

1 Mode

You can manage your credit exposures in one of two modes:

- **Credit Carve-out:** You manage credit in Integral. This is the default mode and provides the best performance in terms of transaction processing.

**NOTE:** The credit examples and methodologies in this document are available only in the Integral Credit Service.

- **Credit Integration:** You integrate your in-house credit system with Integral via the Credit Web API. If your API connection is interrupted, Integral allows trades to the latest credit limit update and then suspends trading until the next credit update. To use this mode, please contact your Integral Technical Account Manager.

2 Methodology

In Credit Carve-out mode, you can choose from the following credit methodologies:

- [Net receivable](#) on page 2
- [Gross settlement](#) on page 5
- [Net settlement](#) on page 8
- [Net settlement \(P/R\)](#) on page 11
- [Net settlement-receivable only](#) on page 14

3 Horizon and Value Dates

The credit horizon is the period of time in which value dates are considered by the credit process:

- Aggregate: All future value dates.
- Daily: Each open value date within a certain range.
- Aggregate of daily: Each open value date, then all dates summed into one aggregate value.

Not all horizons apply to all methodologies:

	Aggregate	Daily	Aggregate of Daily
Gross Settlement			
Net Settlement			
Net Settlement (P/R)			
Net Receivable			

4 Potential Future Exposure (PFE) Coefficients

You can define potential future exposure (PFE) coefficients by tenor and currency pair to adjust a counterparty’s credit utilization. PFE coefficients can be applied to any credit methodology.

- [Potential future exposure \(PFE\) credit coefficients](#) on page 17
- [PFE example: net receivable](#) on page 19

## 5 Net receivable

**NOTE:** All examples are from the maker's perspective: trade direction (buy/sell), credit obligation (receivable/payable), and position (long/short).

### 5.1 Summary

Amounts of both base and term currencies are considered, as well as the position direction (buy or sell), to calculate the total receivable as the credit utilization.

**Limit currency:** USD

**Credit horizon:**

- Daily: Each open value date.
- Aggregate of daily: Each open value date and then summed.

**Process:**

1. Look at the net amount that the maker is long in for each individual currency for each open value date (daily) or each open value date and then summed (aggregate of daily).
2. Convert exposure for each currency to the limit currency (USD) using real-time Integral rates.
3. Total of all short (receivable) positions is the credit utilization.

### 5.2 Trades

Deal ID	Trade Date	Maker Buy/Sell	CCY Pair	Base Amount	Rate	Term Amount	Value Date
FXI1048722750	2/23/2021	Buy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	2/25/2021
FXI1048321606	2/22/2021	Sell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	2/24/2021
FXI1048017848	2/22/2021	Buy	EUR/USD	2,000,000.00	1.10555	2,211,100.00	2/24/2021
FXI1049291364	2/23/2021	Buy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	2/25/2021
FXI1048808961	2/23/2021	Buy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	2/25/2021
FXI1049291426	2/23/2021	Buy	GBP/USD	1,000,000.00	1.40241	1,402,410.00	2/25/2021
FXI1048808251	2/23/2021	Sell	GBP/USD	3,000,000.00	1.41347	4,240,410.00	2/25/2021
FXI1048116191	2/22/2021	Buy	GBP/USD	2,000,000.00	1.41173	2,823,460.00	2/24/2021

### 5.3 Position per currency

1. Look at the net amount that the maker is long in for each individual currency.
2. Convert exposure for each currency to the limit currency (USD) using real-time Integral rates.

EUR

EOD Rate: EUR/USD bid/offer 1.10196/1.10201

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	EUR Amount
FXI1048321606	Sell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	3,000,000.00
FXI1048017848	Buy	EUR/USD	2,000,000.00	110.555	2,211,100.00	(2,000,000.00)
FXI1048722750	Buy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	(3,000,000.00)
EUR position						(2,000,000.00)
EUR position in USD				EUR (2,000,000.00) @ 110.201	USD (2,204,020.00)	

## GBP

EOD Rate: GBP/USD bid/offer 1.40222/1.40242

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	GBP Amount
FXI1048808251	Sell	GBP/USD	3,000,000.00	141.347	4,240,410.00	3,000,000.00
FXI1048116191	Buy	GBP/USD	2,000,000.00	141.173	2,823,460.00	(2,000,000.00)
FXI1048722750	Buy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	2,348,250.00
FXI1048808961	Buy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	(2,000,000.00)
FXI1049291364	Buy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	(2,000,000.00)
FXI1049291426	Buy	GBP/USD	1,000,000.00	140.241	1,402,410.00	(1,000,000.00)
GBP position						(1,651,750.00)
GBP position in USD				GBP (1,651,750.00) @ 140.242	USD (2,316,447.24)	

## JPY (payable amount not used)

EOD Rate: USD/JPY bid/offer 112.028/112.036

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	JPY Amount
FXI1048321606	Sell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	(373,959,000.00)
FXI1048808961	Buy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	316,094,000.00
FXI1049291364	Buy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	314,666,000.00
JPY position						256,801,000.00
JPY position in USD				JPY 256,801,000.00 @ 112.036	USD 2,292,129.32	

## USD (payable amount not used)

EOD Rate: USD/USD bid/offer 1.0000/1.0000

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	USD Amount
FXI1048808251	Sell	GBP/USD	3,000,000.00	141.347	4,240,410.00	(4,240,410.00)

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	USD Amount
FX11048017848	Buy	EUR/USD	2,000,000.00	110555	2,211,100.00	2,211,100.00
FX11048116191	Buy	GBP/USD	2,000,000.00	141173	2,823,460.00	2,823,460.00
FX11049291426	Buy	GBP/USD	1,000,000.00	140241	1,402,410.00	1,402,410.00
USD position						2,196,560.00
USD position in USD				USD 2,196,560.00 @ 10000	USD 2,196,560.00	

5.4 Utilization

3. Total of all maker long (receivable) positions is the credit utilization.

Receivable	
From EUR position	USD (2,204,020.00)
From GBP position	USD (2,316,447.24)
Total	(4,520,467.24)
Absolute Value	4,520,467.24
Credit Utilization	4,520,467.24

## 6 Gross settlement

**NOTE:** All examples are from the maker's perspective: trade direction (buy/sell), credit obligation (receivable/payable), and position (long/short).

### 6.1 Summary

Only the total notional amount equivalent in the limit currency is considered. Position direction (buy or sell) is ignored.

**Limit currency:** USD

**Credit horizon:**

- Aggregate: All open value dates.
- Daily: Each open value date.

**Process:**

1. For trades that include the limit currency as base or term (USD in this example), total the amount in USD regardless of payable or receivable for all open value dates (aggregate) or for each value date (daily).
2. If USD is not part of the currency pair, convert the total receivable amount (amount maker is long) to USD using real-time Integral rates.
3. Sum all direct and converted USD amounts.
4. The total USD amount is the gross credit utilization.

### 6.2 Trades

Deal ID	Trade Date	Maker Buy/Sell	CCY Pair	Base Amount	Rate	Term Amount	Value Date
FXI1048722750	2/23/2021	Buy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	2/25/2021
FXI1048321606	2/22/2021	Sell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	2/24/2021
FXI1048017848	2/22/2021	Buy	EUR/USD	2,000,000.00	1.10555	2,211,100.00	2/24/2021
FXI1049291364	2/23/2021	Buy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	2/25/2021
FXI1048808961	2/23/2021	Buy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	2/25/2021
FXI1049291426	2/23/2021	Buy	GBP/USD	1,000,000.00	1.40241	1,402,410.00	2/25/2021
FXI1048808251	2/23/2021	Sell	GBP/USD	3,000,000.00	1.41347	4,240,410.00	2/25/2021
FXI1048116191	2/22/2021	Buy	GBP/USD	2,000,000.00	1.41173	2,823,460.00	2/24/2021

### 6.3 Position per currency

1. For trades that include the limit currency as base or term (USD in this example), total the amount in USD regardless of payable or receivable.
2. If USD is not part of the currency pair, convert the total receivable amount (amount maker is long) to USD using real-time Integral rates.

## USD

EOD Rate: USD/USD bid/offer 1.00000/1.00000

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	USD Amount
FXI1048017848	Buy	EUR/USD	2,000,000.00	110555	<b>2,211,100.00</b>	2,211,100.00
FXI1049291426	Buy	GBP/USD	1,000,000.00	140241	<b>1,402,410.00</b>	1,402,410.00
FXI1048808251	Sell	GBP/USD	3,000,000.00	141347	<b>4,240,410.00</b>	4,240,410.00
FXI1048116191	Buy	GBP/USD	2,000,000.00	141173	<b>2,823,460.00</b>	2,823,460.00
USD position						10,677,380.00
USD position in USD				USD 10,677,380.00	@ 1.00000	<b>USD 10,677,380.00</b>

## EUR

EOD Rate: EUR/USD bid/offer 1.10196/1.10201

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	EUR Amount
FXI1048722750	Buy	EUR/GBP	<b>3,000,000.00</b>	0.78275	2,348,250.00	3,000,000.00
EUR position						3,000,000.00
EUR position in USD				EUR 3,000,000.00	@ 1.10201	<b>USD 2,722,298.35</b>

## JPY

EOD Rate: USD/JPY bid/offer 112.028/112.036

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	JPY Amount
FXI1048321606	Sell	EUR/JPY	3,000,000.00	124.653	<b>373,959,000.00</b>	373,959,000.00
JPY position						373,959,000.00
JPY position in USD				JPY 373,959,000.00	@ 112.036	<b>USD 3,337,846.76</b>

## GBP

EOD Rate: GBP/USD bid/offer 1.40222/1.40242

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	GBP Amount
FXI1049291364	Buy	GBP/JPY	<b>2,000,000.00</b>	157.333	314,666,000.00	2,000,000.00
FXI1048321606	Buy	GBP/JPY	<b>2,000,000.00</b>	158.047	316,094,000.00	2,000,000.00
GBP position						4,000,000.00
GBP position in USD				GBP 4,000,000.00	@ 1.40242	<b>USD 2,852,212.60</b>

6.4 Utilization

- 1. Add all direct and converted USD amounts.
- 2. The total USD amount is the gross credit utilization.

Total Gross Position	
From USD position	USD 10,677,380.00
From EUR position	USD 2,722,298.35
From JPY position	USD 3,337,846.76
From GBP position	USD 2,852,212.60
Aggregate Credit Utilization	USD 19,589,737.71

## 7 Net settlement

**NOTE:** All examples are from the maker's perspective: trade direction (buy/sell), credit obligation (receivable/payable), and position (long/short).

### 7.1 Summary

Amounts of both base and term currencies are considered, as well as the position direction (buy or sell), to calculate the total payable and receivable. The larger amount, either receivable or payable, is the credit utilization.

**Limit currency:** USD

**Credit horizon:**

**Aggregate:** All open value dates.

**Process:**

1. Look at the net amount that the maker is long or short in for each individual currency for all open value dates.
2. Convert exposure for each currency to USD using real-time Integral rates.
3. Sum all long positions (payable).
4. Sum all short positions (receivable).
5. The larger of the two position totals is considered the higher risk and is the credit utilization.

### 7.2 Trades

Deal ID	Trade Date	Maker Buy/Sell	CCY Pair	Base Amount	Rate	Term Amount	Value Date
FXI1048722750	2/23/2021	Buy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	2/25/2021
FXI1048321606	2/22/2021	Sell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	2/24/2021
FXI1048017848	2/22/2021	Buy	EUR/USD	2,000,000.00	110.555	2,211,100.00	2/24/2021
FXI1049291364	2/23/2021	Buy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	2/25/2021
FXI1048808961	2/23/2021	Buy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	2/25/2021
FXI1049291426	2/23/2021	Buy	GBP/USD	1,000,000.00	140.241	1,402,410.00	2/25/2021
FXI1048808251	2/23/2021	Sell	GBP/USD	3,000,000.00	141.347	4,240,410.00	2/25/2021
FXI1048116191	2/22/2021	Buy	GBP/USD	2,000,000.00	141.173	2,823,460.00	2/24/2021

### 7.3 Position per currency

1. Look at the net amount that the customer is long or short in for each individual currency.
2. Convert exposure for each currency to USD using real-time Integral rates.

EUR



EOD Rate: EUR/USD bid/offer 1.10196/1.10201

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	EUR Amount
FXI1048321606	Sell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	3,000,000.00
FXI1048017848	Buy	EUR/USD	2,000,000.00	110555	2,211,100.00	(2,000,000.00)
FXI1048722750	Buy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	(3,000,000.00)
EUR Position						(2,000,000.00)
EUR Position in USD				EUR (2,000,000.00) @ 110201	USD (2,204,020.00)	

## GBP

EOD Rate: GBP/USD bid/offer 1.40222/1.40242

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	GBP Amount
FXI1048808251	Sell	GBP/USD	3,000,000.00	141347	4,240,410.00	3,000,000.00
FXI1048116191	Buy	GBP/USD	2,000,000.00	141173	2,823,460.00	(2,000,000.00)
FXI1048722750	Buy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	2,348,250.00
FXI1048808961	Buy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	(2,000,000.00)
FXI1049291364	Buy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	(2,000,000.00)
FXI1049291426	Buy	GBP/USD	1,000,000.00	140241	1,402,410.00	(1,000,000.00)
GBP Position						(1,651,750.00)
GBP Position in USD				GBP (1,651,750.00) @ 140242	USD (2,316,447.24)	

## JPY

EOD Rate: USD/JPY bid/offer 112.028/112.036

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	JPY Amount
FXI1048321606	Sell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	(373,959,000.00)
FXI1048808961	Buy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	316,094,000.00
FXI1049291364	Buy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	314,666,000.00
JPY Position						256,801,000.00
JPY Position in USD				JPY 256,801,000.00 @ 112.036	USD 2,292,129.32	

USD

EOD Rate: USD/USD bid/offer 1.0000/1.0000

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	USD Amount
FXI1048808251	Sell	GBP/USD	3,000,000.00	141347	4,240,410.00	(4,240,410.00)
FXI1048017848	Buy	EUR/USD	2,000,000.00	110555	2,211,100.00	2,211,100.00
FXI1048116191	Buy	GBP/USD	2,000,000.00	141173	2,823,460.00	2,823,460.00
FXI1049291426	Buy	GBP/USD	1,000,000.00	140241	1,402,410.00	1,402,410.00
USD Position						2,196,560.00
USD Position in USD				USD 2,196,560.00 @ 10000	USD 2,196,560.00	

7.4 Utilization

- 3. Sum all long positions (payable).
- 4. Sum all short positions (receivable).
- 5. The larger of the two position totals is considered the higher risk and is the credit utilization.

	Receivable	Payable
From EUR position	USD (2,204,020.00)	
From GBP position	USD (2,316,447.24)	
From JPY position		USD 2,292,129.32
From USD position		USD 2,196,560.00
Total	(4,520,467.24)	4,488,689.32
Absolute Value	4,520,467.24	4,488,689.32
Credit Utilization	4,520,467.24	

## 8 Net settlement (P/R)

**NOTE:** All examples are from the maker's perspective: trade direction (buy/sell), credit obligation (receivable/payable), and position (long/short).

### 8.1 Summary

Amounts of both base and term currencies are considered, as well as the position direction (buy or sell), to calculate the total payable and receivable. Amounts in the limit currency are ignored. The sum of the absolute value of receivable and payable is the credit utilization.

**Limit currency:** USD

**Credit horizon:**

Aggregate: All open value dates.

**Process:**

1. Look at the net amount that the maker is long or short in for each individual currency *except for the limit currency (USD)* for all open value dates.
2. Convert exposure for each currency to USD using real-time Integral rates.
3. Sum all long positions (payable).
4. Sum all short positions (receivable).
5. The sum of the absolute value of the two position totals is the credit utilization.

### 8.2 Trades

Deal ID	Trade Date	Maker Buy/Sell	CCY Pair	Base Amount	Rate	Term Amount	Value Date
FXI1048722750	2/23/2021	SellBuy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	2/25/2021
FXI1048321606	2/22/2021	BuySell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	2/24/2021
FXI1048017848	2/22/2021	SellBuy	EUR/USD	2,000,000.00	110555	2,211,100.00	2/24/2021
FXI1049291364	2/23/2021	SellBuy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	2/25/2021
FXI1048808961	2/23/2021	SellBuy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	2/25/2021
FXI1049291426	2/23/2021	SellBuy	GBP/USD	1,000,000.00	1.40241	1,402,410.00	2/25/2021
FXI1048808251	2/23/2021	BuySell	GBP/USD	3,000,000.00	1.41347	4,240,410.00	2/25/2021
FXI1048116191	2/22/2021	SellBuy	GBP/USD	2,000,000.00	1.41173	2,823,460.00	2/24/2021

### 8.3 Position per currency

1. Look at the net amount that the customer is long or short in for each individual currency *except for the limit currency (USD)*.
2. Convert exposure for each currency to USD using real-time Integral rates.

## EUR

EOD Rate: EUR/USD bid/offer 1.10196/1.10201

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	EUR Amount
FXI1048321606	BuySell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	3,000,000.00
FXI1048017848	SellBuy	EUR/USD	2,000,000.00	110.555	2,211,100.00	(2,000,000.00)
FXI1048722750	SellBuy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	(3,000,000.00)
EUR position						(2,000,000.00)
EUR position in USD				EUR (2,000,000.00) @ 1.10201	USD (2,204,020.00)	

## GBP

EOD Rate: GBP/USD bid/offer 1.40222/1.40242

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	GBP Amount
FXI1048808251	BuySell	GBP/USD	3,000,000.00	141.347	4,240,410.00	3,000,000.00
FXI1048116191	SellBuy	GBP/USD	2,000,000.00	141.173	2,823,460.00	(2,000,000.00)
FXI1048722750	SellBuy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	2,348,250.00
FXI1048808961	SellBuy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	(2,000,000.00)
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FXI1049291426	SellBuy	GBP/USD	1,000,000.00	140.241	1,402,410.00	(1,000,000.00)
GBP position						(1,651,750.00)
GBP position in USD				GBP (1,651,750.00) @ 1.40242	USD (2,316,447.24)	

## JPY

EOD Rate: USD/JPY bid/offer 112.028/112.036

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	JPY Amount
FXI1048321606	BuySell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	(373,959,000.00)
FXI1048808961	SellBuy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	316,094,000.00
FXI1049291364	SellBuy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	314,666,000.00
JPY position						256,801,000.00
JPY position in USD				JPY 256,801,000.00 @ 112.036	USD 2,292,129.32	

## USD (not used)

EOD Rate: USD/USD bid/offer 1.0000/1.0000

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	USD Amount
FXI1048808251	BuySell	GBP/USD	3,000,000.00	141347	<b>4,240,410.00</b>	(4,240,410.00)
FXI1048017848	SellBuy	EUR/USD	2,000,000.00	110555	<b>2,211,100.00</b>	2,211,100.00
FXI1048116191	SellBuy	GBP/USD	2,000,000.00	141173	<b>2,823,460.00</b>	2,823,460.00
FXI1049291426	SellBuy	GBP/USD	1,000,000.00	140241	<b>1,402,410.00</b>	1,402,410.00
USD position						2,196,560.00
USD position in USD				USD 2,196,560.00 @ 10000	<b>USD 2,196,560.00</b>	

## 8.4 Utilization

3. Sum all long positions (amount maker owes taker).
4. Sum all short positions (amount taker owes maker).
5. The sum of the absolute value of the two position totals is the credit utilization.

	Receivable	Payable
From EUR position	USD (2,204,020.00)	
From GBP position	USD (2,316,447.24)	
From JPY position		USD 2,292,129.32
From USD position		—
Total	(4,520,467.24)	2,292,129.32
Absolute Value	4,520,467.24	2,292,129.32
<b>Credit Utilization</b>	<b>6,812,596.56</b>	

## 9 Net settlement-receivable only

**NOTE:** All examples are from the maker's perspective: trade direction (buy/sell), credit obligation (receivable/payable), and position (long/short).

### 9.1 Summary

Amounts of both base and term currencies are considered, as well as the position direction (buy or sell), to calculate the total receivable. The total receivable is the credit utilization.

**Limit currency:** USD

**Credit horizon:**

**Aggregate:** All open value dates.

**Process:**

1. Look at the net amount that the maker is long or short in for each individual currency for all open value dates.
2. Convert exposure for each currency to USD using real-time Integral rates.
3. Sum all short positions (receivable).
4. The total receivable is the credit utilization.

### 9.2 Trades

Deal ID	Trade Date	Maker Buy/Sell	CCY Pair	Base Amount	Rate	Term Amount	Value Date
FXI1048722750	2/23/2022	Buy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	2/25/2022
FXI1048321606	2/22/2022	Sell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	2/24/2022
FXI1048017848	2/22/2022	Buy	EUR/USD	2,000,000.00	1.10555	2,211,100.00	2/24/2022
FXI1049291364	2/23/2022	Buy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	2/25/2022
FXI1048808961	2/23/2022	Buy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	2/25/2022
FXI1049291426	2/23/2022	Buy	GBP/USD	1,000,000.00	1.40241	1,402,410.00	2/25/2022
FXI1048808251	2/23/2022	Sell	GBP/USD	3,000,000.00	1.41347	4,240,410.00	2/25/2022
FXI1048116191	2/22/2022	Buy	GBP/USD	2,000,000.00	1.41173	2,823,460.00	2/24/2022

### 9.3 Position per currency

1. Look at the net amount that the customer is long or short in for each individual currency.
2. Convert exposure for each currency to USD using real-time Integral rates.

EUR

EOD Rate: EUR/USD bid/offer 1.10196/1.10201

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	EUR Amount
FXI1048321606	Sell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	3,000,000.00
FXI1048017848	Buy	EUR/USD	2,000,000.00	110.555	2,211,100.00	(2,000,000.00)
FXI1048722750	Buy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	(3,000,000.00)
EUR Position						(2,000,000.00)
EUR Position in USD				EUR (2,000,000.00) @ 110.201	USD (2,204,020.00)	

## GBP

EOD Rate: GBP/USD bid/offer 1.40222/1.40242

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	GBP Amount
FXI1048808251	Sell	GBP/USD	3,000,000.00	141.347	4,240,410.00	3,000,000.00
FXI1048116191	Buy	GBP/USD	2,000,000.00	141.173	2,823,460.00	(2,000,000.00)
FXI1048722750	Buy	EUR/GBP	3,000,000.00	0.78275	2,348,250.00	2,348,250.00
FXI1048808961	Buy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	(2,000,000.00)
FXI1049291364	Buy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	(2,000,000.00)
FXI1049291426	Buy	GBP/USD	1,000,000.00	140.241	1,402,410.00	(1,000,000.00)
GBP Position						(1,651,750.00)
GBP Position in USD				GBP (1,651,750.00) @ 140.242	USD (2,316,447.24)	

## JPY

EOD Rate: USD/JPY bid/offer 112.028/112.036

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	JPY Amount
FXI1048321606	Sell	EUR/JPY	3,000,000.00	124.653	373,959,000.00	(373,959,000.00)
FXI1048808961	Buy	GBP/JPY	2,000,000.00	158.047	316,094,000.00	316,094,000.00
FXI1049291364	Buy	GBP/JPY	2,000,000.00	157.333	314,666,000.00	314,666,000.00
JPY Position						256,801,000.00
JPY Position in USD				JPY 256,801,000.00 @ 112.036	USD 2,292,129.32	

## USD

EOD Rate: USD/USD bid/offer 1.0000/1.0000

Deal ID	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	USD Amount
FXI1048808724	Sell	GBP/USD	3,000,000.00	141347	<b>4,240,410.00</b>	(4,340,410.00)
FXI1048017848	Buy	EUR/USD	2,000,000.00	110555	<b>2,211,100.00</b>	2,211,100.00
FXI1048116191	Buy	GBP/USD	2,000,000.00	141173	<b>2,823,460.00</b>	2,823,460.00
FXI1049291426	Buy	GBP/USD	1,000,000.00	140241	<b>1,402,410.00</b>	1,402,410.00
USD Position						2,296,560.00
USD Position in USD				USD 2,296,560.00 @ 10000	<b>USD 2,296,560.00</b>	

## 9.4 Utilization

- Sum all short positions (receivable).
- The total net receivable is considered the higher risk and is the credit utilization even though the net payable is the larger amount.

	Receivable	Payable
From EUR position	USD (2,204,020.00)	
From GBP position	USD (2,316,447.24)	
From JPY position		USD 2,292,129.32
From USD position		USD 2,296,560.00
Total	(4,520,467.24)	4,588,689.32
Absolute Value	4,520,467.24	4,588,689.32
<b>Credit Utilization</b>	<b>4,520,467.24</b>	



## 10 Potential future exposure (PFE) credit coefficients

You can define coefficients by tenor and currency pair to adjust a counterparty's credit utilization.

To calculate the utilization, the notional amount of a trade is multiplied by the applicable coefficient. The resulting value is used for credit calculations. For example, for notional  $X$ , the amount used for credit is:

$$X \cdot \text{PFE\_Coefficient} = \text{notionalForCredit}$$

Typically, the longer the tenor, the greater the coefficient.

**IMPORTANT:** A PFE coefficient value of 0% (zero) means that trades in that tenor and currency pair have no effect on a counterparty's credit utilization. A coefficient of 100% (one) means the entire notional amount is used for credit calculations.

The following table shows the effect on available credit by a single 2M trade in different tenors on 5 available credit.

**Table 1** Available credit by tenor after PFE coefficient applied

Tenor	Notional	PFE coefficient	Calculation	Utilization	Available credit
SPOT	2,000,000	0%	$2,000,000 \cdot 0$	0	5,000,000
1M	2,000,000	10.5%	$2,000,000 \cdot 0.105$	210,000	4,790,000
6M	2,000,000	25%	$2,000,000 \cdot 0.25$	500,000	4,500,000
2Y	2,000,000	110%	$2,000,000 \cdot 1.1$	2,200,000	2,800,000

Coefficient values can have a maximum of two decimal places and must be positive.

For trades on broken dates, the coefficient value of the following tenor is used. Linear interpolation does not apply for credit checks.

**NOTE:** When you use tenor-based coefficients, if a trade's tenor or value date does not fall within a tenor band, the trade is rejected. If such a deal is entered manually, it will not apply to a customer's credit exposure.

You assign coefficients at the counterparty organization level and can then override them per legal entity.

You manage collections of tenors and their credit coefficients as PFE profiles and associate the PFE profiles with currency pair groups in PFE configurations.

### 10.1 PFE profiles and PFE configurations compared

To clarify the distinction between PFE profiles and PFE configurations:

- **PFE profile:**
  - Associates tenors with PFE coefficients, one tenor to each coefficient.
  - You can apply one profile directly to an organization or legal entity.
- **PFE configuration:**
  - Contains one or more PFE profiles.
  - Applies PFE profiles to currency pair groups. You can associate more than one currency pair group with a profile, but each group must have a different sort order.
  - Requires that you designate a default PFE profile.

- Requires that you define currency pair groups.
- You can apply one configuration to an organization or legal entity.

## 10.2 Credit utilization re-valuation

When using tenor-based credit coefficients, the utilization of unsettled trades is re-evaluated at the end of the business week as a trade's maturity approaches. The remaining days to the maturity are calculated. The credit utilization is recalculated using the corresponding coefficient.

Let's say a customer does a 1M 12-Month trade and we use the following coefficients.

- 1 month 5%
- 2 Months 7.5%
- 3 Months 10%
- 6 Months 15%
- 12 Months 25%

Post-trade, the credit utilization is revaluated in the following sequence.

1. When trade is booked, utilization is  $1\text{M} \cdot 25 = 250\text{k}$  12 months from the value day
2. The credit utilization remains the same in the next 6 month.
3. Value date is within 6 months, credit utilization reduces to  $1\text{M} \cdot 15\% = 150\text{K}$
4. Value date is with 3 months, credit utilization reduces to  $1\text{M} \cdot 10\% = 100\text{K}$
5. ...
6. On the value date, the credit utilization is completely removed.

## 10.3 Effect on net limit currency positions

When managing credit with PFE configurations, trades with the same notional and tenor can result in different amounts of a currency being utilized based on the currency pair. For example, the following table shows the utilized amount of USD for two similar spot trades in different currency pairs.

Trade	Applicable currency pair group	PFE profile applied in PFE configuration	Coefficient defined by PFE profile	Amount of USD utilized
Buy Spot 100M USD/JPY	G7	Asia	1 (1%)	1M
Buy Spot 100M XAU/USD	Metals	Gold	5 (5%)	5M

## 10.4 Sort order and duplicate currency pairs

You set a sort order for each currency pair group in a PFE configuration to resolve duplicate currency pairs. If a currency pair is included in more than one currency pair group, the group with the lowest sort order number in the configuration is used.

## 10.5 PFE example: net receivable

**NOTE:** All examples are from the maker's perspective: trade direction (buy/sell), credit obligation (receivable/payable), and position (long/short).

### Summary

Amounts of both base and term currencies are considered, as well as the trade direction (buy or sell).

PFE coefficients are applied by currency pair and tenor to calculate the total receivable as the credit utilization.

**Limit currency:** USD

**Credit horizon:**

- Daily: Each open value date.
- Aggregate of daily: Each open value date and then summed.

**Process:**

1. Look at the net amount that the maker is long in for each individual currency for each open value date (daily) or each open value date and then summed (aggregate of daily).
2. Apply PFE coefficient by currency pair and tenor.
3. Convert exposure for each currency to the limit currency (USD) using real-time Integral rates.
4. Sum of all short (receivable) positions is the credit utilization.

PFE profile: Group1 (USD/CAD)   PFE profile: Group2 (EUR/GBP, USD/MXN)

Tenor	Coefficient %	Tenor	Coefficient %
SPOT	0	SPOT	0
1W	6	1W	6.5
2W	7.5	2W	8
1M	10	1M	10.5
45D	11.1	45D	11.9
2M	12.5	2M	13.5
3M	15	3M	16
6M	20.5	6M	22
1Y	29.5	1Y	31
18M	36	18M	39
2Y	42.5	2Y	45.5

### Trades

Deal ID	Trade Type	Maker Buy/Sell	CCY Pair	Base Amount	Rate	Term Amount	Trade Date	Value Date	Days til Value Date
FXI7304719941	Outright	Sell	USD/CAD	7,500,000.00	1312752	9,845,640.00	10/14/2020	10/19/2021	79
FXI8366707061	Outright	Buy	EUR/GBP	46,285,000.00	0.8868235	41,046,625.70	7/19/2021	10/19/2021	79
FXI8385890152	Fwd/Fwd near leg	Buy	USD/MXN	30,000,000.00	17.8579424	535,738,272.00	7/31/2021	8/11/2021	10
FXI8385890152	Fwd/Fwd far leg	Sell	USD/MXN	30,000,000.00	17.9502791	538,508,373.00	7/31/2021	9/11/2021	41
FXI8385890444	Fwd/Fwd near leg	Buy	USD/MXN	30,000,000.00	17.96203	538,860,900.00	7/31/2021	9/11/2021	41
FXI8385890444	Fwd/Fwd far leg	Sell	USD/MXN	30,000,000.00	18.9574228	568,722,684.00	7/31/2021	8/13/2022	377

### PFE per currency pair

USD/CAD (PFE profile: Group1)

See [PFE profile: Group1 \(USD/CAD\)](#) on page 19.

Deal ID	Trade Type	Maker Buy/Sell	CCY Pair	Base Amount	Rate	Term Amount	Trade Date	Value Date	Days til Value Date
FXI7304719941	Outright	Sell	USD/CAD	7,500,000.00	1312752	<b>9,845,640.00</b>	10/14/2016	10/19/2021	79

PFE Coefficient: 15% (Tenor: 79 days, no exact match in PFE profile so use the following tenor 3M).

Utilization:  $9,845,640.00 \times 0.15 = 1,476,846.00$  CAD

EUR/GBP (PFE profile: Group2)

See [PFE profile: Group2 \(EUR/GBP, USD/MXN\)](#) on page 19.

Deal ID	Trade Type	Maker Buy/Sell	CCY Pair	Base Amount	Rate	Term Amount	Trade Date	Value Date	Days til Value Date
FXI8366707061	Outright	Buy	EUR/GBP	46,285,000.00	0.8868235	<b>41,046,625.70</b>	7/19/2021	10/19/2021	79

PFE Coefficient: 16% (Tenor: 79 days, no exact match in PFE profile so use the following tenor 3M).

Utilization:  $41,046,625.70 \times 0.16 = 6,156,993.86$  GBP

USD/MXN (PFE profile: Group2)

See [PFE profile: Group2 \(EUR/GBP, USD/MXN\)](#) on page 19.

#	Deal ID	Trade Type	Maker Buy/Sell	CCY Pair	Base Amount	Rate	Term Amount	Trade Date	Value Date	Days til Value Date
1	FXI8385890152	Fwd/Fwd near leg	Buy	USD/MXN	30,000,000.00	17.8579424	535,738,272.00	7/31/2021	8/11/2021	10

#	Deal ID	Trade Type	Maker Buy/Sell	CCY Pair	Base Amount	Rate	Term Amount	Trade Date	Value Date	Days til Value Date
2	FXI8385890152	Fwd/Fwd far leg	Sell	USD/MXN	30,000,000.00	179502791	538,508,373.00	7/31/2021	9/11/2021	41
3	FXI8385890444	Fwd/Fwd near leg	Buy	USD/MXN	30,000,000.00	1796203	538,860,900.00	7/31/2021	9/11/2021	41
4	FXI8385890444	Fwd/Fwd far leg	Sell	USD/MXN	30,000,000.00	189574228	568,722,684.00	7/31/2021	8/13/2022	377

**Trade #1:**

PFE Coefficient: 8% (Tenor: 10 days, no exact match in PFE profile so use the following tenor 2W).

Utilization:  $535,738,272.00 \times 0.08 = 42,859,061.76$  MXN

**Trade #2:**

PFE Coefficient: 11.9% (Tenor: 41 days, no exact match in PFE profile so use the following tenor 45D).

Utilization:  $538,508,373.00 \times 0.119 = 64,082,496.39$  MXN

**Trade #3:**

PFE Coefficient: 11.9% (Tenor: 41 days, no exact match in PFE profile so use the following tenor 45D).

Utilization:  $538,860,900.00 \times 0.119 = 64,124,447.10$  MXN

**Trade #4:**

PFE Coefficient: 39% (Tenor: 377 days, no exact match in PFE profile so use the following tenor 18M).

Utilization:  $568,722,684.00 \times 0.39 = 221,801,846.76$  MXN

**Position per currency**

1. Look at the net amount that the customer is short in for each individual currency.
2. Convert exposure for each currency to the limit currency (USD) using real-time Integral rates.

**CAD**

EOD Rate: USD/CAD bid/offer 1.312722/1.312791

PFE Coefficient (Group1): 15% (Tenor: 79 days, no exact match in PFE profile so use the following tenor 3M).

Utilization:  $9,845,640.00 \times 0.15 = 1,476,846.00$  CAD

Deal ID	Trade Type	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	CAD Amount
FXI1048321606	Outright	Sell	USD/CAD	7,500,000.00	1312752	9,845,640.00	(9,845,640.00)
CAD position							(9,845,640.00)
CAD utilization with PFE							(1,476,846.00)
CAD position in USD					CAD (1,476,846.00) @ 1312791	USD (1,938,790.14)	

GBP

EOD Rate: GBP/USD bid/offer 1.34997/1.35002

PFE Coefficient: 16% (Tenor: 79 days, no exact match in PFE profile so use the following tenor 3M).

Utilization: 41,046,625.70 x 0.16 = **6,156,993.86 GBP**

Deal ID	Trade Type	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	GBP Amount
FXI1048808251	Outright	Buy	EUR/GBP	46,285,000.00	0.8868235	<b>41,046,625.70</b>	(41,046,625.70)
GBP position							(41,046,625.70)
GBP utilization with PFE							(6,156,993.86)
GBP position in USD					GBP (6,156,993.86) @ 1.35002	<b>USD (8,312,064.85)</b>	

MXN (payable amount not used)

EOD Rate: USD/MXN bid/offer 17.92840/17.97953

Trade #1:

PFE Coefficient: 8% (Tenor: 10 days, no exact match in PFE profile so use the following tenor 2W).

Utilization: 535,738,272.00 x 0.08 = **42,859,061.76 MXN**

Trade #2:

PFE Coefficient: 11.9% (Tenor: 41 days, no exact match in PFE profile so use the following tenor 45D).

Utilization: 538,508,373.00 x 0.119 = **64,082,496.39 MXN**

Trade #3:

PFE Coefficient: 11.9% (Tenor: 41 days, no exact match in PFE profile so use the following tenor 45D).

Utilization: 538,860,900.00 x 0.119 = **64,124,447.10 MXN**

Trade #4:

PFE Coefficient: 39% (Tenor: 377 days, no exact match in PFE profile so use the following tenor 18M).

Utilization: 568,722,684.00 x 0.39 = **221,801,846.76 MXN**

#	Deal ID	Trade Type	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	MXN Amount
1	FXI1048321606	Fwd/Fwd near leg	Buy	USD/MXN	30,000,000.00	17.8579424	535,738,272.00	(535,738,272.00)
2	FXI1048808961	Fwd/Fwd far leg	Sell	USD/MXN	30,000,000.00	17.9502791	538,508,373.00	538,508,373.00
3	FXI1049291364	Fwd/Fwd near leg	Buy	USD/MXN	30,000,000.00	17.96203	538,860,900.00	(538,860,900.00)
4	FXI1049291364	Fwd/Fwd far leg	Sell	USD/MXN	30,000,000.00	18.9574228	568,722,684.00	568,722,684.00

#	Deal ID	Trade Type	Maker Buy/Sell	Currency Pair	Base Amount	Rate	Term Amount	MXN Amount
	Trade #1: MXN utilization with PFE							(42,859,061.76)
	Trade #2: MXN utilization with PFE							64,082,496.39
	Trade #3: MXN utilization with PFE							(64,124,447.10)
	Trade #4: MXN utilization with PFE							221,801,846.76
	MXN position							178,900,834.29
	MXN position in USD					MXN @ 17.97953 178,900,834.29		USD 9,950,250.88

Utilization

3. Sum of all maker long (receivable) positions is the credit utilization.

Receivable	
From CAD position	USD (1,938,790.14)
From GBP position	USD (8,312,064.85)
Total	(10,250,854.99)
Absolute Value	10,250,854.99
Credit Utilization	10,250,854.99