ECL Technical Design

ERS Banking RegTech

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The purpose of this document is to understand the details data flow for ECL application. The document describes the Data model and Data flow for each User interface screen available in ECL application. The document also describes all the Database objects to be created by either Vendor/ Moody's Team or Moody's Partner.

**IMPORTANT : This Document is INTERNAL and in DRAFT Version.**

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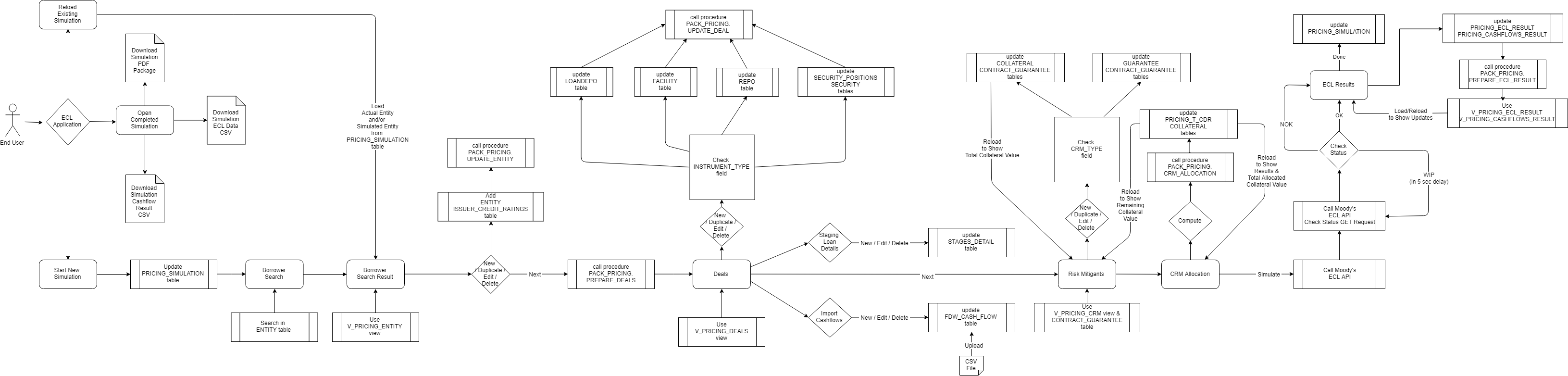
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ERS Banking RegTech

# 1 Overall Technical Flow

Following diagram describes the overall User actions, technical flow, Data operations and procedures triggered. This is general guidance and not to be followed strictly as we may make necessary changes along the way as we build the application either to achieve better performance or any other functional/technical need.



# 2 Simulation

All the simulations information are stored in non partitioned / regular table called PRICING\_SIMULATION with following structure.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Column Name | Display Value | UI Data type | Applicable Value | List Display | Required  (Duplicate/New/Edit) | RFO  Source Column From underlying Table  PRICING\_SIMULATION |
| simulation\_id | ID | Number | Auto computed based on maximum number available/ sort of sequence | True | True | ID |
| description | Description | String |  | True | True | DESCRIPTION |
| as\_of\_date | As Of Date | Date |  | True | True | AS\_OF\_DATE |
| borrower | Borrower | String |  | True | True | BORROWER\_NAME  based on existing borrower or simulated borrower |
| existing\_entity\_code | Existing Borrower Code | String |  |  |  | EXISTING\_ENTITY\_CODE  if available in case of Edit |
| simulated\_entity\_code | Simulated Borrower Code | String |  |  | True | SIMULATED\_ENTITY\_CODE |
| created\_by | Created By | String | Automatically set from CD\_USERS.USER\_NAME  field | True | True | USER\_NAME |
| created\_at | Created At | Date | Automatically set when User creates new Simulation | True | True | CREATED\_AT |
| updated\_at | Updated At | Date | Automatically set when the Simulation API completes Successfully or Error out |  | True | UPDATED\_AT |
| status | Status | String | Automatically set  'In Progress' or 'Failed' or 'Success' | True | True | STATUS |
| remark | Remark | String |  |  |  | REMARK |

# 3 Borrowers

The main table for borrower are ENTITY and ISSUER\_CREDIT\_RATING

## Search Borrower (ENTITY)

Upon end user search request, search the table ENTITY and retrieve the results for borrowers by matching field mentioned in below table CONTAINS/LIKE operator. View returns only one record for a borrower.

* Retrieve the PARTITION\_KEY from CONTEXTS table matching AS\_OF\_DATE selected by user before starting the Simulation and get PK\_RD column for WORKSPACE = 'PRICING' and POSITION = 0
* Retrieve matching records and then prepare list of unique ENTITY\_CODE values.
* Using those ENTITY\_CODE values retrieve the results from V\_PRICING\_ENTITY view and all the fields mentioned further in Search Result Data chapter.

|  |  |  |  |
| --- | --- | --- | --- |
| Source Table | Source  Column | Search  Criteria | Oracle DB  Type |
| ENTITY | PARTITION\_KEY | Exact Match | VARCHAR2 |
| ENTITY | ENTITY\_CODE | Like | VARCHAR2 |
| ENTITY | ENTITY\_DESC | Like | VARCHAR2 |
| ENTITY | LONG\_NAME  (in Chinese) | Like | VARCHAR2 |

Search Result Data (V\_PRICING\_ENTITY)

* The primary table for this view is ENTITY left outer joined with ISSUER\_CREDIT\_RATINGS and BEA\_I9\_INFO
* This view contains only one record per ENTITY\_CODE by AS\_OF\_DATE for user to select, edit, duplicate and continue the simulation process.
* In case user creates new ENTITY using 'Duplicate' button or edit existing ENTITY records using 'Edit' button, new record is created in the respective tables mentioned below with new ENTITY\_CODE value to avoid the unique key constraint.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Column Name | Display Value | UI Data type | Applicable Value | List Display | Required  (Duplicate/New/Edit) | RFO  V\_PRICING\_ENTITY  View Column Name | RFO  Source Column From underlying Table |
| as\_of\_date | As of Date | Date | Auto computed based on the As of Date selected by user. |  | True | AS\_OF\_DATE | ENTITY.PARTITION\_KEY |
| entity\_code | Borrower ID | String | auto computed vs. user provided see flow below.. | True | True | ENTITY\_CODE | ENTITY.ENTITY\_CODE |
| entity\_desc | Name 1 | String |  | True | True | ENTITY\_DESC | ENTITY.ENTITY\_DESC |
| long\_name | Name 2  (**Chinese Characters**) | String |  | True |  | LONG\_NAME | ENTITY.LONG\_NAME |
| type | type | String |  |  | True | ET\_CODE\_USER | ENTITY.ET\_CODE\_USER |
| country\_of\_operation | Country of Operations | String | lookup  service | True | True | COUNTRY\_NAME | COUNRY.COUNTRY\_NAME  where  ENTITY.COUNTRY\_CODE = COUNTRY.COUNTRY\_CODE |
| ci\_account\_number | CI Account Number | String |  | True |  | CI\_ACCOUNT\_NUMBER | Unique Value of BEA\_I9\_INFO.CI\_ACC\_NO  where  ENTITY.ATTRIBUTE\_5||':'||ENTITY.ATTRIBUTE\_2||':'||ENTITY.ATTRIBUTE\_3||':'||ENTITY.ATTRIBUTE\_4 = BEA\_I9\_INFO.ID\_DOCUMENT |
| ci\_application\_number | CI Application Number | String |  |  |  | CI\_DOCUMENT\_NUMBER | Unique Value of BEA\_I9\_INFO.CI\_APP\_TYP  where  ENTITY.ATTRIBUTE\_5||':'||ENTITY.ATTRIBUTE\_2||':'||ENTITY.ATTRIBUTE\_3||':'||ENTITY.ATTRIBUTE\_4 = BEA\_I9\_INFO.ID\_DOCUMENT |
| ci\_document\_number | CI Document Number | String |  |  |  | CI\_DOCUMENT\_TYPE | ENTITY.ATTRIBUTE\_3 |
| ci\_issue\_country\_name | CI Issue Country | String | lookup service |  | True | CI\_ISSUE\_COUNTRY\_NAME | COUNRY.COUNTRY\_NAME  where  ENTITY.ATTRIBUTE\_2 = COUNTRY.COUNTRY\_CODE |
| industry\_sector | Industry Sector | String | lookup  service |  |  | INDUSTRY\_SECTOR | ENTITY.INDUSTRY\_SECTOR |
| total\_assets | Total assets | Number |  |  |  | TOTAL\_ASSETS | ENTITY.TOTAL\_ASSETS |
| source\_system | Source System | String | default  PRICING\_SIMULATION for new/duplicate/edit |  |  | IMPORT\_SOURCE | ENTITY.IMPORT\_SOURCE |
| staging\_source | Staging Source | String |  |  |  | STAGING\_SOURCE | ENTITY.STAGING\_SOURCE |
| moodys\_rating | Moody's Rating | String | lookup  service |  |  | MOODYS\_RATING | ISSUER\_CREDIT\_RATINGS.LONG\_TERM\_RATING  where  AGENCY\_CODE = 'MOODYS' and ENTITY.ENTITY\_CODE = ISSUER\_CREDIT\_RATINGS.ENTITY\_CODE |
| sp\_rating | S&P Rating | String | lookup  service |  |  | SP\_RATING | ISSUER\_CREDIT\_RATINGS.LONG\_TERM\_RATING  where  AGENCY\_CODE = 'SP' and ENTITY.ENTITY\_CODE = ISSUER\_CREDIT\_RATINGS.ENTITY\_CODE |
| car\_rating | CAR Rating | String | lookup  service |  |  | CAR\_RATING | ISSUER\_CREDIT\_RATINGS.LONG\_TERM\_RATING  where  AGENCY\_CODE = 'CAR' and ENTITY.ENTITY\_CODE = ISSUER\_CREDIT\_RATINGS.ENTITY\_CODE |
| internal\_rating | Internal Rating | String | lookup  service |  | True | INTERNAL\_RATING | ISSUER\_CREDIT\_RATINGS.LONG\_TERM\_RATING  where  AGENCY\_CODE = 'INT' and ENTITY.ENTITY\_CODE = ISSUER\_CREDIT\_RATINGS.ENTITY\_CODE |
| final\_external\_rating | Final External Rating | String |  | True | True | FINAL\_EXTERNAL\_RATING | ISSUER\_CREDIT\_RATINGS.LONG\_TERM\_RATING  where  AGENCY\_CODE = 'IFRS9\_FINAL' and ENTITY.ENTITY\_CODE = ISSUER\_CREDIT\_RATINGS.ENTITY\_CODE |
| simulated | Simulated | Boolean | Automatically set to True for New, Duplicate or Edit actions. Not Editable by user | True | True | FLAG\_SIMULATED | 'T' if value is 'PRICING\_SIMULATION' else 'F'  ENTITY.IMPORT\_SOURCE |
| remark | Remark | String |  | True |  | REMARK | ENTITY.ATTRIBUTE\_20 |
| import\_source | Import Source | String | Auto set to 'PRICING\_SIMULATION' for New/Edited/Duplicated lines |  | True | IMPORT\_SOURCE | ENTITY.IMPORT\_SOURCE |

Borrower Screen User Actions

Always create New record when user Duplicate/Edit/create New borrower Record. Application should not modify the existing data loaded by ETL Batch. following explains the overall flow

**New/Edit/Duplicate Action Flow**

* For New/ Duplicate, Create new record with following keys,
  + ENTITY.ENTITY\_CODE and ISSUER\_CREDIT\_RATINGS.ENTITY\_CODE = <provided by user>+'\_'+<simulation\_id>
  + PRICING\_SIMULATION.EXISTING\_ENTITY\_CODE = Null
  + PRICING\_SIMULATION.SIMULATION\_ENTITY\_CODE =  <provided by user>+'\_'+<simulation\_id
* For Edit, Create new record with following keys if the selected ENTITY record is NOT SIMULATED entity. check the IMPORT\_SOURCE = 'PRICING\_SIMULATION' on the ENTITY record. Else Edit the same record,
  + ENTITY.ENTITY\_CODE and ISSUER\_CREDIT\_RATINGS.ENTITY\_CODE = <selected record entity\_code>+'\_'+<simulation\_id>
  + PRICING\_SIMULATION.EXISTING\_ENTITY\_CODE = <selected record entity\_code>
  + PRICING\_SIMULATION.SIMULATION\_ENTITY\_CODE =  <selected record entity\_code>+'\_'+<simulation\_id>
* Derive various codes for names entered by user using lookup service.
  + ENTITY.INDUSTRY\_SECTOR = INDUSTRY\_SECTOR.CODE matching "industry\_sector" description selected by user from drop down
  + ENTITY.COUNTRY\_CODE = COUNTRY.COUNTRY\_CODE matching "country\_of\_operation" and "ci\_issue\_country\_name" selected by user from drop down
* Set some default attributes
  + ENTITY / ISSUER\_CREDIT\_RATINGS.IMPORT\_SOURCE = 'PRICING\_SIMULATION'
  + ENTITY / ISSUER\_CREDIT\_RATINGS.CHECK\_ERROR\_STATUS = 0
  + ENTITY / ISSUER\_CREDIT\_RATINGS.CHECK\_ERROR\_STATUS\_V = 0
* Save Data into various RFO tables with changes done by user in the modal window.
  + Insert or update multiple records.
    - in case user selected the ENTITY which is NOT simulated
      * find if the simulated record available for the same EXISTING\_ENTITY\_CODE , SIMULATION\_ID and AS\_OF\_DATE then update the same record.
      * Else create new simulated record
  + Insert/Update ENTITY (all fields as provided in the table above)
  + Insert/Update ISSUER\_CREDIT\_RATINGS (all fields as provided in the table above)
    - note then we insert one record for each rating provided by user. e.g. if user provided moodys\_rating, sp\_rating, internal\_rating, car\_rating. we insert/update 4 records in this table.
* Post Save PL/SQL Call PACK\_PRICING.UPDATE\_ENTITY following is Pseudo code
  + Purpose : anything BEA wants to update after entity record is saved.
  + Pseudo Code TBD by Moody's Partner team
  + Input Parameters:
    - p\_simulation\_id  (PRICING\_SIMULATION.ID)
    - p\_as\_of\_date (PRICING\_SIMULATION.AS\_OF\_DATE)
    - p\_entity\_code (PRICING\_SIMULATION.EXISTING\_ENTITY\_CODE)
    - p\_simulation\_entity\_code (PRICING\_SIMULATION.SIMULATION\_ENTITY\_CODE)
    - p\_user\_name (PRICING.USER\_NAME)
  + Return Successfully if not error Else Show Error on the Screen for User to take screen shot and communicate back to Admin team.

**Next Button to Go to Deals Screen**

* PL/SQL Call PACK\_PRICING.PREPARE\_DEALS following is Pseudo code
  + Purpose : anything BEA wants to update before deals are loaded.
  + Pseudo Code TBD by Moody's Partner team
  + Input Parameters:
    - p\_simulation\_id  (PRICING\_SIMULATION.ID)
    - p\_as\_of\_date (PRICING\_SIMULATION.AS\_OF\_DATE)
    - p\_entity\_code (PRICING\_SIMULATION.EXISTING\_ENTITY\_CODE)
    - p\_simulation\_entity\_code (PRICING\_SIMULATION.SIMULATION\_ENTITY\_CODE)
    - p\_user\_name (PRICING.USER\_NAME)
  + Return Successfully if not error Else Show Error on the Screen for User to take screen shot and communicate back to Admin team.

# 4 Deals

The main Instrument tables for deals are LOANDEPO, FACILITY, REPO and SECURITY\_POSITIONS.

Additional Tables are FDW\_CASH\_FLOW and STAGES\_DETAIL.

## Summary of Deals Display

Once end user select the borrower and navigates to Deals screen pull the deals information from V\_PRICING\_DEALS view based on following filters,

* V\_PRICING\_DEALS.AS\_OF\_DATE = CONTEXTS.PK\_RD (converted to Date format) where CONTEXTS.WORKSPACE = 'PRICING' and POSITION = 0
* V\_PRICING\_DEALS.COUNTERPARTY\_CODE IN (PRICING\_SIMULATION.ENTITY\_CODE, PRICING\_SIMULATION.SIMULATION\_ENTITY\_CODE)

Details of the Deal Screen fields and view...

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Column Name | Display Value | UI Data type | Applicable Value | List Display | Required  (Duplicate/  New/  Edit) | RFO  V\_PRICING\_DEALS  View  Column Name | RFO  Instrument  Table  LOANDEPO | RFO  Instrument  Table  FACILITY | RFO  Instrument  Table  REPO | RFO  Instrument  Table  SECURITY\_POSITIONS |
| as\_of\_date | As of Date | Date | Auto computed based on the As of Date selected by user. |  | True | AS\_OF\_DATE | PARTITION\_KEY | PARTITION\_KEY | PARTITION\_KEY | PARTITION\_KEY |
| instrument\_type | Instrument Type | String |  |  | True | INSTRUMENT\_TYPE | 'LOANDEPO' | 'FACILITY' | 'REPO' | 'SECURITY\_POSITIONS' |
| simulated | Simulated | Boolean | Auto computed based on IMPORT\_SOURCE = 'PRICING\_SIMULATION' | True | True | FLAG\_SIMULATED | 'T' if IMPORT\_SOURCE = 'PRICING\_SIMULATION' else 'F' | 'T' if IMPORT\_SOURCE = 'PRICING\_SIMULATION' else 'F' | 'T' if IMPORT\_SOURCE = 'PRICING\_SIMULATION' else 'F' | 'T' if IMPORT\_SOURCE = 'PRICING\_SIMULATION' else 'F' |
| contract\_reference | Contract Reference | String |  | True | True | CONTRACT\_REFERENCE | CONTRACT\_REFERENCE | CONTRACT\_REFERENCE | CONTRACT\_REFERENCE | CONTRACT\_REFERENCE |
| contract\_type | Contract Type | String |  | True | True | CONTRACT\_TYPE | CONTRACT\_TYPES.CT\_DESC\_USER  where CONTRACT\_TYPE = CONTRACT\_TYPES.CT\_CODE\_USER | CONTRACT\_TYPES.CT\_DESC\_USER  where CONTRACT\_TYPE = CONTRACT\_TYPES.CT\_CODE\_USER | CONTRACT\_TYPES.CT\_DESC\_USER  where CONTRACT\_TYPE = CONTRACT\_TYPES.CT\_CODE\_USER | CONTRACT\_TYPES.CT\_DESC\_USER  where CONTRACT\_TYPE = CONTRACT\_TYPES.CT\_CODE\_USER |
| contract\_type\_code | Contract Type Code | String | Look up into CONTRACT\_TYPES table and derive |  | True | CONTRACT\_TYPE | CONTRACT\_TYPE | CONTRACT\_TYPE | CONTRACT\_TYPE | CONTRACT\_TYPE |
| trade\_date | Trade Date | Date |  | True | True | TRADE\_DATE | TRADE\_DATE | TRADE\_DATE | TRADE\_DATE | TRADE\_DATE |
| maturity\_date | Maturity Date | Date |  | True | True | MATURITY\_DATE | MATURITY\_DATE | MATURITY\_DATE | MATURITY\_DATE | MATURITY\_DATE TBD |
| principal\_amount | Nominal/Limit | Number |  | True | True | PRINCIPAL\_AMOUNT | NOMINAL | AMOUNT |  |  |
| principal\_amount\_in\_currency | Nominal/Limit | Number |  |  |  | PRINCIPAL\_AMOUNT\_IN\_CURRENCY | NOMINAL convert into HKD using MKT\_FX\_INPUT used in the Risk Mitigant step Deals Summary Screen | AMOUNT convert into HKD using MKT\_FX\_INPUT used in the Risk Mitigant step Deals Summary Screen |  |  |
| currency | Currency | String | Dropdown based on CURRENCY table display CCY\_CODE | True | True | CURRENCY | CURRENCY | CURRENCY | CURRENCY |  |
| outstanding | Outstanding/Used Amount | Number |  | True | True | OUTSTANDING | OUTSTANDING | USED\_AMOUNT |  |  |
| outstanding\_in\_currency | Outstanding/Used Amount | Number |  |  |  | OUTSTANDING\_IN\_CURRENCY | OUTSTANDING convert into HKD using MKT\_FX\_INPUT used in the Risk Mitigant step Deals Summary Screen | USED\_AMOUNT convert into HKD using MKT\_FX\_INPUT used in the Risk Mitigant step Deals Summary Screen |  |  |
| original\_rating | Original Rating | String |  | True |  | ORIGINAL\_RATING | DIM14 | DIM14 | DIM14 | DIM14 |
| current\_rating | Current Rating | String |  | True |  | CURRENT\_RATING | DIM15 | DIM15 | DIM15 | DIM15 |
| simulated\_rating | Simulated Rating | String |  | True |  | SIMULATED\_RATING | PRICING\_DEALS\_EXT.SIMULATED\_RATING  left join  PRICING\_DEALS\_EXT.TABLE\_NAME  AND PRICING\_DEALS\_EXT.CONTRACT\_REFERENCE | PRICING\_DEALS\_EXT.SIMULATED\_RATING  left join  PRICING\_DEALS\_EXT.TABLE\_NAME  AND PRICING\_DEALS\_EXT.CONTRACT\_REFERENCE | PRICING\_DEALS\_EXT.SIMULATED\_RATING  left join  PRICING\_DEALS\_EXT.TABLE\_NAME  AND PRICING\_DEALS\_EXT.CONTRACT\_REFERENCE | PRICING\_DEALS\_EXT.SIMULATED\_RATING  left join  PRICING\_DEALS\_EXT.TABLE\_NAME  AND PRICING\_DEALS\_EXT.CONTRACT\_REFERENCE |
| existing\_stage | Existing Stage | String |  | True |  | EXISTING\_STAGE | DIM20 | DIM20 | DIM20 | DIM20 |
| simulated\_stage | Simulated Stage | String |  | True |  | SIMULATED\_STAGE | PRICING\_DEALS\_EXT.SIMULATED\_STAGE  left join  PRICING\_DEALS\_EXT.TABLE\_NAME  AND PRICING\_DEALS\_EXT.CONTRACT\_REFERENCE | PRICING\_DEALS\_EXT.SIMULATED\_STAGE  left join  PRICING\_DEALS\_EXT.TABLE\_NAME  AND PRICING\_DEALS\_EXT.CONTRACT\_REFERENCE | PRICING\_DEALS\_EXT.SIMULATED\_STAGE  left join  PRICING\_DEALS\_EXT.TABLE\_NAME  AND PRICING\_DEALS\_EXT.CONTRACT\_REFERENCE | PRICING\_DEALS\_EXT.SIMULATED\_STAGE  left join  PRICING\_DEALS\_EXT.TABLE\_NAME  AND PRICING\_DEALS\_EXT.CONTRACT\_REFERENCE |
| remark | Remark | String |  | True |  | REMARK | ATTRIBUTE\_20 | ATTRIBUTE\_20 | ATTRIBUTE\_20 | ATTRIBUTE\_20 |
| counterparty\_code | Counterparty Code | String | Automatically set to PRICING\_SIMULATION.SIMULATED\_ENTITY |  | True | COUNTERPARTY\_CODE | COUNTERPARTY\_CODE | COUNTERPARTY\_CODE | COUNTERPARTY\_CODE | CPTY\_CODE |
| basel\_asset\_class\_code | Basel Asset Class Code | String |  |  | True | BASEL\_ASSET\_CLASS\_CODE | DIM6 | DIM6 | DIM6 | DIM6 |
| default\_ind | Basel Asset Class | String |  |  | True | DEFAULT\_IND | DIM4 | DIM4 | DIM4 | DIM4 |
| past\_due\_days | Basel Asset Class | String |  |  | True | PAST\_DUE\_DAYS | NDIM5 | NDIM5 | NDIM5 | NDIM5 |
| bu\_dept\_code | Basel Asset Class | String | Automatically set from PRICING\_USERS.BU\_DEPT\_CODE  where FLAG\_MAIN\_BU = 'T'  But User can change to other if he is assigned more than one BU |  | True | BU\_DEPT\_CODE | ATTRIBUTE\_4 | ATTRIBUTE\_4 | ATTRIBUTE\_4 | ATTRIBUTE\_4 |
| company\_code | Basel Asset Class | String |  |  | True | COMPANY\_CODE | DIM2 | DIM2 | DIM2 | DIM2 |
| import\_source | Import Source | String | Auto set to 'PRICING\_SIMULATION' for New/Edited/Duplicated lines |  | True | IMPORT\_SOURCE | IMPORT\_SOURCE | IMPORT\_SOURCE | IMPORT\_SOURCE | IMPORT\_SOURCE |

**Note : There are additional fields to be Capture or Show  when User Create/Edit/Duplicate any Deals. These fields are described in the specific instrument table chapter and work in progress. Also note that the UX design provided does not show the Modal window size bigger.**

## PRICING\_DEALS\_EXT table

This table contains the additional fields captured at Deal level or computed by simulation. The purpose of this table is to avoid any updated on the existing instrument table.

This table will be left joined with instrument tables using TABLE\_NAME and CONTRACT\_REFERENCE fields in the V\_PRICING\_DEALS view.

This table is updated by PACK\_PRICING.PREPARE\_DEALS and PACK\_PRICING.UPDATE\_DEAL procedures.

|  |  |
| --- | --- |
| Source  Column | Oracle DB  Type |
| PARTITION\_KEY | VARCHAR2 |
| TABLE\_NAME | VARCHAR2 |
| CONTRACT\_REFERENCE | VARCHAR2 |
| SIMULATION\_ID | VARCHAR2 |
| SIMULATED\_RATING | VARCHAR2 |
| SIMULATED\_STAGE | VARCHAR2 |

## Deals Screen User Actions

Always create New record when user Duplicate/Edit/create New borrower Record. Application should not modify the existing data loaded by ETL Batch. following explains the overall flow

**New/Edit/Duplicate Action Flow**

* For New/ Duplicate, Create new record with following keys,
  + <instrument\_table>.CONTRACT\_REFERENCE= <provided by user>+'\_'+<simulation\_id>
* For Edit, Create new record with following keys if the selected instrument table record is NOT SIMULATED. heck the IMPORT\_SOURCE = 'PRICING\_SIMULATION' on the record. Else Edit the same record,
  + <instrument\_table>.CONTRACT\_REFERENCE= <selected record contract\_reference>+'\_'+<simulation\_id>
* Derive various codes for names entered by user using lookup service.  e.g.
  + Periodicity
  + Rate Type
  + refer to Real Time ECL Technical Document provided with Possible Values table.
* Set some default attributes
  + <instrument\_table>.IMPORT\_SOURCE = 'PRICING\_SIMULATION'
  + <instrument\_table>.CHECK\_ERROR\_STATUS = 0
  + <instrument\_table>.CHECK\_ERROR\_STATUS\_V = 0
* Save Data into various RFO tables with changes done by user in the modal window.
  + Insert or update into instrument\_table
  + where table can be LOANDEPO / FACILITY / REPO / SECURITY\_POSITIONS.
* Post Save PL/SQL Call PACK\_PRICING.UPDATE\_DEAL following is Pseudo code
  + Purpose : Deal related computation and update. e.g. simulated rating and stage.
  + Pseudo Code TBD By Moody's Partner
  + Input Parameters:
    - p\_simulation\_id  (PRICING\_SIMULATION.ID)
    - p\_as\_of\_date (PRICING\_SIMULATION.AS\_OF\_DATE)
    - p\_entity\_code (PRICING\_SIMULATION.EXISTING\_ENTITY\_CODE)
    - p\_simulation\_entity\_code (PRICING\_SIMULATION.SIMULATION\_ENTITY\_CODE)
    - p\_user\_name (PRICING.USER\_NAME)
    - p\_instrument\_type (V\_PRICING\_DEALS.INSTRUMENT\_TYPE)
    - p\_contract\_reference (V\_PRICING\_DEALS.CONTRACT\_REFERENCE)
  + Return Successfully if not error Else show full error for User to further rectify with Admin.

## FACILITY Fields

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RFO Field | JSON Field | UI Field Name | Comments | FACILITY TEMPLATE - Fixed Rate | FACILITY TEMPLATE - Floating Rate |
| COUNTERPARTY\_CODE |  | <not shown> |  |  |  |
| CONTRACT\_REFERENCE |  | Contract Reference |  |  |  |
| CONTRACT\_TYPE |  | Contract Type |  |  |  |
| BOOK\_CODE |  | Dealbook |  |  |  |
| DIM2 |  | Company Code |  |  |  |
| DIM13 |  | Segment Type |  |  |  |
| DIM14 |  | Current Rating |  |  |  |
| DIM15 |  | Final Rating |  |  |  |
| DIM20 |  | IFRS9 Stage |  |  |  |
| TRADE\_DATE |  | Trade Date |  | <reporting date> | <reporting date> |
| VALUE\_DATE |  | Value Date |  | <reporting date> | <reporting date> |
| MATURITY\_DATE |  | Maturity Date |  | <reporting date> + 1year | <reporting date> + 1year |
| FIRST\_PAYMENT\_DATE |  | First Payment Date |  | <reporting date> + 1month | <reporting date> + 1month |
| AMOUNT |  | Limit Amount |  | 100000 | 100000 |
| AVAILABLE\_AMOUNT |  | Available Amount |  | 100000 | 100000 |
| USED\_AMOUNT |  | Used Amount |  | 0 | 0 |
| REVOLVING |  | Revolving |  | T | T |
| RATE\_TYPE |  | Interest Rate Type |  | FIXED | FLOATING |
| INTEREST\_RATE |  | Interest Rate Value |  | 0.0 | 0.0 |
| FREQUENCY |  | Interest Periodicity |  | M | M |
| CURRENCY |  | Currency |  | HKD | HKD |
| CURVE\_NAME |  | Repricing Curve | \*We need the values you can select and how to map them to RFO | <null> | <null> |
| TENOR |  | Repricing Tenor |  | <null> | <null> |
| MKT\_SPREAD |  | Repricing Spread |  | <null> | <null> |
| MULT\_SPREAD |  | <not shown> | Default to 1 | <null> | 1 |
| RESET\_FREQUENCY |  | Repricing Periodicity |  | <null> | <null> |
| FIXING\_RULE |  | <not shown> |  | <null> | B |
| FIRST\_FIXING\_DATE |  | First Fixing Date |  | <null> | <reporting date> + 1month |
| DISCOUNT\_CURVE\_NAME |  | <not shown> | Send to RCO based on lookup> | <null> | <null> |
| ACCRUAL\_BASIS |  | Accrual Basis |  | 1 | 1 |
| ACCRUALS |  | Accruals |  | <null> | <null> |
| IMPORT\_CF? |  | Import Cashflows? |  | <null> | <null> |

* Do we need imported cashflows for facility?
* What type of behavioral model are we going to apply to facility?

## LOANDEPO Fields

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RFO Field | JSON Field | UI Field Name | Comments | LOAN TEMPLATE - Fixed Rate Bullet | LOAN TEMPLATE - Floating Rate Bullet | LOAN TEMPLATE - Fixed Rate Linear Amortizing | LOAN TEMPLATE - Floating Rate Linear Amortizing | LOAN TEMPLATE - Fixed Rate Constant Installment |
| COUNTERPARTY\_CODE |  | <not shown> |  |  |  |  |  |  |
| CONTRACT\_REFERENCE |  | Contract Reference |  |  |  |  |  |  |
| CONTRACT\_TYPE |  | Contract Type |  |  |  |  |  |  |
| BOOK\_CODE |  | Dealbook |  |  |  |  |  |  |
| Do we need a rating for specialized projects? |  |  |  |  |  |  |  |  |
| DIM2 |  | Company Code |  |  |  |  |  |  |
| DIM13 |  | Segment Type |  |  |  |  |  |  |
| DIM14 |  | Current Rating |  |  |  |  |  |  |
| DIM15 |  | Final Rating |  |  |  |  |  |  |
| DIM20 |  | IFRS9 Stage |  |  |  |  |  |  |
| TRADE\_DATE |  | Trade Date |  | <reporting date> |  |  |  |  |
| VALUE\_DATE |  | Value Date |  | <reporting date> |  |  |  |  |
| MATURITY\_DATE |  | Maturity Date |  | <reporting date> + 1year |  |  |  |  |
| NOMINAL |  | Nominal |  | 100000 |  |  |  |  |
| OUTSTANDING |  | Outstanding |  | 100000 |  |  |  |  |
| RATE\_TYPE |  | Interest Rate Type |  | FIXED |  |  |  |  |
| RATE\_VALUE |  | Interest Rate Value |  | 0.0 |  |  |  |  |
| PERIODICITY |  | Interest Periodicity |  | M |  |  |  |  |
| CURRENCY |  | Currency |  | HKD |  |  |  |  |
| CURVE\_NAME |  | Repricing Curve | \*We need the values you can select and how to map them to RFO | <null> |  |  |  |  |
| TENOR |  | Repricing Tenor |  | <null> |  |  |  |  |
| MKT\_SPREAD |  | Repricing Spread |  | <null> |  |  |  |  |
| MULT\_SPREAD |  | <not shown> | Default to 1 for floating date | <null> | 1 | <null> | 1 | <null> |
| FIXING\_PERIODICITY |  | Repricing Periodicity |  | <null> | <null> | <null> | <null> | <null> |
| AMORTIZING\_TYPE |  | Amortization Method |  | F |  |  |  |  |
| AMORTIZING\_PERIODICITY |  | Amortization Periodicity |  | 4 |  |  |  |  |
| AMORTIZING\_AMOUNT |  | Amortization Amount |  | <null> |  |  |  |  |
| DISCOUNT\_CURVE\_NAME |  | <not shown> | Send to RCO based on lookup> | <null> |  |  |  |  |
| ACCRUAL\_BASIS |  | Accrual Basis |  | 1 |  |  |  |  |
| ACCRUALS |  | Accruals |  | <null> |  |  |  |  |
| IMPORT\_CF |  | Import Cashflows |  | <null> |  |  |  |  |

* Add constant installment
* Add loan stages

## SECURITY\_POSITION Fields

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RFO Field | JSON Field | UI Field Name | Comments | SECURITY\_POSITION Template - Fixed Rate | SECURITY\_POSITION Template - Floating Rate |
| SECURITY\_POSITION.CONTRACT\_REFERENCE |  | Contract Reference |  |  |  |
| SECURITY\_POSITION.SECURITY\_REFERENCE |  | Security Reference |  |  |  |
| SECURITY\_POSITION.CONTRACT\_TYPE |  | Contract Type |  |  |  |
| SECURITY\_POSITION.BOOK\_CODE |  | Dealbook |  |  |  |
| SECURITY\_POSITION.LONG\_SHORT |  | <not shown> | Defaulted to "L". | L | L |
| SECURITY\_POSITION.DIM2 |  | Company Code |  |  |  |
| SECURITY\_POSITION.DIM13 |  | Segment Type |  |  |  |
| SECURITY\_POSITION.DIM14 |  | Current Rating |  |  |  |
| SECURITY\_POSITION.DIM15 |  | Final Rating |  |  |  |
| SECURITY\_POSITION.DIM20 |  | IFRS9 Stage |  |  |  |
| SECURITY\_POSITION.TRADE\_DATE |  | Trade Date |  | <reporting date> |  |
| SECURITY\_POSITION.VALUE\_DATE |  | Value Date |  | <reporting date> |  |
| SECURITY\_POSITION.NOMINAL |  | Number of Securities |  | 100000 |  |
| SECURITY.SECURITY\_REFERENCE |  | Security Reference |  |  |  |
| SECURITY.SECURITY\_TYPE |  | Security Type |  |  |  |
| SECURITY.ISSUER\_CODE |  | Issuer Code |  |  |  |
| SECURITY.CURRENCY |  | Currency |  |  |  |
| SECURITY.RATING\_AGENCY\_CODE |  | Rating Agency |  |  |  |
| SECURITY.RATING |  | Rating |  |  |  |
| SECURITY.ISSUE\_DATE |  | Issue Date |  |  |  |
| SECURITY.MATURITY\_DATE |  | Maturity Date |  |  |  |
| SECURITY.PRICE\_INDICATOR |  | Price Indicator |  |  |  |
| SECURITY.BID\_PRICE |  | Bid Price |  |  |  |
| SECURITY.OFFER\_PRICE |  | Offer Price |  |  |  |
| SECURITY.UNITY\_NOMINAL |  | Unity Nominal |  |  |  |
| SECURITY.RATE\_TYPE |  | Interest Rate Type |  |  |  |
| SECURITY.COUPON\_PERIODICITY |  | Interest Periodicity |  |  |  |
| SECURITY.RATE\_VALUE |  | Interest Rate Value |  |  |  |
| SECURITY.CURVE\_NAME |  | Repricing Curve |  |  |  |
| SECURITY.TENOR |  | Repricing Tenor |  |  |  |
| SECURITY.MKT\_SPREAD |  | Repricing Spread |  |  |  |
| SECURITY.MULT\_SPREAD |  | <not shown> | Default to 1 for floating date | <null> | 1 |
| SECURITY.ACCRUED\_INTEREST |  | Accruals |  |  |  |
| SECURITY.ACCRUAL\_BASIS |  | Accrual Basis |  |  |  |
| SECURITY.AMORTIZING\_TYPE |  | Amortization Method |  |  |  |
| SECURITY.AMORTIZING\_PERIODICITY |  | Amortization Periodicity |  |  |  |
| SECURITY.AMORTIZING\_AMOUNT |  | Amortization Amount |  |  |  |

* Confirm we do not need imported CF
* Confirm DIM fields are tagged on the SECURITY\_POSITION and not on SECURITY.

# 5 Risk Mitigants

The main Instrument tables for deals are COLLATERAL, GUARANTEE, CONTRACT\_GUARANTEE and PRICING\_T\_CDR.

## Summary of Risk Mitigants

Pull the Risk mitigants information from V\_PRICING\_CRM view based on following filters,

* V\_PRICING\_CRM.AS\_OF\_DATE = CONTEXTS.PK\_RD (converted to Date format) where CONTEXTS.WORKSPACE = 'PRICING' and POSITION = 0
* Match the Borrower deals based on BU Dept code of the user to fetch the relevant GUAR\_CONTRACT\_REF values and GUAR\_TABLE\_NAME from CONTRACT\_GUARANTEE table.
* fetch relevant records from COLLATERAL and GUARANTEE table.
* Then return the COLLATERAL and GUARANTEE table information.

**Note : For better performance we may use the direct query while pulling the data into screen in order to join the selected borrower deals with contract\_guarantee table. And then fetching relevant collateral and guarantee references based on BU Dept code. In any case View is provide the guidance on the query and output fields mapped to screen.**

Details of the Screen fields and view...

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Column Name | Display Value  Risk Mitigants | Display Value  Collateral  Record Modal | Display Value  Guarantee Record Modal | UI Data type | Applicable Value | List Display | Required  (Duplicate/  New/  Edit) | RFO  V\_PRICING\_CRM  View  Column Name | RFO  Instrument  Table  COLLATERAL | RFO  Instrument  Table  GUARANTEE |
| as\_of\_date | As of Date |  | As of Date | Date | Auto computed based on the As of Date selected by user. |  | True | AS\_OF\_DATE | PARTITION\_KEY | PARTITION\_KEY |
| crm\_type | CRM Type | Type | Type | String |  | True | True | CRM\_TYPE | 'COLLATERAL' | 'GUARANTEE' |
| simulated | Simulated | Simulated | Simulated | Boolean | Auto computed based on IMPORT\_SOURCE = 'PRICING\_SIMULATION' | True | True | FLAG\_SIMULATED | 'T' if IMPORT\_SOURCE = 'PRICING\_SIMULATION' else 'F' | 'T' if IMPORT\_SOURCE = 'PRICING\_SIMULATION' else 'F' |
| reference | Reference | Reference | Reference | String |  | True | True | REFERENCE | CONTRACT\_REFERENCE | CONTRACT\_REFERENCE |
| contract\_type | Type | Collateral Type | Guarantee Type | String |  | True | True | CONTRACT\_TYPE | CONTRACT\_TYPES.CT\_DESC\_USER  where CONTRACT\_TYPE = CONTRACT\_TYPES.CT\_CODE\_USER | CONTRACT\_TYPES.CT\_DESC\_USER  where CONTRACT\_TYPE = CONTRACT\_TYPES.CT\_CODE\_USER |
| contract\_type\_code | Contract Type Code |  |  | String | Look up into CONTRACT\_TYPES table and derive |  | True | CONTRACT\_TYPE | CONTRACT\_TYPE | CONTRACT\_TYPE |
| crm\_value\_in\_currency |  | Collateral Value | Guarantee Amount | Number |  |  | True | NOMINAL | NOMINAL | NOMINAL |
| currency |  | Currency | Currency | String | Lookup into CURRENCY table and derive CCY\_CODE |  | True | CURRENCY | CURRENCY | CURRENCY |
| value | Value |  |  | Number |  | True |  | VALUE | Join with MKT\_FX\_INPUT table and convert NOMINAL into HKD Currency | Join with MKT\_FX\_INPUT table and convert NOMINAL into HKD Currency |
| guarantee\_percentage |  | Collateral  Percentage | Guarantee  Percentage | Number |  |  | True | GUARANTEE\_PERCENTAGE | GUARANTEE\_PERCENTAGE | GUARANTEE\_PERCENTAGE |
| joint | Joint |  | Joint (Multiple Guarantees) | Boolean | Check if the value is 'T' else un check if the value is 'F' or Blank or Anything else |  | True | FLAG\_JOINT | Hard code to 'F' | DIM20 |
| remark | Remark | Remark | Remark | String |  | True | True | REMARK | ATTRIBUTE\_20 | ATTRIBUTE\_9 |
| link\_to\_borrower |  | Link to Borrower | Link to Borrower | Boolean | Check if the value is 'P' else un check if the value is 'O' or Blank or Anything else |  | True | COLLATERAL\_MODE | COLLATERAL\_MODE | COLLATERAL\_MODE |
| import\_source |  |  |  | String | Auto set to 'PRICING\_SIMULATION' for New/Edited/Duplicated lines |  | True | IMPORT\_SOURCE | IMPORT\_SOURCE | IMPORT\_SOURCE |
| beneficiary |  |  |  |  | Auto set with PRICING\_SIMULATION.SIMULATED\_ENTITY\_CODE value |  | True | BENEFICIARY | BENEFICIARY | BENEFICIARY |
| remaining\_collateral | Remaining Collateral |  |  | Number |  | True |  | REMAINING\_COLLATERAL | Left Join with PRICING\_T\_CDR value to get Remaining Collateral value. Applicable only to COLLATERAL Table. | Hard Code to 0 |

## Risk Mitigants Contracts

Display Summary values for User to link one or more deals with selected Collateral/Guarantee record from V\_PRICING\_DEALS view for selected Simulation ID.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Column Name | Display Value | UI Data type | Applicable Value | List Display | RFO  V\_PRICING\_DEALS  View  Column Name | RFO  Instrument  Table  LOANDEPO | RFO  Instrument  Table  FACILITY | RFO  Instrument  Table  REPO | RFO  Instrument  Table  SECURITY\_POSITIONS |
| contract\_reference | Contract Reference | String |  | True | CONTRACT\_REFERENCE | CONTRACT\_REFERENCE | CONTRACT\_REFERENCE | CONTRACT\_REFERENCE | CONTRACT\_REFERENCE |
| outstanding | Outstanding/Used Amount | Number |  | True | OUTSTANDING | OUTSTANDING | USED\_AMOUNT |  |  |
| currency | Currency | String |  | True | TRADE\_DATE | CURRENCY | TRADE\_DATE | TRADE\_DATE | TRADE\_DATE |

For Selected Deals insert/update records into CONTRACT\_GUARANTEE table as described further,

|  |  |
| --- | --- |
| Source  Column | Value  Insert/Update |
| PARTITION\_KEY | Derived Using As Of Date from CONTEXTS table or using PACK\_CONTEXT api . YYYYMMDD0000 |
| GUAR\_CONTRACT\_REF | V\_PRICING\_CRM.REFERENCE |
| GUAR\_TABLE\_NAME | V\_PRICING\_CRM.CRM\_TYPE |
| BENEF\_CONTRACT\_REF | V\_PRICING\_DEALS.CONTRACT\_REFERENCE |
| BENEF\_TABLE\_NAME | V\_PRICING\_DEALS.INSTRUMENT\_TYPE |
| BENEF\_COUNTERPARTY | PRICING\_SIMULATION.SIMULATED\_ENTITY\_CODE |
| IMPORT\_SOURCE | Hard Code to 'PRICING\_SIMULATION' |
| AMOUNT\_1 | PRICING\_SIMULATION.SIMULATION\_ID |

## CRM Allocation

Pull the information from PRICING\_T\_CDR table to show in this screen as described further,

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Column Name | Display Value | UI Data type | Applicable Value | List Display | RFO  PRICING\_T\_CDR  Table  Column Name |
| as\_of\_date |  | String |  |  | AS\_OF\_DATE |
| simulation\_id |  | Number |  |  | SIMULATION\_ID |
| collateral\_reference | Collateral Ref. | String |  | True | COLLATERAL\_REFERENCE |
| guarantee\_reference | Guarantee Ref. | String |  | True | GUARANTEE\_REFERENCE |
| id | Tranche ID | Number |  | True | ID |
| ead | EAD | Number |  | True | EAD |
| allocated\_amount | Allocated Amount | Number |  | True | ALLOCATED\_AMOUNT |
| remark | Remark | String |  | True | Remark |

Note : PRICING\_T\_CDR table will have many fields in addition to above. Refer to the COLLATERAL\_INPUT.JSON file structure provided with Real-Time ECL Documentation. This table is populated using PACK\_PRICING.CRM\_ALLOCATION procedure.

**CRM Allocation Procedure**

* Purpose : Compute CRM Allocation and refresh PRICING\_T\_CDR table with result. Risk Mitigant Screen needs to populate the
* Pseudo Code TBD By Moody's Partner
* Input Parameters:
  + p\_simulation\_id  (PRICING\_SIMULATION.ID)
  + p\_as\_of\_date (PRICING\_SIMULATION.AS\_OF\_DATE)
  + p\_entity\_code (PRICING\_SIMULATION.EXISTING\_ENTITY\_CODE)
  + p\_simulation\_entity\_code (PRICING\_SIMULATION.SIMULATION\_ENTITY\_CODE)
  + p\_user\_name (PRICING.USER\_NAME)
* Return Successfully if not error Else show full error for User to further rectify with Admin.

## Risk Mitigant Screen User Actions

Always create New record when user Duplicate/Edit/create New borrower Record. Application should not modify the existing data loaded by ETL Batch. following explains the overall flow

**New/Edit/Duplicate Action Flow**

* For New/ Duplicate, Create new record with following keys,
  + <crm\_table>.CONTRACT\_REFERENCE= <provided by user>+'\_'+<simulation\_id>
* For Edit, Create new record with following keys if the selected instrument table record is NOT SIMULATED. heck the IMPORT\_SOURCE = 'PRICING\_SIMULATION' on the record. Else Edit the same record,
  + <crm\_table>.CONTRACT\_REFERENCE= <selected record contract\_reference>+'\_'+<simulation\_id>
* Derive various codes for names entered by user using lookup service.  e.g.
  + CONTRACT\_TYPE from CONTRACT\_TYPES table.
* Set some default attributes
  + <crm\_table>.IMPORT\_SOURCE = 'PRICING\_SIMULATION'
  + <crm\_table>.CHECK\_ERROR\_STATUS = 0
  + <crm\_table>.CHECK\_ERROR\_STATUS\_V = 0
* Save Data into various RFO tables with changes done by user in the modal window.
  + Insert or update into crm\_tables
  + where table can be COLLATERAL / GUARANTEE

# 6 ECL Results

# 7 Pricing Users