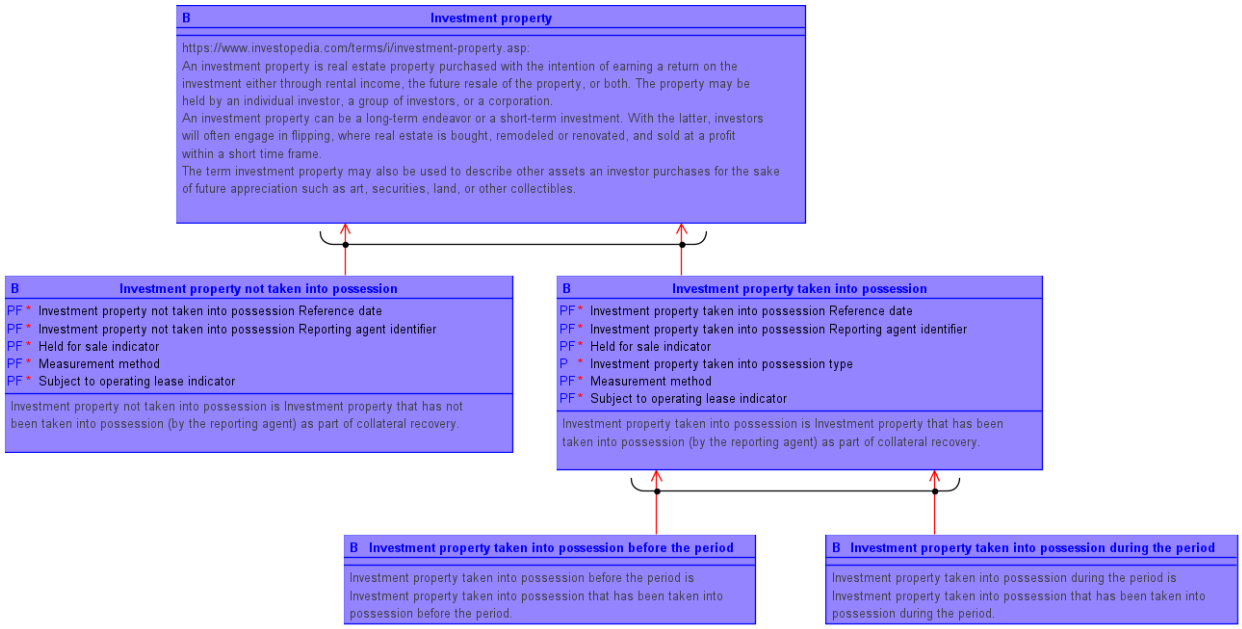

Figure 84: Investment property hierarchy

The indicated approach for *Held for sale* and *Collateral taken into possession* is applied to other types of *Non-financial assets* and *Non-financial liabilities*. For further details about this part of the model we refer to the LDM / ELDM html reports or directly the LDM itself.

3.8 Rating systems

A *Rating agency* in the LDM is defined as "…a credit rating agency that is registered or certified in accordance with Regulation (EC) No 1060/2009 of the European Parliament and of the Council of 16 September 2009 on credit rating agencies or a central bank issuing credit ratings which are exempt from the application of Regulation (EC) No 1060/2009.

A Rating agency can be either an Extern Credit Assessment Institution (ECAI) or an Export Credit Agency (ECA).

An export credit agency (known in trade finance as an ECA) or investment insurance agency is a private or quasi-governmental institution that acts as an intermediary between national governments and exporters to issue export insurance solutions, guarantees for financing. The financing can take the form of credits (financial support) or credit insurance and guarantees (pure cover) or both, depending on the mandate the ECA has been given by its government. ECAs can also offer credit or cover on their own account. This does not differ from normal banking activities. Some agencies are government-sponsored, others private, and others a combination of the two."

Consequently, we distinguish between *External Credit Assessment Institutions (ECAIs)* and *Export Credit Agencies (ECAs)*. Such a *Rating agency* manages one-or-many *Rating systems*.

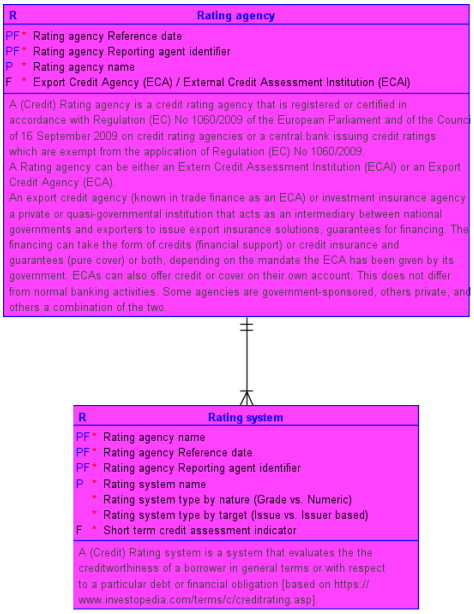

Figure 85: Rating agency managing Rating system(s)

In the LDM we distinguish between *Graded* and *Numeric rating systems* where in the former ratings are reflected by so-called *Rating grades*, like AAA, and in the later ratings are reflected by a *Probability of default*. At the same time, both Graded and Numeric rating systems may be applied to specific *Parties* or to a particular debt obligation, e.g., *Debt securities*. Consequently, in the LDM we have applied disjoint subtyping into *Graded* and *Numeric rating systems* and *Issue* and *Issuer based rating systems*. The model design is illustrated in the following picture:

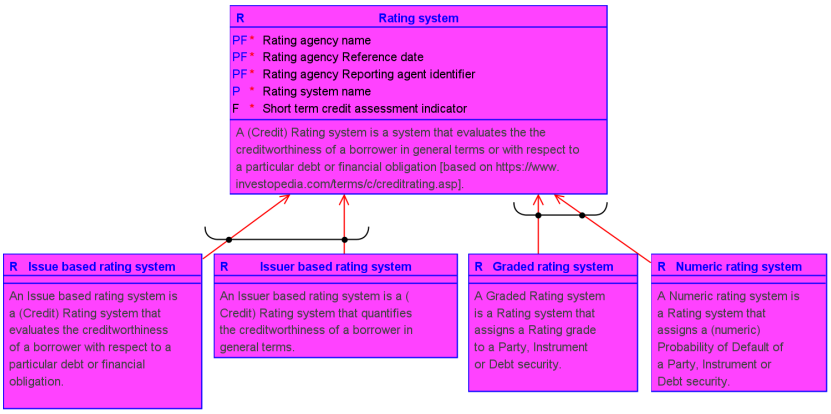

Figure 86: Rating system by target (Issue vs. Issuer) and nature (Graded vs. Numeric)

3.8.1 Graded & Issue based rating systems

Issue based rating systems comprises one-or-many *Rating grades* which may then be assigned to particular *Debt securities*. The LDM design is illustrated in the following picture:

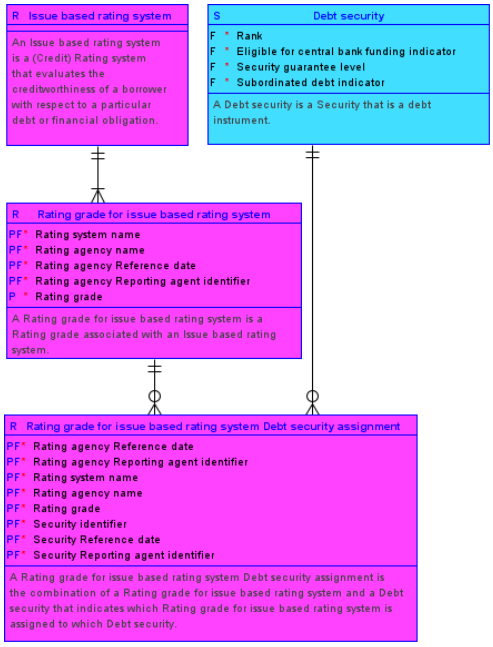

Figure 87: Rating grade (for issue based rating system) being assigned to a Debt security

It may be interpreted as following: An *Issue based rating system* has one-or-many *Rating grades*. Each of these *Rating grades* may be assigned to one-or-many *Debt securities*. On the other hand, a *Debt security* may be rated, and therefore assigned a *Rating grade* by one-or-many different *Issue based rating systems*.

3.8.2 Graded & Issuer based rating systems

As regards *Issuer based rating systems*, we distinguish between *Issuer based rating systems* where the target is a *Central government* and those where the target is not a *Central government*. We will discuss the model design for targets other than *Central governments*, the design for *Central governments* is similar but differs in the resulting target which is a *Country* for *Central governments*. The design is illustrated as following:

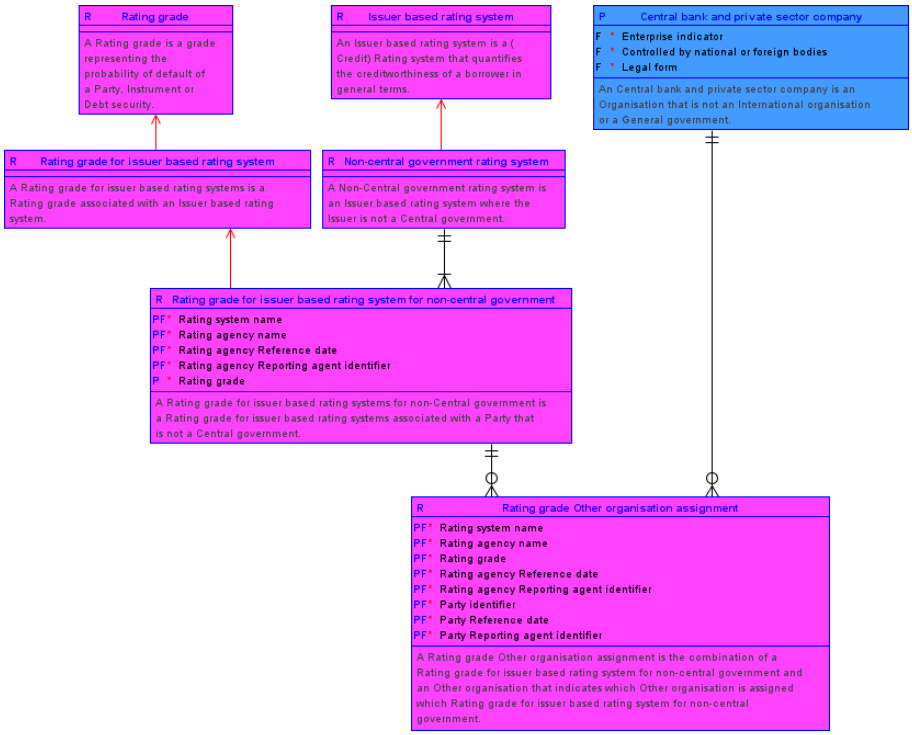

Figure 88: Issuer based rating system applied to Central banks and private sector companies

It may be interpreted as: A *Non-central government rating system* is an *Issuer based rating system*. Such a *Rating system* has one-or-many *Rating grades* (reflected in the Entity type *Rating grade for issuer based rating system for non-central government*) which may be assigned to one-or-many *Central banks and private sector companies*.

The overall design, including Central government rating systems is illustrated here:

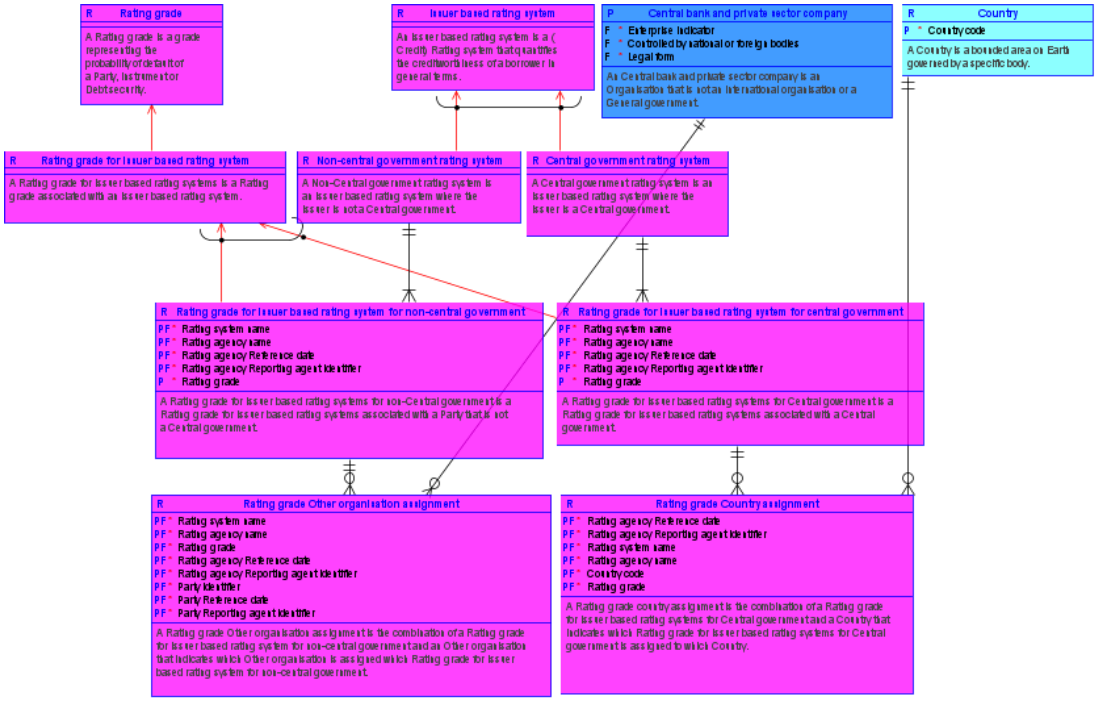

Figure 89: Issuer based rating systems applied to Countries and Central banks and private sector companies

3.8.3 Numeric rating systems

A *Numeric rating system*, where the rating is reflected by a *Probability of default*, may be assigned to a Legal person. Please note that, in its current state, the LDM does not include numeric ratings for individual debt obligations like *Debt securities* or *Loans*[20]. The model design is indicated in the following picture:

[20] The LDM does include graded ratings for debt securities via entity type Rating grade for issue based rating system Debt security assignment.

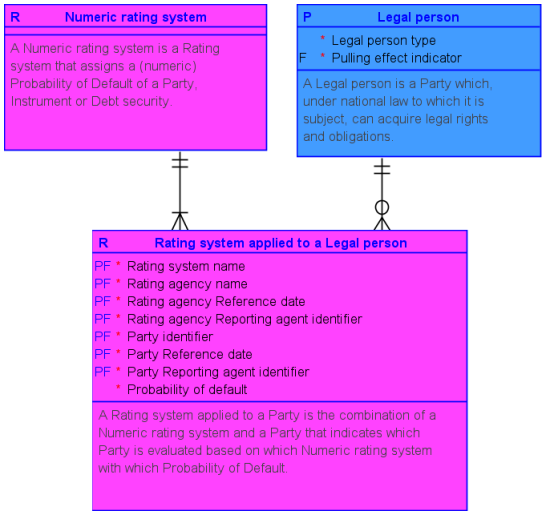

Figure 90: Numeric rating system applied to Legal person

3.9 Reference data

The term *Reference data* in the LDM reflects data / information that may be managed centrally. Examples for Reference data in the LDM are *Countries*, *Currencies* and *Default status*. For example, the *Default status* is illustrated in the LDM as following:

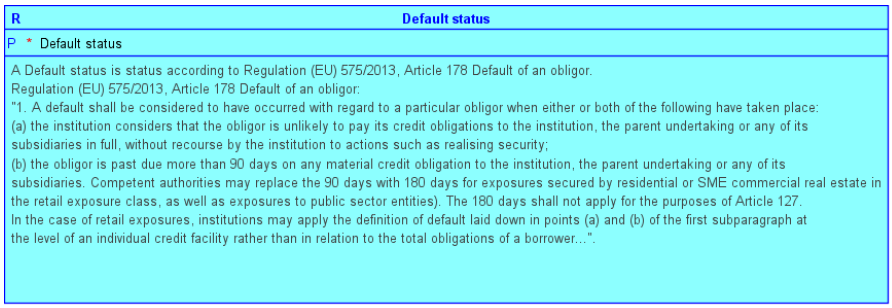

Figure 91: Default status

Entity types in the LDM where the *Default status* is relevant, like *Default financial asset instrument individually assessed*, have a relationship type to the entity type *Default status*.

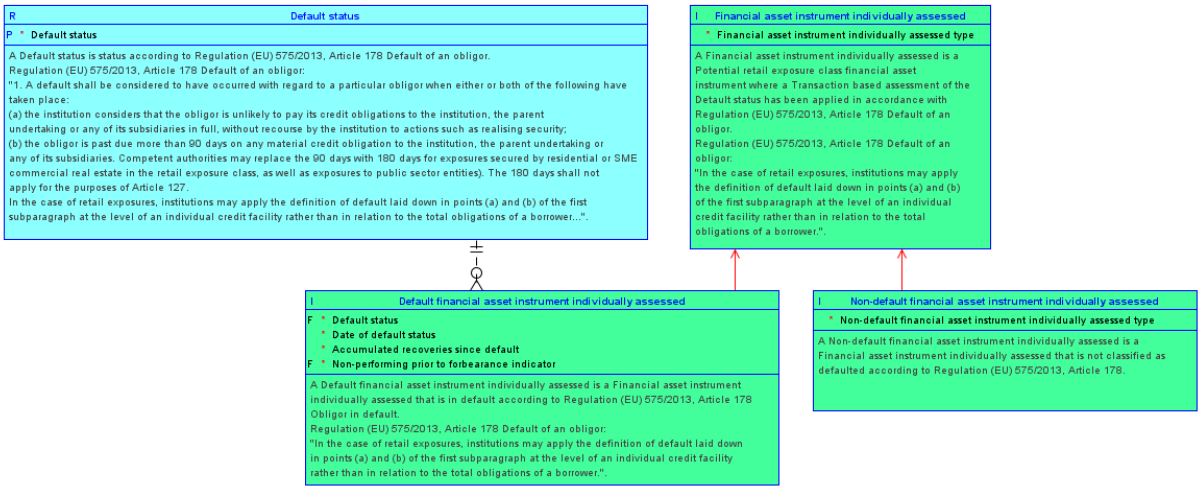

Figure 92: Default status as a foreign key in Default financial asset instrument individually assessed

The main reason for the separate representation – in separate entity types – of this information is that it makes it explicit which entity types may be managed centrally.

3.10 Derivation of concepts, association between the Logical Data Model (LDM) and the Enriched Logical Data Model (ELDM)

The BIRD documentation distinguishes between the LDM and the ELDM. The main difference between these two models is that the ELDM comprises derived concepts, e.g., attributes which may be derived based on information present in the LDM. These derived attributes are organised in dedicated entity types whose name ends with “derived data”, for example *Party derived data*. An example is illustrated in the following picture:

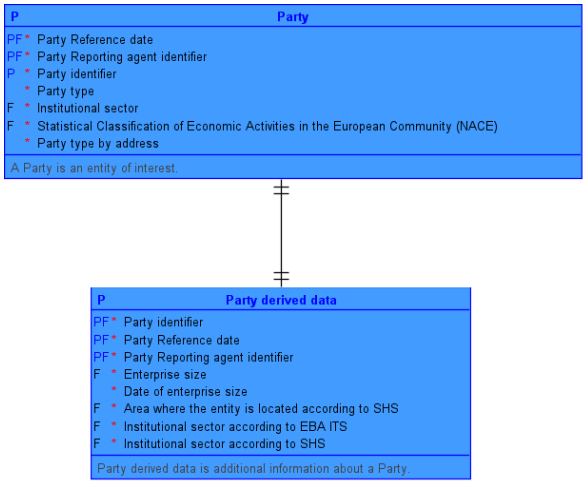

Figure 93: Party & Party derived data

Please note that a concept is considered a derived concept if it differs from the input data. This definition implies that, if an output concept is equal to an input concept but the granularity is different the output concept is considered a derived concept.

Considering the previous paragraphs, it is important to note that, when we refer to the LDM we actually mean the ELDM because we are referring to the model comprising also derived information. However, because we have started developing the LDM and the concept of the ELDM has only been added at a later stage we continue referring to the LDM, although we may refer to derived information as well.

Annex 1: Introduction to (logical) data modelling

In order to support the reader in understanding the content of the LDM it is important to understand the notation and its meaning. The following picture illustrates the most important data modelling objects like entity types, attributes, relationship type, Inheritance (relationship types) and explains the given notation. The following subsections provide further details about the key objects and modelling techniques that are used throughout the model.

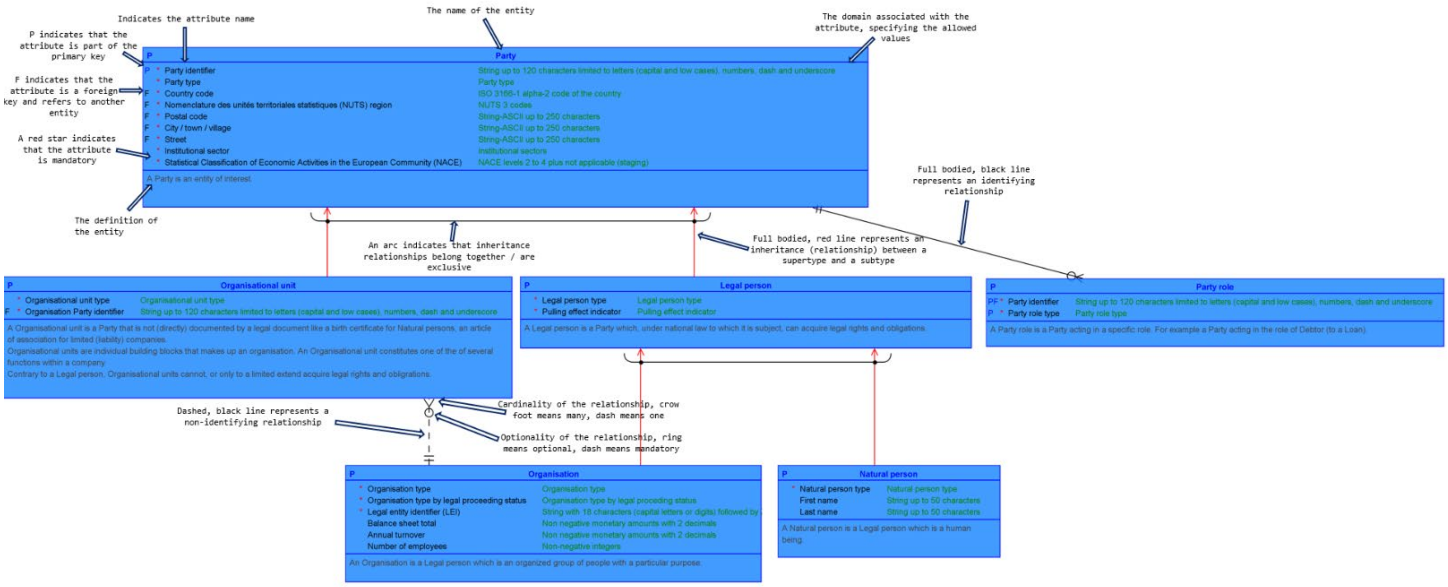

Figure 94: Description of data model objects

Please be aware that the illustrations in the LDM / ELDM html report use black, dashed lines for representing inheritance relationship types (which are indicated by red with an arrow throughout this document).

3.10.1 Entity type

Entity types are the main components of (logical) data modelling. They represent the “things of interest”. Every entity type in a logical data model must have a definition that uses only commonly known business terms and/or concepts that are described by other entity types in the model.

An example of an entity type in the LDM is Security and exchange tradable derivative. Its definition is “A Security and exchange tradable derivative is a certificate attesting credit, the ownership of stocks or bonds, or the right to ownership connected with tradable derivatives.”. The following picture indicates the representation of this entity type in the LDM:

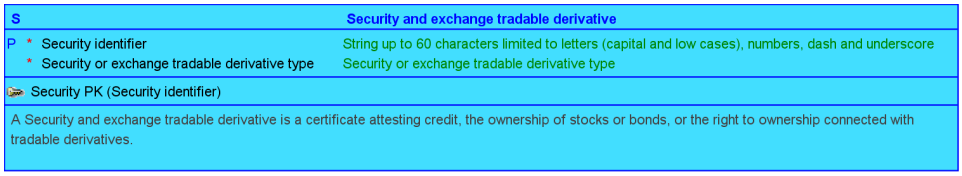

Figure 95: The Entity type Security and exchange tradable derivative in the LDM

The name of the entity type is indicated in bold on top of the entity type, i.e., *Security and exchange tradable derivative*. Separated by a line, the following section of the entity type lists the attributes associated to it (i.e., Security identifier, Security or exchange tradable derivative type) and provides an indication of their allowed values (String up to 60 characters limited to letters (capital and low cases), numbers, dash and underscore, Security and exchange tradable derivative type). The P next to the Security identifier indicates that the Security identifier is part of the primary key, in this case it is equal to the primary key. The primary key of an entity type allows to identify a record / an instance univocally. The third and last section of the entity type illustrates its definition.

3.10.1.1. A note on the name entity type versus entity

We use the term entity type to indicate the construct within the LDM. We use the term entity when we deal with legal entity or Special Purpose Entities. This is done to try to keep the confusion between legal entities and model entities to a minimum.

3.10.2 Attribute

Attributes are the defining characteristics of an entity type in (logical) data modelling. They can take either specific values (i.e., enumerated or defined on a domain) or various values of a specific data type (e.g., string, integer, double, date). In the example presented above, the attributes associated to the Entity type *Securitisation and exchange tradable derivative* are the *Security identifier,* and the *Security and exchange tradable derivative type*. Attributes may be mandatory (indicated by a red star) or optional (without further indication).

3.10.3 Inheritance

An inheritance (relationship type) between entity types indicates that a subtype entity type (“child”) is a special kind of a supertype entity type (“parent”). The subtype inherits all the features of the supertype but may have additional features that are restricted to this subtype. Semantically, such an inheritance (relationship type) may be expressed as “a specific subtype is a type of a supertype”, or more practically “a dolphin is a type of mammal”, “a human is a type of mammal”. The following picture illustrates the inheritance (relationship type) between Security and exchange tradable derivative and its two subtypes Exchange tradable derivative and Security:

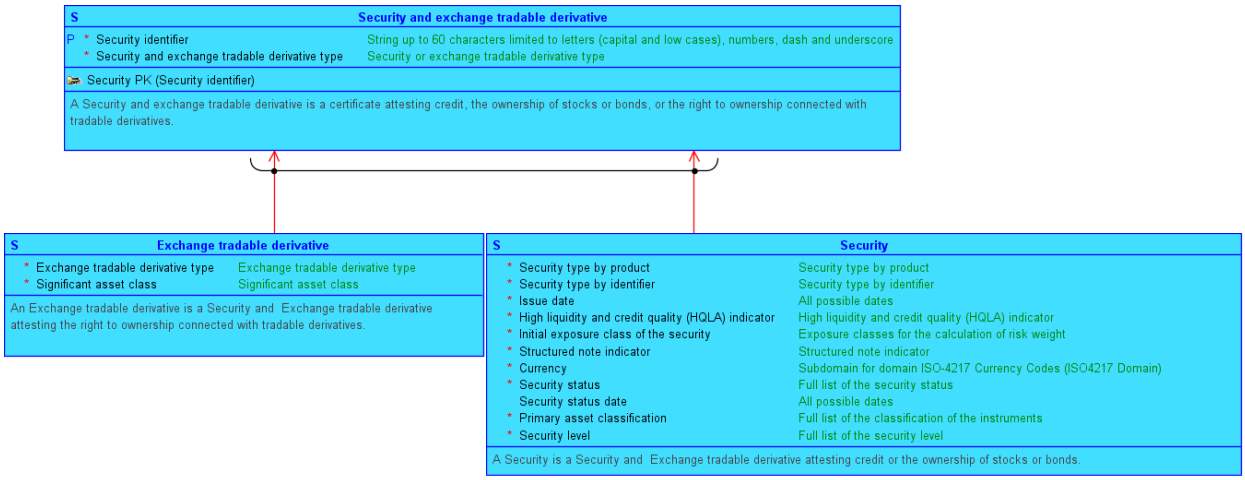

Figure 96: The entity type Security and exchange tradable derivative and its two subtypes Exchange tradable derivative and Security

Using the above-mentioned pattern, this picture may be interpreted as “an Exchange tradable derivative is a type of Security and exchange tradable derivative” and “a Security is a type of Security and exchange tradable derivative”. Another relevant information that is comprised in the picture is that specific features (represented as attributes) are only applicable for particular types. For example, the attribute Currency only applies to Securities but not to Exchange tradable derivatives. On the other hand, the attribute Significant asset class applies only to Exchange tradable derivatives but not to Securities.

When applying subtyping we use so-called discriminator attributes (or discriminators) located in the supertype to establish a reference to the subtypes, i.e., the allowed values of these discriminators reflect the possible subtypes. By convention they comprise the term “type”, examples are Security and exchange tradable derivative type, Security type by product, Security type by identifier. In the above presented example, the discriminator Security and exchange tradable derivative type has allowed values Exchange tradable derivative and Security.

3.10.4 Disjoint subtyping

In some situations, a model design requires (or may be optimised) by using different subtyping at the same hierarchy level, we refer to such subtyping as “disjoint subtyping”. An example, from the LDM is illustrated in the next picture:

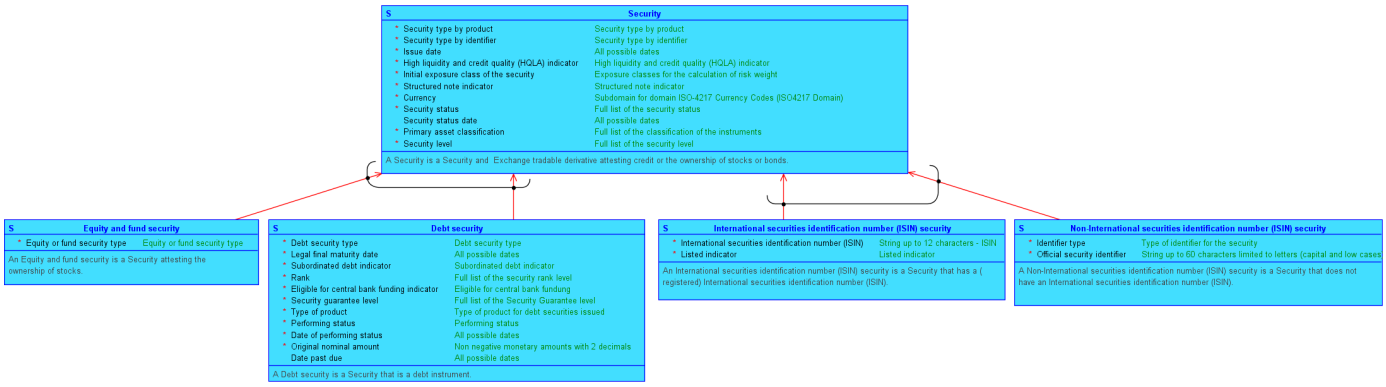

Figure 97: Disjoint subtyping of Security by product (Equity and fund security, Debt security) and by identifier (International securities identification number (ISIN) security, Non-International securities identification number (ISIN) security)

It may be interpreted as “an Equity and fund security is a (type of) Security” and “a Debt security is a Security” and at the same time “an International securities identification number (ISIN) security is a Security” and “a Non-International securities identification number (ISIN) security is a Security”. Please note that both subtypes apply at the same time, so that the following statements hold true:

- a Debt security can be either an ISIN security or a Non-ISIN security
- an Equity and fund security can be either ISIN security or a Non-ISIN security
- an ISIN security can be either an Equity and fund security or a Debt security
- a Non-ISIN security can be either an Equity and fund security or a Debt security

The alternative to such an approach results in additional optional attributes and therefore reduces the referential integrity of the model, due to the reduction of integrated business rules (e.g., every ISIN security must have an ISIN).

3.10.5 Relationship type

A relationship type between two entity types indicates that two entity types are related to each other in a certain way. How many of one entity type is involved in the other is indicated by the cardinality. The cardinality specifies if for example a Financial contract can have no instruments (zero), only one instrument, or possibly many instruments.

We use crow’s foot notation to indicate the cardinality of the relationship type and specify whether the information is optional or mandatory. The cardinality is indicated by the symbols ring, dash and crow’s foot (triangle), which stand for zero, one and many respectively. The combination of ring, dash and crow’s foot can be summarized as follows:

- ring and dash = zero-or-one (optional)

Figure 98: ring and dash indicating zero-or-one (optional)

- dash and dash = one (mandatory)

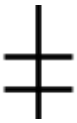

Figure 99: dash and dash indicating one (mandatory)

- ring and crow's foot = zero-or-many (optional)

Figure 100: ring and crow's foot indicating zero-or-many (optional)

- dash and crow's foot = one-or-many (mandatory)

Figure 101: dash and crow's foot indicating one-or-many (mandatory)

Additionally, relationship types can be either

- identifying, indicated by a solid line, or
- non-identifying, which is indicated by a dashed line

The former is used in situations where the primary key of the source entity type is also part of the primary key of the target entity type, while the later creates a reference (to the source entity type) in the target entity type.

To clarify the difference, please consider the following examples:

A Security may be used as a Security collateral, e.g., to protect a loan. The underlying semantics may be expressed as "a Security may be used in one-or-many Security collateral, while a Security collateral must refer to one Security". The associated model design is illustrated in the following picture:

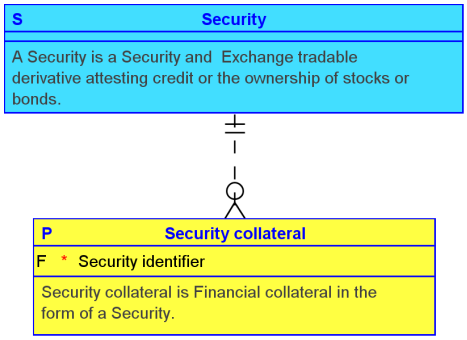

Figure 102: A Security may be used in one-or-many Security collateral, a Security collateral must refer to one Security

Please note the dashed line indicating that it is a non-identifying relationship, therefore the primary key of the Security collateral is not affected[21]. We would also like to point out the F next to Security identifier, indicating the reference to the source entity type, i.e., Security. This modelling construct enforces that every Security collateral must refer to a Security. A missing reference to a Security would violate the referential integrity of the model.

A Security may, on the other hand, be used in a Security position, i.e., a number of equal Securities (having the same Security identifier) held by an Investor. The semantics may be expressed as "a Security may be used in one-or-many Security positions, while a Security position must refer to one Security". The model design is illustrated in the next picture:

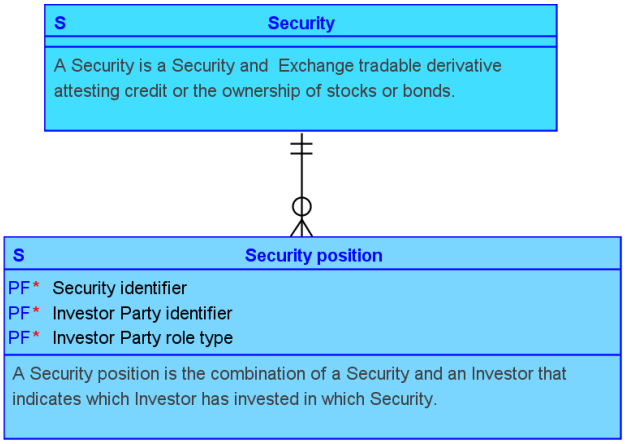

Figure 103: Security may be comprised in one-or-many Security position(s), a Security position must refer to one Security

Please note that solid line marking this relationship type as identifying. Consequently, the primary key (of the source entity type), in this case the Security identifier, is pushed to the target entity type being the

[21] Unfortunately, our current data modelling software does not illustrate the primary key of subtypes, therefore the primary key of the entity Security is not indicated in the picture.

Security position. The other components of the primary key are inherited from the Investor. For the sake of completeness, we illustrate the complete picture here:

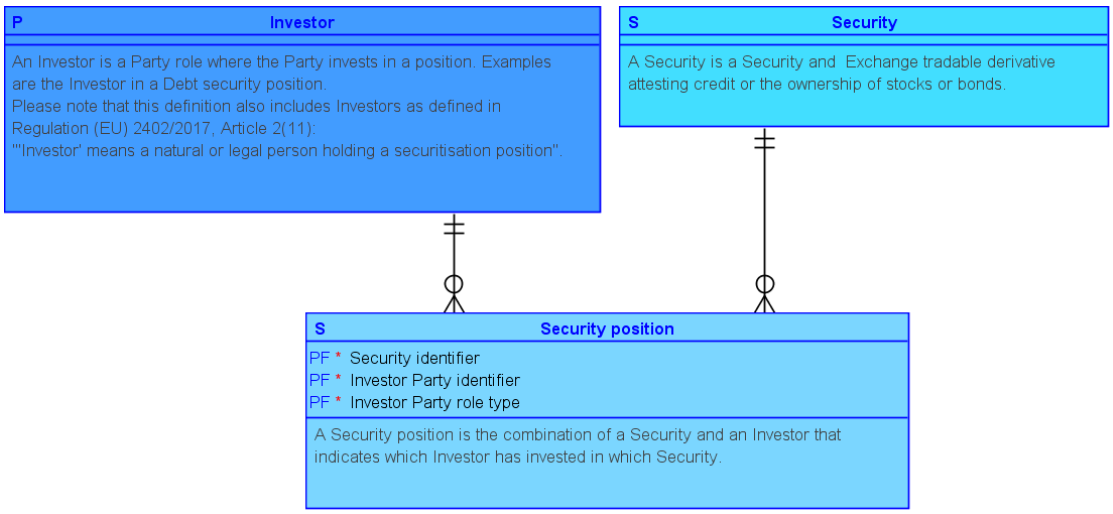

Figure 104: Security position as the combination of an Investor and a Security

This model construct, i.e., designing an entity type that establishes a many-to-many relationship type between two other entity types, is used regularly in the LDM. If there exists no specific business term for such an entity type, we apply the following naming convention: <name of the first entity type> <name of the second entity type> assignment, examples are Instrument Collateral assignment, Credit facility Collateral assignment.