

# Bank of Canada Collateral and Pledging Report

Author: Haoze (Will) Song

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Email: [songhaoze6@gmail.com](mailto:songhaoze6@gmail.com)

Tools: SQLite, Excel

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## Background Information

The purpose of this report is to provide the Bank of Canada with data on collateral pledging which is necessary for evaluating linkages between counterparties and activities, as well as determining the magnitude of transactions across various asset classes.

This return is to be completed at the business day frequency. Business days are defined to include all weekdays except federal and provincial statutory holidays. The attached template identifies a selection of rows and columns which are only required to be updated as of month end. Values are required to be reported in these cells for every business day; however, previous values can be carried forward until month end is reached.

The template for this return has been provided in “objectives” section.

### [Definition for asset types]

Level 1 Asset: Government Bond

Level 2 Asset: Non-financial corporate bond/equity, with credit rating between A and AAA.

Level 3 Asset: Financial corporate bond/equity, or non-financial corporate bond/equity with credit rating under A.

## Objectives

Our objective is to fill in the report template as requested by Bank of Canada.

Counterparty Type	Direction	Collateral Type	Level 1 Asset	Level 2 Asset	Level 3 Asset
Domestic Banks	Collateral Received	Initial Margin			
		Variation Margin			
	Collateral Pledged	Initial Margin			
		Variation Margin			
Other Domestic	Collateral Received	Initial Margin			
		Variation Margin			
	Collateral Pledged	Initial Margin			
		Variation Margin			
Foreign Counterparties	Collateral Received	Initial Margin			
		Variation Margin			
	Collateral Pledged	Initial Margin			
		Variation Margin			

Table 1: Final Report Template from Bank of Canada

## Inputs

The inputs provided as following:

## ✓ Collateral transactions as of Jul 2020. ("Collateral\_Transaction.csv")

Process_Dating	Trade_ID	Transaction_Date	Currency	Customer	Encum_St	Product_T	PV	PV_CDE	Encum_Mat_Date	Margin_Ty	Security_ID	Post_Direction	CSA_ID	Quantity
7/31/2020	T16_0016	1/20/2020	KRW	C001	0	Cash	1.74E+08	204000	10/6/2020	Variation	Margin	Deliv to Bank	ABC CSA	
7/31/2020	T16_0033	3/10/2020	USD	C001	0	Cash	89624.27	117000	7/14/2020	Variation	Margin	Deliv to Bank	ABC CSA	
7/31/2020	T16_0045	4/6/2020	GBP	C001	0	Security	67550.08	116676.5	2/6/2021	Variation	G19081101	Deliv to Bank	ABC CSA	8000
7/31/2020	T16_0052	4/29/2020	USD	C001	0	Security	517676.7	675801	2/18/2021	Variation	912828WT3	Deliv to Bank	ABC CSA	7000
7/31/2020	T16_0071	6/7/2020	CAD	C001	0	Security	64526.23	64526.23	9/23/2020	Variation	112585740	Deliv to Cpty	ABC CSA	7000
7/31/2020	T16_0094	7/20/2020	USD	C001	0	Security	142931.3	186589.7	3/17/2021	Initial Mar	146229109	Deliv to Bank	ABC CSA	6000
7/31/2020	T16_0001	1/2/2020	GBP	C002	0	Cash	138369.5	239000	12/13/2020	Variation	Margin	Deliv to Bank	Pear CSA	
7/31/2020	T16_0023	2/20/2020	CAD	C002	100	Security	573317.8	573317.8	1/2/2021	Variation	961148509	Deliv to Cpty	Pear CSA	5000
7/31/2020	T16_0053	4/30/2020	CAD	C002	0	Security	489645	489645	7/18/2020	Variation	S0015	Deliv to Bank	Pear CSA	5000
7/31/2020	T16_0061	5/20/2020	JPY	C002	0	Cash	28997968	371000	9/28/2020	Variation	Margin	Deliv to Bank	Pear CSA	
7/31/2020	T16_0093	7/19/2020	CAD	C002	0	Security	46090.16	46090.16	3/16/2021	Variation	112585740	Deliv to Bank	Pear CSA	5000
7/31/2020	T16_0095	7/20/2020	CAD	C002	0	Security	687981.4	687981.4	7/17/2021	Initial Mar	961148509	Deliv to Bank	Pear CSA	6000
7/31/2020	T16_0004	1/6/2020	USD	C003	100	Security	238218.9	310982.8	3/22/2020	Variation	146229109	Deliv to Bank	IDM CSA	10000
7/31/2020	T16_0005	1/8/2020	CAD	C003	0	Security	413801.7	413801.7	9/29/2020	Variation	699320206	Deliv to Cpty	IDM CSA	8000
7/31/2020	T16_0014	1/18/2020	HKD	C003	100	Security	2586157	435149.3	6/18/2020	Variation	Y14965100	Deliv to Cpty	IDM CSA	10000
7/31/2020	T16_0027	2/28/2020	JPY	C003	0	Cash	25324371	324000	6/13/2020	Initial Margin		Deliv to Bank	IDM CSA	
7/31/2020	T16_0047	4/10/2020	CAD	C003	0	Security	334336	334336	12/21/2020	Variation	960410504	Deliv to Bank	IDM CSA	6000
7/31/2020	T16_0067	6/1/2020	USD	C003	0	Security	666501.2	870084	4/26/2021	Variation	912810E27	Deliv to Cpty	IDM CSA	9000
7/31/2020	T16_0069	6/3/2020	JPY	C003	0	Security	28370379	362970.6	9/1/2020	Variation	S0013	Deliv to Cpty	IDM CSA	6000

Figure I: Collateral transactions source file (sample).

## ✓ Security instrument details. ("Security.csv")

1	Security_ID	Security_ID_2	Issuer	Issuer_Credit_Rating	Industry	Currency	Security_Type	Maturity_date	Issue_Date	Coupon	Price	Factor	MTM_Date	Fixed_Flag
2	00507V109	S0001	ACTIVISION BLIZZARD	BBB-	Software	USD	Equity				76.13	1	7/31/2020	
3	112585740	S0002	BROOKFIELD ASSET											
4	Y14965100	S0003	MANAGEMENT INC	A-	Real Estate	CAD	Equity				86.71	1	7/31/2020	
5	G19081101	S0004	CHINA MOBILE LTD	A	Telecommunications	HKD	Equity				44.63	1	7/31/2020	
6	146229109	S0005	CARNIVAL PLC	BBB+	Leisure Time	GBP	Equity				119.85	1	7/31/2020	
7	699320206	S0006	CARTER'S INC	BB+	Apparel	USD	Equity				31.61	1	7/31/2020	
8	884903105	S0007	PARAMOUNT	B-	Oil&Gas	CAD	Equity				24.25	1	7/31/2020	
9	960410504	S0008	THOMSON REUTERS	BBB+	Media	USD	Equity				93.43	1	7/31/2020	
10	961148509	S0009	WESTJET AIRLINES LTD	BBB-	Airlines	CAD	Equity				50.74	1	7/31/2020	
11	D94523103	S0010	GEORGE WESTON LTD	BBB	Food	CAD	Equity				114.78	1	7/31/2020	
12	094523103	S0011	VOLKSWAGEN AG	BBB+	Auto Manufacturers	EUR	Equity				104.65	1	7/31/2020	
13	D03080112	S0012	ALLIANZ SE	AA-	Insurance	EUR	Equity				66.49	1	7/31/2020	
14	35906A108	S0013	FRONTIER											
15	J1346E100	S0014	COMMUNICATIONS	BB-	Telecommunications	USD	Equity				31.05	1	7/31/2020	
16	135087F66	S0015	FAST RETAILING CO LTD	A	Retail	JPY	Equity				43.38	1	7/31/2020	
17	13508ZHY1	S0016	CANADIAN	AAA	Sovereign	CAD	Bond	6/30/2028	6/30/2008	0.021	98.48	100	7/31/2020 Y	
18	13509PFN8	S0017	CAN 10 1/2 21-STRIP	AAA	Sovereign	CAD	Bond	1/1/2025	1/1/2015	0.018	97.93	100	7/31/2020 Y	
19	UV9949289	S0018	CANADA HOUSING	AAA	Sovereign	CAD	Bond	1/1/2024	1/1/2014	0.031	97.71	100	7/31/2020 Y	
20	6924502M9	S0019	FRANCE (GOVT OF)	AA	Sovereign	EUR	Bond	1/1/2030	1/1/2000	0.06	89.27	100	7/31/2020 Y	
21	912810E27	S0020	UK TSY 4 1/2% 2019	AA+	Sovereign	GBP	Bond	12/31/2029	12/31/1999	0.045	97.04	100	7/31/2020 Y	
22	912828WT3	S0021	US TREASURY N/B	AAA	Sovereign	USD	Bond	3/1/2028	3/1/1998	0.032	96.68	100	7/31/2020 Y	
23			US TREASURY N/B	AAA	Sovereign	USD	Bond	1/1/2042	1/1/2012	0.024	96.54	100	7/31/2020 Y	

Figure II: Security instruments source file (sample).

## ✓ Counterparty details. ("Customer.csv")

	A	B	C	D	E
1	Customer_ID	Customer_Name	Industry	Jurisdiction	Credit_Rating
2	C001	ABC	Energy	Canada	CCC
3	C002	Pear	Technology	US	A
4	C003	IDM	Technology	US	AA
5	C004	IDM	Technology	Canada	AA
6	C005	TB Bank	Financial	Canada	AA
7	C006	JD Morgan	Financial	US	AAA
8	C007	Somy	Technology	Japan	A
9	C008	Maple	Commodity	Canada	B
10	C009	Noba Chem	Chemical	Mexico	BBB
11	C010	Cetegroup	Financial	US	AA

Figure III: Counterparty source file (sample)

## Tools

SQLite Studio, Excel

## Build up

### 1. Import files into SQL

We first create data structures in SQLite and import all .csv files respectively.

The first table, **Col\_Trans**, is named after sources file “Collateral\_Transaction.csv” which contains all collateral transactions details as of July,2020.

```

1 DROP TABLE IF EXISTS Col_Trans;
2 CREATE TABLE Col_Trans (
3     `Process_Date`      TEXT,
4     `Trade_ID`          TEXT,
5     `Transaction_Date`  TEXT,
6     `Currency`         TEXT,
7     `Customer_ID`      TEXT,
8     `Encum_Status`     NUMERIC,
9     `Product_Type`     TEXT,
10    `PV`                DECIMAL(12,2),
11    `PV_CDE`           DECIMAL(12,2),
12    `Encum_Mat_Date`   TEXT,
13    `Margin_Type`      TEXT,
14    `Security_ID`      TEXT,
15    `Post_Direction`   TEXT,
16    `CSA_ID`           TEXT,
17    `Quantity`         NUMERIC
18 );
19

```

Figure 1.1: Col\_Trans table import code.

	Process_Date	Trade_ID	Transaction_Date	Currency	Customer_ID	Encum_Status	Product_Type	PV	PV_CDE	Encum_Mat_Date	Margin_Type	Security_ID	Post_Directio
1	2020-07-31	T16_0016	2020-01-20	KRW	C001	0	Cash	173913043.5	204000	2020-10-06	Variation Margin		Deliv to Bank
2	2020-07-31	T16_0033	2020-03-10	USD	C001	0	Cash	89624.27	117000	2020-07-14	Variation Margin		Deliv to Bank
3	2020-07-31	T16_0045	2020-04-06	GBP	C001	0	Security	67550.08	116676.49	2021-02-06	Variation Margin	G19081101	Deliv to Bank
4	2020-07-31	T16_0052	2020-04-29	USD	C001	0	Security	517676.66	675801	2021-02-18	Variation Margin	912828WT3	Deliv to Bank
5	2020-07-31	T16_0071	2020-06-07	CAD	C001	0	Security	64526.23	64526.23	2020-09-23	Variation Margin	112585740	Deliv to Cpty
6	2020-07-31	T16_0094	2020-07-20	USD	C001	0	Security	142931.33	186589.7	2021-03-17	Initial Margin	146229109	Deliv to Bank
7	2020-07-31	T16_0001	2020-01-02	GBP	C002	0	Cash	138369.52	239000	2020-12-13	Variation Margin		Deliv to Bank
8	2020-07-31	T16_0023	2020-02-20	CAD	C002	100	Security	573317.83	573317.83	2021-01-02	Variation Margin	961148509	Deliv to Cpty
9	2020-07-31	T16_0053	2020-04-30	CAD	C002	0	Security	489645	489645	2020-07-18	Variation Margin	S0015	Deliv to Bank
10	2020-07-31	T16_0061	2020-05-20	JPY	C002	0	Cash	28997967.8	371000	2020-09-28	Variation Margin		Deliv to Bank
11	2020-07-31	T16_0093	2020-07-19	CAD	C002	0	Security	46090.16	46090.16	2021-03-16	Variation Margin	112585740	Deliv to Bank
12	2020-07-31	T16_0095	2020-07-20	CAD	C002	0	Security	687981.39	687981.39	2021-07-17	Initial Margin	961148509	Deliv to Bank
13	2020-07-31	T16_0004	2020-01-06	USD	C003	100	Security	238218.88	310982.83	2020-03-22	Variation Margin	146229109	Deliv to Bank
14	2020-07-31	T16_0005	2020-01-08	CAD	C003	0	Security	413801.66	413801.66	2020-09-29	Variation Margin	699320206	Deliv to Cpty
15	2020-07-31	T16_0014	2020-01-18	HKD	C003	100	Security	2586156.53	435149.28	2020-06-18	Variation Margin	Y14965100	Deliv to Cpty
16	2020-07-31	T16_0027	2020-02-28	JPY	C003	0	Cash	25324370.8	324000	2020-06-13	Initial Margin		Deliv to Bank
17	2020-07-31	T16_0047	2020-04-10	CAD	C003	0	Security	334336.03	334336.03	2020-12-21	Variation Margin	960410504	Deliv to Bank
18	2020-07-31	T16_0067	2020-06-01	USD	C003	0	Security	666501.21	870084	2021-04-26	Variation Margin	912810EZ7	Deliv to Cpty
19	2020-07-31	T16_0069	2020-06-03	JPY	C003	0	Security	28370379.33	362970.63	2020-09-01	Variation Margin	S0013	Deliv to Cpty
20	2020-07-31	T16_0085	2020-07-01	CAD	C003	0	Cash	296000	296000	2021-09-01	Initial Margin		Deliv to Bank
21	2020-07-31	T16_0087	2020-07-08	KRW	C003	0	Cash	404944586.5	475000	2020-11-17	Variation Margin		Deliv to Bank
22	2020-07-31	T16_0092	2020-07-13	JPY	C003	0	Cash	16101297.48	206000	2020-10-15	Variation Margin		Deliv to Bank
23	2020-07-31	T16_0096	2020-07-22	GBP	C003	0	Security	67550.08	116676.49	2021-06-29	Variation Margin	G19081101	Deliv to Cpty
24	2020-07-31	T16_0097	2020-07-23	GBP	C003	0	Cash	94948.12	164000	2021-07-27	Variation Margin		Deliv to Cpty

Figure 1.2: Imported Col\_Trans data in SQL (sample).

The second table we need to import is **Sec**, named after the source file “**Security.csv**”, which contains details of issued securities, where the **primary key** is “**Security\_ID**”

```

31 DROP TABLE IF EXISTS Sec;
32 CREATE TABLE Sec (
33     Security_ID      TEXT,
34     Security_ID_2    TEXT,
35     Issuer           TEXT,
36     Issuer_Credit_Rating TEXT,
37     Industry         TEXT,
38     Currency         TEXT,
39     Security_Type     TEXT,
40     Maturity_date     TEXT,
41     Issue_Date       TEXT,
42     Coupon           TEXT,
43     Price            FLOAT,
44     Factor           TEXT,
45     MTM_Date         TEXT,
46     Fixed_Flag       TEXT,
47     primary key (Security_ID)
48 );

```

Figure 1.3: Sec table import code.

	Security_ID	Security_ID_2	Issuer	Issuer_Credit_Rating	Industry	Currency	Security_Type	Maturity_date	Issue_Date	Coupon	Price	I
1	00507V109	S0001	ACTIVISION BLIZZARD INC	BBB-	Software	USD	Equity				76.13	1
2	112585740	S0002	BROOKFIELD ASSET MANAGEMENT INC	A-	Real Estate	CAD	Equity				86.71	1
3	Y14965100	S0003	CHINA MOBILE LTD	A	Telecommunications	HKD	Equity				44.63	1
4	G19081101	S0004	CARNIVAL PLC	BBB+	Leisure Time	GBP	Equity				119.85	1
5	146229109	S0005	CARTER'S INC	BB+	Apparel	USD	Equity				31.61	1
6	699320206	S0006	PARAMOUNT RESOURCES LTD	B-	Oil&Gas	CAD	Equity				24.25	1
7	884903105	S0007	THOMSON REUTERS CORP	BBB+	Media	USD	Equity				93.43	1
8	960410504	S0008	WESTJET AIRLINES LTD	BBB-	Airlines	CAD	Equity				50.74	1
9	961148509	S0009	GEORGE WESTON LTD	BBB	Food	CAD	Equity				114.78	1
10	D94523103	S0010	VOLKSWAGEN AG	BBB+	Auto Manufacturers	EUR	Equity				104.65	1
11	D03080112	S0011	ALLIANZ SE	AA-	Insurance	EUR	Equity				66.49	1
12	35906A108	S0012	FRONTIER COMMUNICATIONS CORP	BB-	Telecommunications	USD	Equity				31.05	1
13	J1346E100	S0013	FAST RETAILING CO LTD	A	Retail	JPY	Equity				43.38	1
14	135087F66	S0014	CANADIAN GOVERNMENT	AAA	Sovereign	CAD	Bond	2028-06-30	2008-06-30	0.021	98.48	10
15	13508ZHY1	S0015	CAN 10 1/2 21-STRIP	AAA	Sovereign	CAD	Bond	2025-01-01	2015-01-01	0.018	97.93	10
16	13509PFN8	S0016	CANADA HOUSING TRUST	AAA	Sovereign	CAD	Bond	2024-01-01	2014-01-01	0.031	97.71	10
17	UV9949289	S0017	FRANCE (GOVT OF)	AA	Sovereign	EUR	Bond	2030-01-01	2000-01-01	0.06	89.27	10
18	G924502M9	S0018	UK TSY 4 1/2% 2019	AA+	Sovereign	GBP	Bond	2029-12-31	1999-12-31	0.045	97.04	10
19	912810EZ7	S0019	US TREASURY N/B	AAA	Sovereign	USD	Bond	2028-03-01	1998-03-01	0.032	96.68	10
20	912828WT3	S0020	US TREASURY N/B	AAA	Sovereign	USD	Bond	2042-01-01	2012-01-01	0.024	96.54	10

Figure 1.4: Imported Sec table data (sample).

The third table we import is called **Customer**, named after the source file “**Customer.csv**”, which contains all information of business entities, and their credit ratings.

```

1 DROP TABLE IF EXISTS Customer;
2 CREATE TABLE Customer (
3     `Customer_ID`      TEXT,
4     `Customer_Name`    TEXT,
5     `Industry`         TEXT,
6     `Jurisdiction`     TEXT,
7     `CreditRating`     TEXT
8 );

```

Figure 1.5: Customer table import code.

	Customer_ID	Customer_Name	Industry	Jurisdiction	CreditRating
1	C001	ABC	Energy	Canada	CCC
2	C002	Pear	Technology	US	A
3	C003	IDM	Technology	US	AA
4	C004	IDM	Technology	Canada	AA
5	C005	TB Bank	Financial	Canada	AA
6	C006	JD Morgan	Financial	US	AAA
7	C007	Somy	Technology	Japan	A
8	C008	Maple	Commodity	Canada	B
9	C009	Noba Chem	Chemical	Mexico	BBB
10	C010	Cetegroup	Financial	US	AA

Figure 1.6: Imported Customer table data..

## 2. Categorize Counterparty Type for Customers

As we can see in the Table 1:Final Report Template from Bank of Canada , it is requested that all business entities should be organized into 3 major categories in terms of **Counterparty Type**: ‘Domestic Banks’, ‘Other Domestics’ and ‘Foreign Counterparty’.

We can categories them in following conditions:

Counterparty Type	Conditions
<i>Domestic Banks</i>	<b>Jurisdiction</b> is <b>Canada</b> and <b>industry</b> is <b>Financial</b>
<i>Other Domestics</i>	<b>Jurisdiction</b> is <b>Canada</b> and <b>industry</b> is <b>something other than Financial</b>
<i>Foreign Counterparty</i>	<b>Jurisdiction</b> is <b>not Canada</b> , <b>industry</b> is <b>any</b>

Table 2.1:Counterparty Type categorization.

Therefore, we can create a new table **cust2** that contains all data from the **Customer** table and has new column “*cpty\_type*”, in shot of Countryparty Type.




```

CREATE TABLE cust2 as
SELECT
  *,
  CASE
    WHEN jurisdiction = 'Canada' and industry = 'Financial' THEN 'Domestic Banks'
    WHEN jurisdiction = 'Canada' and industry <> 'Financial' THEN 'Other Domestic'
    ELSE 'Foreign Cpty' -- Foreign Counterparty
  END AS cpty_type -- cpty_type (Counterparty Type)
FROM Customer
;

```

Figure 2.1: Code of New table: cust2



	Customer_ID	Customer_Name	Industry	Jurisdiction	CreditRating	cpty_type
1	C001	ABC	Energy	Canada	CCC	Other Domestic
2	C002	Pear	Technology	US	A	Foreign Cpty
3	C003	IDM	Technology	US	AA	Foreign Cpty
4	C004	IDM	Technology	Canada	AA	Other Domestic
5	C005	TB Bank	Financial	Canada	AA	Domestic Banks
6	C006	JD Morgan	Financial	US	AAA	Foreign Cpty
7	C007	Somy	Technology	Japan	A	Foreign Cpty
8	C008	Maple	Commodity	Canada	B	Other Domestic
9	C009	Noba Chem	Chemical	Mexico	BBB	Foreign Cpty
10	C010	Cetegroup	Financial	US	AA	Foreign Cpty

Figure 2.2: View of new table: cust2.

Now, all customers have been assigned with certain counterparty type.

### 3. Classify Asset Level for Securities

According to the Table 1:Final Report Template from Bank of Canada, we are required to classify securities into 3 classes:

**Level 1 Asset:** Government Bond

**Level 2 Asset:** Non-financial corporate bond/equity, with credit rating between A and AAA.

**Level 3 Asset:** Financial corporate bond/equity, or non-financial corporate bond/equity with credit rating under A.

Note that we rank credit ratings from high to low as following:

AAA, AA+, AA, AA-, A+, A, A-, BBB+, BBB, BBB-, BB+, BB, BB-, B+, B, B-, etc.

Therefore, we can create a new table **sec2** that contains all data from the **Security** table and has new column “**asset\_class**”.

```

CREATE TABLE sec2 AS
SELECT
*,
CASE
WHEN industry = 'Sovereign' and security_type = 'Bond' THEN 'Level_1_Asset'
WHEN industry not in ('Finanical', 'Insurance', 'Sovereign')
AND issuer_credit_rating like 'A%'
-- include : A, A+, AA-, AA, AA+, AAA
AND issuer_credit_rating <> 'A-'
-- exclude 'A-' since it is lower than 'A' rating
THEN 'Level_2_Asset'
ELSE 'Level_3_Asset'
END AS asset_class

FROM sec
;

```

Figure 3.1: Code of new table: sec2



	Security_ID	Security_ID_2	Issuer	Issuer_Credit_Rating	Industry	Currency	asset_class
1	00507V109	S0001	ACTIVISION BLIZZARD INC	BBB-	Software	USD	Level_3_Asset
2	112585740	S0002	BROOKFIELD ASSET MANAGEMENT INC	A-	Real Estate	CAD	Level_3_Asset
3	Y14965100	S0003	CHINA MOBILE LTD	A	Telecommunications	HKD	Level_2_Asset
4	G19081101	S0004	CARNIVAL PLC	BBB+	Leisure Time	GBP	Level_3_Asset
5	146229109	S0005	CARTER'S INC	BB+	Apparel	USD	Level_3_Asset
6	699320206	S0006	PARAMOUNT RESOURCES LTD	B-	Oil&Gas	CAD	Level_3_Asset
7	884903105	S0007	THOMSON REUTERS CORP	BBB+	Media	USD	Level_3_Asset
8	960410504	S0008	WESTJET AIRLINES LTD	BBB-	Airlines	CAD	Level_3_Asset
9	961148509	S0009	GEORGE WESTON LTD	BBB	Food	CAD	Level_3_Asset
10	D94523103	S0010	VOLKSWAGEN AG	BBB+	Auto Manufacturers	EUR	Level_3_Asset
11	D03080112	S0011	ALLIANZ SE	AA-	Insurance	EUR	Level_3_Asset
12	35906A108	S0012	FRONTIER COMMUNICATIONS CORP	BB-	Telecommunications	USD	Level_3_Asset
13	J1346E100	S0013	FAST RETAILING CO LTD	A	Retail	JPY	Level_2_Asset
14	135087F66	S0014	CANADIAN GOVERNMENT	AAA	Sovereign	CAD	Level_1_Asset
15	13508ZHY1	S0015	CAN 10 1/2 21-STRIP	AAA	Sovereign	CAD	Level_1_Asset
16	13509PFN8	S0016	CANADA HOUSING TRUST	AAA	Sovereign	CAD	Level_1_Asset
17	UV9949289	S0017	FRANCE (GOVT OF)	AA	Sovereign	EUR	Level_1_Asset
18	G924502M9	S0018	UK TSY 4 1/2% 2019	AA+	Sovereign	GBP	Level_1_Asset
19	912810EZ7	S0019	US TREASURY N/B	AAA	Sovereign	USD	Level_1_Asset
20	912828WT3	S0020	US TREASURY N/B	AAA	Sovereign	USD	Level_1_Asset

Figure 3.2: View of new table sec2

Now, all securities have been assigned with certain asset class from “Level 1 Asset” to “Level 3 Asset”.

#### 4. Obtain More Comprehensive Customer, Security tables using JOIN


If we **INNER JOIN** **cust2** table and **Col\_Trans** table, we will obtain a more comprehensive customer table, **cust\_join**, with all information of collateral transactions and customer name and counterparty type (*cpty\_type*)

```

CREATE TABLE cust_join AS
SELECT
    a.Customer_ID,
    b.Customer_Name,
    a.Process_Date,
    a.Trade_ID,
    a.Transaction_Date,
    a.Product_Type,
    a.Security_ID,
    a.PV_CDE,
    a.Margin_Type,
    a.Post_Direction,
    b.cpty_type
FROM col_trans a
INNER JOIN cust2 b
ON a.customer_id = b.customer_id
;

```

Figure 4.1: Code of new table cust\_join.



Customer_ID	Customer_Name	Process_Date	Trade_ID	Transaction_Date	Product_Type	Security_ID	PV_CDE	Margin_Type	Post_Direction	cpty_type
C001	ABC	2020-07-31	T16_0016	2020-01-20	Cash		204000	Variation Margin	Deliv to Bank	Other Domestic
C001	ABC	2020-07-31	T16_0033	2020-03-10	Cash		117000	Variation Margin	Deliv to Bank	Other Domestic
C001	ABC	2020-07-31	T16_0045	2020-04-06	Security	G19081101	116676.49	Variation Margin	Deliv to Bank	Other Domestic
C001	ABC	2020-07-31	T16_0052	2020-04-29	Security	912828WT3	675801	Variation Margin	Deliv to Bank	Other Domestic
C001	ABC	2020-07-31	T16_0071	2020-06-07	Security	112585740	64526.23	Variation Margin	Deliv to Cpty	Other Domestic
C001	ABC	2020-07-31	T16_0094	2020-07-20	Security	146229109	186589.7	Initial Margin	Deliv to Bank	Other Domestic
C002	Pear	2020-07-31	T16_0001	2020-01-02	Cash		239000	Variation Margin	Deliv to Bank	Foreign Cpty
C002	Pear	2020-07-31	T16_0023	2020-02-20	Security	961148509	573317.83	Variation Margin	Deliv to Cpty	Foreign Cpty
C002	Pear	2020-07-31	T16_0053	2020-04-30	Security	S0015	489645	Variation Margin	Deliv to Bank	Foreign Cpty
C002	Pear	2020-07-31	T16_0061	2020-05-20	Cash		371000	Variation Margin	Deliv to Bank	Foreign Cpty
C002	Pear	2020-07-31	T16_0093	2020-07-19	Security	112585740	46090.16	Variation Margin	Deliv to Bank	Foreign Cpty
C002	Pear	2020-07-31	T16_0095	2020-07-20	Security	961148509	687981.39	Initial Margin	Deliv to Bank	Foreign Cpty
C003	IDM	2020-07-31	T16_0004	2020-01-06	Security	146229109	310982.83	Variation Margin	Deliv to Bank	Foreign Cpty
C003	IDM	2020-07-31	T16_0005	2020-01-08	Security	699320206	413801.66	Variation Margin	Deliv to Cpty	Foreign Cpty
C003	IDM	2020-07-31	T16_0014	2020-01-18	Security	Y14965100	435149.28	Variation Margin	Deliv to Cpty	Foreign Cpty
C003	IDM	2020-07-31	T16_0027	2020-02-28	Cash		324000	Initial Margin	Deliv to Bank	Foreign Cpty
C003	IDM	2020-07-31	T16_0047	2020-04-10	Security	960410504	334336.03	Variation Margin	Deliv to Bank	Foreign Cpty
C003	IDM	2020-07-31	T16_0067	2020-06-01	Security	912810EZ7	870084	Variation Margin	Deliv to Cpty	Foreign Cpty
C003	IDM	2020-07-31	T16_0069	2020-06-03	Security	S0013	362970.63	Variation Margin	Deliv to Cpty	Foreign Cpty

Figure 4.2: Partial view of new table cust\_join, with new columns: Customer\_Name and cpty\_type.

We apply similar ideas on security table: **sec2**, use **cust\_join** table from above **LEFT JOIN sec2** on **Security\_ID**.

In this case we should be aware that NULL values might appear in results, since some customers **may not use securities** (i.e **Product\_Type** < > 'Security') as **collaterals**, therefore the corresponding **Security\_ID** is empty, which will result in **NULL** value in **asset\_class**.

```

SELECT
    a.*,
    b.asset_class as b_asset_class,
    c.asset_class as c_asset_class
FROM cust_join a
LEFT JOIN sec2 b ON a.security_id = b.security_id
LEFT JOIN sec2 c ON a.security_id = c.security_id_2

```

Figure 4.3: Query that may get NULL value in result.

Customer_ID	Customer_Name	Process_Date	Trade_ID	Transaction_Date	Product_Type	Security_ID	PV_CDE	Margin_Type	Post_Direction	cpity_type	b_asset_class	c_asset_class
C001	ABC	2020-07-31	T16_0016	2020-01-20	Cash		204000	Variation Margin	Deliv to Bank	Other Domestic	NULL	NULL
C001	ABC	2020-07-31	T16_0033	2020-03-10	Cash		117000	Variation Margin	Deliv to Bank	Other Domestic	NULL	NULL
C001	ABC	2020-07-31	T16_0045	2020-04-06	Security	G19081101	116676.49	Variation Margin	Deliv to Bank	Other Domestic	Level_3_Asset	NULL
C001	ABC	2020-07-31	T16_0052	2020-04-29	Security	912828WT3	675801	Variation Margin	Deliv to Bank	Other Domestic	Level_1_Asset	NULL
C001	ABC	2020-07-31	T16_0071	2020-06-07	Security	112585740	64526.23	Variation Margin	Deliv to Cpty	Other Domestic	Level_3_Asset	NULL
C001	ABC	2020-07-31	T16_0094	2020-07-20	Security	146229109	186589.7	Initial Margin	Deliv to Bank	Other Domestic	Level_3_Asset	NULL
C002	Pear	2020-07-31	T16_0001	2020-01-02	Cash		239000	Variation Margin	Deliv to Bank	Foreign Cpty	NULL	NULL
C002	Pear	2020-07-31	T16_0023	2020-02-20	Security	961148509	573317.83	Variation Margin	Deliv to Cpty	Foreign Cpty	Level_3_Asset	NULL
C002	Pear	2020-07-31	T16_0053	2020-04-30	Security	S0015	489645	Variation Margin	Deliv to Bank	Foreign Cpty	NULL	Level_1_Asset
C002	Pear	2020-07-31	T16_0061	2020-05-20	Cash		371000	Variation Margin	Deliv to Bank	Foreign Cpty	NULL	NULL
C002	Pear	2020-07-31	T16_0093	2020-07-19	Security	112585740	46090.16	Variation Margin	Deliv to Bank	Foreign Cpty	Level_3_Asset	NULL
C002	Pear	2020-07-31	T16_0095	2020-07-20	Security	961148509	687981.39	Initial Margin	Deliv to Bank	Foreign Cpty	Level_3_Asset	NULL
C003	IDM	2020-07-31	T16_0004	2020-01-06	Security	146229109	310982.83	Variation Margin	Deliv to Bank	Foreign Cpty	Level_3_Asset	NULL
C003	IDM	2020-07-31	T16_0005	2020-01-08	Security	699320206	413801.66	Variation Margin	Deliv to Cpty	Foreign Cpty	Level_3_Asset	NULL
C003	IDM	2020-07-31	T16_0014	2020-01-18	Security	Y14965100	435149.28	Variation Margin	Deliv to Cpty	Foreign Cpty	Level_2_Asset	NULL
C003	IDM	2020-07-31	T16_0027	2020-02-28	Cash		324000	Initial Margin	Deliv to Bank	Foreign Cpty	NULL	NULL
C003	IDM	2020-07-31	T16_0047	2020-04-10	Security	960410504	334336.03	Variation Margin	Deliv to Bank	Foreign Cpty	Level_3_Asset	NULL
C003	IDM	2020-07-31	T16_0067	2020-06-01	Security	912810EZ7	870084	Variation Margin	Deliv to Cpty	Foreign Cpty	Level_1_Asset	NULL
C003	IDM	2020-07-31	T16_0069	2020-06-03	Security	S0013	362970.63	Variation Margin	Deliv to Cpty	Foreign Cpty	NULL	Level_2_Asset

Figure 4.4: NULL value in the result of asset class

To resolve this issue, we use apply **WHERE** and **CASE WHEN** clause to get rows that **Product\_Type** is 'Security' and **Security\_ID** is **NOT NULL**.

```

CREATE TABLE sec_join AS
SELECT
    a.*,
    CASE WHEN b.asset_class is not null THEN b.asset_class
    ELSE c.asset_class
    END AS asset_class
-- coalesce(b.asset_class, c.asset_class) as asset_class
FROM cust_join a
LEFT JOIN sec2 b on a.security_id = b.security_id
LEFT JOIN sec2 c on a.security_id = c.security_id_2
WHERE a.product_type = 'Security'
;

```

Figure 4.5: Query to deal with NULL values when JOIN tables

Alternatively, we can also choose **Coalesce** function to replace **CASE WHEN** clause when dealing with NULL values, which yields the same result.

```

create table sec_join_1 as
select
    a.*,
    coalesce(b.asset_class, c.asset_class) as asset_class
from cust_join a
left join sec2 b on a.security_id = b.security_id
left join sec2 c on a.security_id = c.security_id_2
where a.product_type = 'Security'
;

```

Figure 4.5.1: Use 'Coalesce' function to replace CASE WHEN clause.



	Customer_ID	Customer_Name	Process_Date	Trade_ID	Transaction_Date	Product_Type	Security_ID	PV_CDE	Margin_Type	Post_Direction	cpty_type	asset_class
1	C001	ABC	2020-07-31	T16_0045	2020-04-06	Security	G19081101	116676.49	Variation Margin	Deliv to Bank	Other Domestic	Level_3_Asset
2	C001	ABC	2020-07-31	T16_0052	2020-04-29	Security	912828WT3	675801	Variation Margin	Deliv to Bank	Other Domestic	Level_1_Asset
3	C001	ABC	2020-07-31	T16_0071	2020-06-07	Security	112585740	64526.23	Variation Margin	Deliv to Cpty	Other Domestic	Level_3_Asset
4	C001	ABC	2020-07-31	T16_0094	2020-07-20	Security	146229109	186589.7	Initial Margin	Deliv to Bank	Other Domestic	Level_3_Asset
5	C002	Pear	2020-07-31	T16_0023	2020-02-20	Security	961148509	573317.83	Variation Margin	Deliv to Cpty	Foreign Cpty	Level_3_Asset
6	C002	Pear	2020-07-31	T16_0053	2020-04-30	Security	S0015	489645	Variation Margin	Deliv to Bank	Foreign Cpty	Level_1_Asset
7	C002	Pear	2020-07-31	T16_0093	2020-07-19	Security	112585740	46090.16	Variation Margin	Deliv to Bank	Foreign Cpty	Level_3_Asset
8	C002	Pear	2020-07-31	T16_0095	2020-07-20	Security	961148509	687981.39	Initial Margin	Deliv to Bank	Foreign Cpty	Level_3_Asset
9	C003	IDM	2020-07-31	T16_0004	2020-01-06	Security	146229109	310982.83	Variation Margin	Deliv to Bank	Foreign Cpty	Level_3_Asset
10	C003	IDM	2020-07-31	T16_0005	2020-01-08	Security	699320206	413801.66	Variation Margin	Deliv to Cpty	Foreign Cpty	Level_3_Asset
11	C003	IDM	2020-07-31	T16_0014	2020-01-18	Security	Y14965100	435149.28	Variation Margin	Deliv to Cpty	Foreign Cpty	Level_2_Asset
12	C003	IDM	2020-07-31	T16_0047	2020-04-10	Security	960410504	334336.03	Variation Margin	Deliv to Bank	Foreign Cpty	Level_3_Asset
13	C003	IDM	2020-07-31	T16_0067	2020-06-01	Security	912810EZ7	870084	Variation Margin	Deliv to Cpty	Foreign Cpty	Level_1_Asset
14	C003	IDM	2020-07-31	T16_0069	2020-06-03	Security	S0013	362970.63	Variation Margin	Deliv to Cpty	Foreign Cpty	Level_2_Asset
15	C003	IDM	2020-07-31	T16_0096	2020-07-22	Security	G19081101	116676.49	Variation Margin	Deliv to Cpty	Foreign Cpty	Level_3_Asset
16	C004	IDM	2020-07-31	T16_0013	2020-01-13	Security	G924502M9	873387	Variation Margin	Deliv to Bank	Other Domestic	Level_1_Asset
17	C004	IDM	2020-07-31	T16_0051	2020-04-28	Security	912810EZ7	870084	Variation Margin	Deliv to Cpty	Other Domestic	Level_1_Asset
18	C004	IDM	2020-07-31	T16_0064	2020-05-26	Security	D03080112	130307.56	Variation Margin	Deliv to Cpty	Other Domestic	Level_3_Asset
19	C004	IDM	2020-07-31	T16_0100	2020-07-30	Security	13509PFN8	488570	Variation Margin	Deliv to Bank	Other Domestic	Level_1_Asset
20	C005	TB Bank	2020-07-31	T16_0012	2020-01-12	Security	S0013	423465.74	Variation Margin	Deliv to Bank	Domestic Banks	Level_2_Asset
21	C005	TB Bank	2020-07-31	T16_0070	2020-06-04	Security	D94523103	146451.24	Variation Margin	Deliv to Bank	Domestic Banks	Level_3_Asset
22	C005	TB Bank	2020-07-31	T16_0072	2020-06-08	Security	13509PFN8	879426	Variation Margin	Deliv to Bank	Domestic Banks	Level_1_Asset
23	C005	TB Bank	2020-07-31	T16_0088	2020-07-10	Security	S0015	685503	Variation Margin	Deliv to Cpty	Domestic Banks	Level_1_Asset
24	C005	TB Bank	2020-07-31	T16_0099	2020-07-28	Security	S0015	587574	Variation Margin	Deliv to Bank	Domestic Banks	Level_1_Asset
25	C006	JD Morgan	2020-07-31	T16_0018	2020-01-30	Security	884903105	131059.46	Variation Margin	Deliv to Bank	Foreign Cpty	Level_3_Asset

Figure 4.6: Partial view of new table Sec\_join

## 5. Obtain Requested Data for the Final Report

From **Sec\_join** table we just obtained, we can calculate the total value of assets when group by Counterparty\_Type (**cpty\_type**), Direction (**post\_direction**) and Margin\_Type (**margin\_type**).

To keep simplicity, we **ROUND** the sum to 2 decimals. And that is our new table: **output**

```

CREATE TABLE output AS
SELECT
    cpty_type,
    CASE
        WHEN post_direction = 'Deliv to Bank' THEN 'Collateral Received'
        ELSE 'Collateral Pledged'
    END AS Direction,
    margin_type,
    ROUND(sum(CASE WHEN asset_class = 'Level_1_Asset' THEN pv_cde ELSE 0 END),2) Level_1_Asset,
    ROUND(sum(CASE WHEN asset_class = 'Level_2_Asset' THEN pv_cde ELSE 0 END),2) Level_2_Asset,
    ROUND(sum(CASE WHEN asset_class = 'Level_3_Asset' THEN pv_cde ELSE 0 END),2) Level_3_Asset
FROM sec_join
GROUP BY cpty_type, Direction, margin_type
ORDER BY cpty_type, Direction, margin_type

```

Figure 5.1: Query to calculate total value of assets, new table: output

	cpty_type	Direction	margin_type	Level_1_Asset	Level_2_Asset	Level_3_Asset
1	Domestic Banks	Collateral Pledged	Variation Margin	685503	0	0
2	Domestic Banks	Collateral Received	Variation Margin	1467000	423465.74	146451.24
3	Foreign Cpty	Collateral Pledged	Variation Margin	2233383	1798963.27	2671443.16
4	Foreign Cpty	Collateral Received	Initial Margin	772344	0	760904.2
5	Foreign Cpty	Collateral Received	Variation Margin	1841247	348119.43	1935487.81
6	Other Domestic	Collateral Pledged	Variation Margin	870084	1028416.79	967939.38
7	Other Domestic	Collateral Received	Initial Margin	0	0	186589.7
8	Other Domestic	Collateral Received	Variation Margin	2919119	362970.63	933774.3

Figure 5.2: View of value of assets for each group, table: output

## 6. Generate Identical Structure as the Final Report

Presumably, we can write a query like below to generate the structure:

```

create table struct_temp as
select
    a.cpty_type,
    b.direction,
    c.margin_type
from (select distinct cpty_type from output) a
cross join (select distinct direction from output) b
cross join (select distinct margin_type from output) c
order by a.cpty_type, b.direction desc, c.margin_type

```

Figure 6.1: Query to generate struct\_temp that is not perfectly matched with requested.

We get:



cpty_type	direction	margin_type
Domestic Banks	Collateral Received	Initial Margin
Domestic Banks	Collateral Received	Variation Margin
Domestic Banks	Collateral Pledged	Initial Margin
Domestic Banks	Collateral Pledged	Variation Margin
Foreign Cpty	Collateral Received	Initial Margin
Foreign Cpty	Collateral Received	Variation Margin
Foreign Cpty	Collateral Pledged	Initial Margin
Foreign Cpty	Collateral Pledged	Variation Margin
Other Domestic	Collateral Received	Initial Margin
Other Domestic	Collateral Received	Variation Margin
Other Domestic	Collateral Pledged	Initial Margin
Other Domestic	Collateral Pledged	Variation Margin

Figure 6.2: View of struct\_temp

Counterparty Type	Direction	Collateral Type
Domestic Banks	Collateral	Initial Margin
	Received	Variation Margin
	Collateral	Initial Margin
	Pledged	Variation Margin
Other Domestic	Collateral	Initial Margin
	Received	Variation Margin
	Collateral	Initial Margin
	Pledged	Variation Margin
Foreign Counterparties	Collateral	Initial Margin
	Received	Variation Margin
	Collateral	Initial Margin
	Pledged	Variation Margin

Figure 6.3: Form required by Bank of Canada

From above we can clearly observe that two form are **slightly different** in terms of **order of** Counterparty Type (*cpty\_tyep*) column.

Now, if we want to construct an **identical structure** as the Table 1:Final Report Template from Bank of Canada shows, we can generate 2 sub-parts: *struct\_1* and *struct\_2*, then use **UNION ALL** to get the ultimate form *struct*.

#### *Struct\_1*:

```

--- In order to generate the EXACT SAME structure as the final report,
--- we need to break it down to 2 separate tables,
--- then use UNION ALL to get the desired table
CREATE TABLE struct_1 as
SELECT
    a.cpty_type,
    b.direction,
    c.margin_type
FROM (SELECT distinct cpty_type FROM output) a
CROSS JOIN (SELECT distinct direction FROM output) b
CROSS JOIN (SELECT distinct margin_type FROM output) c
WHERE cpty_type in ('Domestic Banks','Other Domestic')
ORDER BY a.cpty_type, b.direction desc, c.margin_type
;
```

Figure 6.4: Query of sub-part 1: table struct\_1

	<b>cpty_type</b>	<b>direction</b>	<b>margin_type</b>
1	Domestic Banks	Collateral Received	Initial Margin
2	Domestic Banks	Collateral Received	Variation Margin
3	Domestic Banks	Collateral Pledged	Initial Margin
4	Domestic Banks	Collateral Pledged	Variation Margin
5	Other Domestic	Collateral Received	Initial Margin
6	Other Domestic	Collateral Received	Variation Margin
7	Other Domestic	Collateral Pledged	Initial Margin
8	Other Domestic	Collateral Pledged	Variation Margin

Figure 6.5: View of table: struct\_1

**Struct\_2:**

```

CREATE TABLE struct_2 as
SELECT
    a.cpty_type,
    b.direction,
    c.margin_type
FROM (SELECT distinct cpty_type FROM output) a
CROSS JOIN (SELECT distinct direction FROM output) b
CROSS JOIN (SELECT distinct margin_type FROM output) c
WHERE cpty_type = 'Foreign Cpty'
ORDER BY a.cpty_type,b.direction desc, c.margin_type
;

```

Figure 6.6: Query of sub-part2 : struct\_2

	<b>cpty_type</b>	<b>direction</b>	<b>margin_type</b>
1	Foreign Cpty	Collateral Received	Initial Margin
2	Foreign Cpty	Collateral Received	Variation Margin
3	Foreign Cpty	Collateral Pledged	Initial Margin
4	Foreign Cpty	Collateral Pledged	Variation Margin

Figure 6.7: View of table: struct\_2

Finally, put 2 tables together using **UNION ALL**

**Struct:**

```

---This gives the EXACT SAME structure as the Bank of Canada requested
CREATE TABLE struct as
SELECT *
from struct_1
UNION ALL
SELECT *
FROM struct_2;

```

Figure 6.8: Query to UNION 2 sub-parts, get struct



	cpty_type	direction	margin_type	Counterparty Type	Direction	Collateral Type
1	Domestic Banks	Collateral Received	Initial Margin	Domestic Banks	Collateral Received	Initial Margin
2	Domestic Banks	Collateral Received	Variation Margin			Variation Margin
3	Domestic Banks	Collateral Pledged	Initial Margin		Collateral Pledged	Initial Margin
4	Domestic Banks	Collateral Pledged	Variation Margin			Variation Margin
5	Other Domestic	Collateral Received	Initial Margin	Other Domestic	Collateral Received	Initial Margin
6	Other Domestic	Collateral Received	Variation Margin			Variation Margin
7	Other Domestic	Collateral Pledged	Initial Margin		Collateral Pledged	Initial Margin
8	Other Domestic	Collateral Pledged	Variation Margin			Variation Margin
9	Foreign Cpty	Collateral Received	Initial Margin	Foreign Counterparties	Collateral Received	Initial Margin
10	Foreign Cpty	Collateral Received	Variation Margin			Variation Margin
11	Foreign Cpty	Collateral Pledged	Initial Margin		Collateral Pledged	Initial Margin
12	Foreign Cpty	Collateral Pledged	Variation Margin			Variation Margin

Figure 6.9: Exact same structure as requested. Table: struct

We now have the identical structure as the template given by Bank of Canada.

## 7. Final Report

Finally, we now have the **final structure** table: **struct**, and the table contains all **desired data**: **output**. We now combine them using **LEFT JOIN** and **'Coalesce'** function to get the desired report by Bank of Canada.

```

CREATE TABLE col_trans_report AS
SELECT
    a.cpty_type AS 'Counterparty Type',
    a.direction as Direction,
    a.margin_type AS 'Collateral Type',
    coalesce(b.Level_1_Asset, 0) Level_1_Asset,
    coalesce(b.Level_2_Asset, 0) Level_2_Asset,
    coalesce(b.Level_3_Asset, 0) Level_3_Asset
FROM struct a
LEFT JOIN output b
on a.cpty_type = b.cpty_type
and a.direction = b.direction
and a.margin_type = b.margin_type
;

```

Figure 7.1: Query to combine data and structure to get desired table: col\_trans\_report

Counterparty Type	Direction	Collateral Type	Level_1_Asset	Level_2_Asset	Level_3_Asset
Domestic Banks	Collateral Received	Initial Margin	0	0	0
Domestic Banks	Collateral Received	Variation Margin	1467000	423465.74	146451.24
Domestic Banks	Collateral Pledged	Initial Margin	0	0	0
Domestic Banks	Collateral Pledged	Variation Margin	685503	0	0
Other Domestic	Collateral Received	Initial Margin	0	0	186589.7
Other Domestic	Collateral Received	Variation Margin	2919119	362970.63	933774.3
Other Domestic	Collateral Pledged	Initial Margin	0	0	0
Other Domestic	Collateral Pledged	Variation Margin	870084	1028416.79	967939.38
Foreign Cpty	Collateral Received	Initial Margin	772344	0	760904.2
Foreign Cpty	Collateral Received	Variation Margin	1841247	348119.43	1935487.81
Foreign Cpty	Collateral Pledged	Initial Margin	0	0	0
Foreign Cpty	Collateral Pledged	Variation Margin	2233383	1798963.27	2671443.16

Figure 7.2: Final report table: col\_trans\_report

Hence, we have completed the Bank of Canada Collateral and Pledging Report.