



CRZ Pricer

Why choose CRZ Pricer?

A next generation tool with modern architecture and reduced TCO

Legacy tools tend to become overly complex, and are at the same time difficult to understand, costly to maintain, and almost impossible to upgrade.

CRZ Pricer was built from scratch in 2016 with a modern architecture that is naturally simple and efficient:

- It is sound and consistent. There is for instance a unique deal representation as well as a unique market data representation (only one table in the database in each case). This reduces maintainability issues and ultimately TCO for the client.
- It is thread-safe, which allows parallelisation of all calculations.
- It is fully testable – and tested. This is key to achieve robustness.
- It has a very intuitive API as there is one-to-one correspondence between a GUI action/property and an API function/property (this also allows task scheduling of most functionalities).

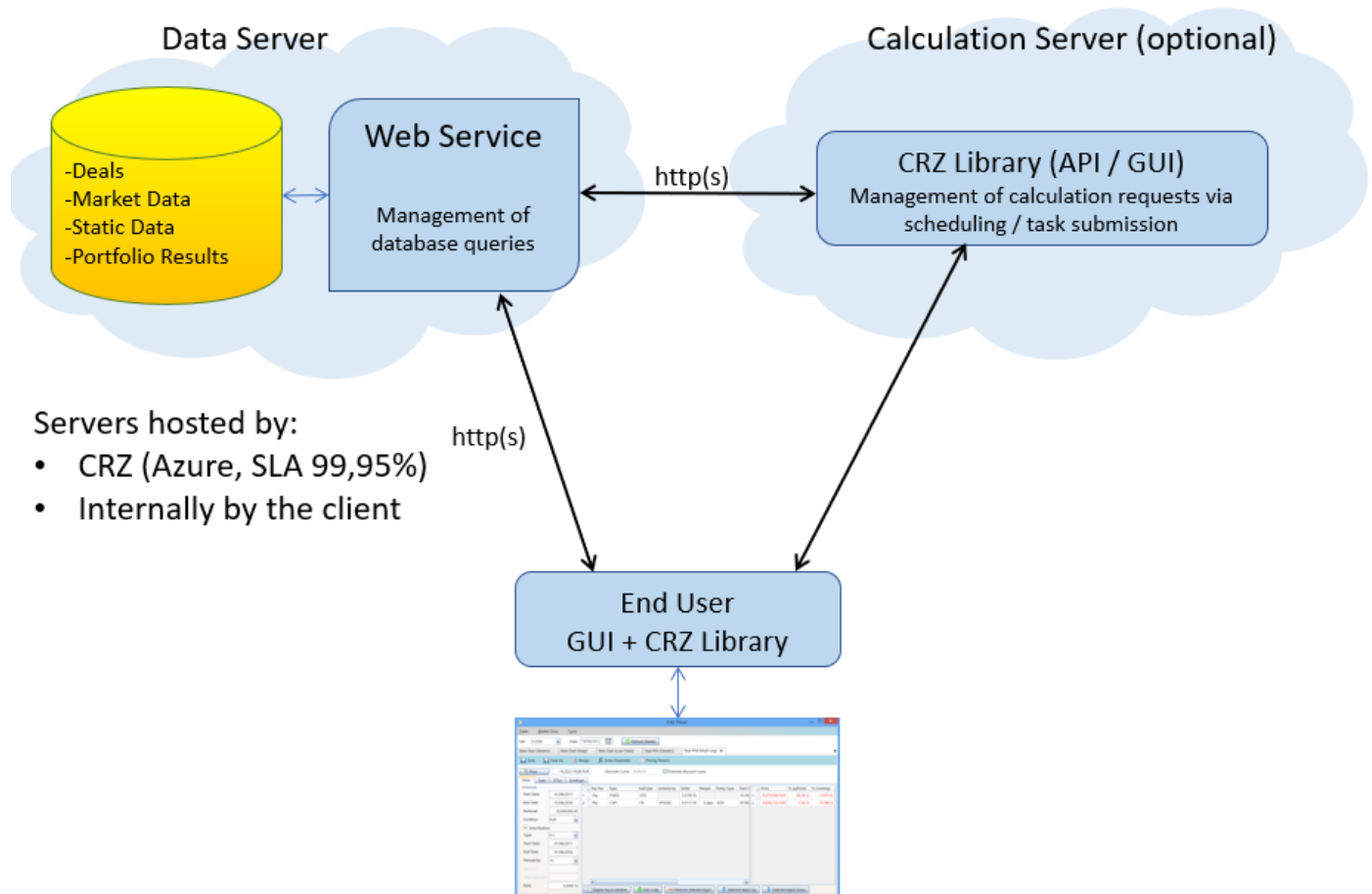
A high performance tool

We believe that performance is a feature. The user experience improves dramatically if he switches from overnight batches to real-time numbers.

At CRZ, we leveraged the auto-differentiation to four different topics: optimisation algorithms, risk calculations, deal allocation of portfolio dependent measures and risk calculations on XVA.

Other optimisations include parallelisation of calculations and the Monte Carlo engine.

Architecture



Pricing

Wide Range of Products

- 37 currencies
- Interest rates : most products including options, inflation, multi/auto-callable, bonds, ND products
- FX, Equities & Commodities : flow, vanilla options, variance swaps, American barriers, autocallable
- Credit: CDS, bonds, default baskets, options, tranches. Indices & bespoke portfolios

State of the art modelling

- Multi-curve discounting framework: discount curves are deduced from CSA, cross-currency basis swaps, or bond and CDS curves when relevant
- Market standards for volatility (e.g. SABR) with support for negative rates, static replication for CMS, Vanna-Volga
- Multi factor Gaussian HJM for multi/auto-callable products and XVA
- FX/EQ/CO exotics : Local vol, Heston, Local stochastic vol models

Interoperability

- Support of FIX protocol with FIX/FIXML messages
- Support of FpML
- Mifid 2 Transaction Reporting

Schedule

Start Date: 09-oct-2017

End Date: 09-oct-2027

Notional: 10 000 000,00

Currency: EUR

Amortization

Schedule Details

	Pay Rec	Type	SubType	Underlying	Strike	Margin	Fixing Type
1	Receive	FLOAT	IBOR	EUR6M		0,00 bp	ADV
2	Pay	FIXED	STD		1,2508 %	0,00 bp	

	Currency	Price	% (upfront)	% (running)
1	EUR	820 646	8,21 %	0,820 %
2	EUR	-1 230 772	-12,31 %	-1,229 %
3	EUR	410 110	4,10 %	0,410 %

Solver

Deal Parameters

Solve: Strike

Of Selected Legs:

(Select All)

FLOAT EUR6M

FIXED 1,2508 %

Keep constant: Difference

Implied Market Value

Solve: Yield

Target

Price: 0

Of Selected Legs:

(Select All)

FLOAT EUR6M

FIXED 1,2508 %

Exercise Leg

Result: 1,2508 %

(upfront)	% (running)
0,00 %	0,001 %

Market Data Contribution

Real-Time contribution

- Supports Bloomberg (Terminal, B-PIPE, Data Licence), Reuters and TP ICAP
- Automatic Contribution with threshold
- Data synchronization as well as integrity check before contribution
- Manual calibration for less liquid markets (IR volatility and correlation)
- Based on historical data for non observables (e.g. inflation seasonality)

SDR

- Connection to DTCC and BSR data feeds
- Integration of these data: pricing, manual calibration

Interoperability

- Thanks to a simple API (essentially one function that supports all types of market data), it is very easy to adapt any existing contribution tool to make it feed CRZ database. Built-in functions make it straightforward in Excel.

Yield Curve|USD3M

Commands

- Start
- Stop
- Contribute
- Reset Grid
- Reset parameters

Source

Provider: Random

Source: BRKR

Auto Contribute

Auto Contribute:

Threshold: 0,1 bp

Parameters

Warning Time: 60

Smooth Before Contribute

Historical Contribution

Convexity

Subtract Convexity:

Calculate Convexity

Roll Futures

Expiry in days: 15

Roll Futures

Manual Contribution

Views Yield Curve|USD3M

Yield Curve|EUR6M

<input checked="" type="checkbox"/>	Type	Te...	Spread	Value	Last	Diff
<input checked="" type="checkbox"/>	MM	6M	0	-0,2019 %	-0,2018 %	-0,01 bp
<input checked="" type="checkbox"/>	SW	1Y	0	-0,1933 %	-0,1932 %	-0,01 bp
<input checked="" type="checkbox"/>	SW	2Y	0	-0,1389 %	-0,1390 %	0,01 bp
<input checked="" type="checkbox"/>	SW	3Y	0	-0,0321 %	-0,0321 %	0,00 bp
<input checked="" type="checkbox"/>	SW	4Y	0	0,0907 %	0,0908 %	-0,01 bp
<input checked="" type="checkbox"/>	SW	5Y	0	0,2164 %	0,2161 %	0,03 bp
<input checked="" type="checkbox"/>	SW	6Y	0	0,3375 %	0,3381 %	-0,06 bp
<input checked="" type="checkbox"/>	SW	7Y	0	0,4616 %	0,4623 %	-0,07 bp
<input checked="" type="checkbox"/>	SW	8Y	0	0,5906 %	0,5908 %	-0,02 bp
<input checked="" type="checkbox"/>	SW	9Y	0	0,7172 %	0,7182 %	-0,10 bp
<input checked="" type="checkbox"/>	SW	10Y	0	0,8340 %	0,8353 %	-0,13 bp
<input checked="" type="checkbox"/>	SW	12Y	0	1,0216 %	1,0211 %	0,05 bp
<input checked="" type="checkbox"/>	SW	15Y	0	1,2007 %	1,2015 %	-0,08 bp
<input checked="" type="checkbox"/>	SW	20Y	0	1,3644 %	1,3650 %	-0,06 bp
<input checked="" type="checkbox"/>	SW	25Y	0	1,4425 %	1,4421 %	0,04 bp
<input checked="" type="checkbox"/>	SW	30Y	0	1,4682 %	1,4706 %	-0,24 bp
<input checked="" type="checkbox"/>	SW	35Y	0	1,4794 %	1,4772 %	0,22 bp
<input checked="" type="checkbox"/>	SW	40Y	0	1,4702 %	1,4694 %	0,08 bp
<input checked="" type="checkbox"/>	SW	50Y	0	1,4330 %	1,4323 %	0,07 bp

Last contribution: 05/10/2017 09:48:29

Yield Curve|USD3M

<input checked="" type="checkbox"/>	Type	Te...	Spread	Value	Last	Diff
<input checked="" type="checkbox"/>	MM	3M	0	1,1911 %	1,1922 %	-0,11 bp
<input checked="" type="checkbox"/>	FUT	Z17	0	1,3010 %	1,3038 %	-0,28 bp
<input checked="" type="checkbox"/>	FUT	H18	-0,020...	1,3978 %	1,4032 %	-0,54 bp
<input checked="" type="checkbox"/>	FUT	M18	-0,060...	1,5101 %	1,5119 %	-0,18 bp
<input checked="" type="checkbox"/>	FUT	U18	-0,130...	1,6269 %	1,6286 %	-0,17 bp
<input checked="" type="checkbox"/>	SW	18M	0	1,4663 %	1,4706 %	-0,43 bp
<input checked="" type="checkbox"/>	SW	2Y	0	1,5907 %	1,5891 %	0,16 bp
<input checked="" type="checkbox"/>	SW	3Y	0	1,7585 %	1,7613 %	-0,28 bp
<input checked="" type="checkbox"/>	SW	4Y	0	1,8851 %	1,8822 %	0,29 bp
<input checked="" type="checkbox"/>	SW	5Y	0	1,9755 %	1,9791 %	-0,36 bp
<input checked="" type="checkbox"/>	SW	6Y	0	2,0615 %	2,0612 %	0,03 bp
<input checked="" type="checkbox"/>	SW	7Y	0	2,1367 %	2,1341 %	0,26 bp
<input checked="" type="checkbox"/>	SW	8Y	0	2,1961 %	2,1987 %	-0,26 bp
<input checked="" type="checkbox"/>	SW	9Y	0	2,2479 %	2,2562 %	-0,83 bp
<input checked="" type="checkbox"/>	SW	10Y	0	2,3118 %	2,3065 %	0,53 bp
<input checked="" type="checkbox"/>	SW	12Y	0	2,3738 %	2,3858 %	-1,20 bp
<input checked="" type="checkbox"/>	SW	15Y	0	2,4675 %	2,4625 %	0,50 bp
<input checked="" type="checkbox"/>	SW	20Y	0	2,5271 %	2,5282 %	-0,11 bp
<input checked="" type="checkbox"/>	SW	25Y	0	2,5552 %	2,5546 %	0,06 bp
<input checked="" type="checkbox"/>	SW	30Y	0	2,5590 %	2,5600 %	-0,10 bp
<input checked="" type="checkbox"/>	SW	40Y	0	2,5459 %	2,5497 %	-0,38 bp
<input checked="" type="checkbox"/>	SW	50Y	0	2,5341 %	2,5313 %	0,28 bp

Last contribution: 04/09/2017 13:23:36

Market Data Viewers

Flexible market data screens

- More than 50 market data screens allow to efficiently follow the market
- These market data screens are fully configurable and they support real-time update
- Many kind of charts are available: historical data, forwards and volatility smiles, 3D surface

Blotters

- Product-specific blotters on swaptions, caps & floors and FX options allow to monitor more complex market structures

Market Scenarios

- One can define stress scenarios by shifting any market data, e.g. Eur6M +50bp and EURUSD +5%
- More complex scenarios are available, e.g. move SABR beta and recalibrate alpha and rho
- Change of risk representation, e.g. EUROIS can be changed from outright to spread curve
- All the pricer functionalities support markets defined through a scenario

Spot Swap Rates ×

Maturity	EUROIS	EUR1M	EUR3M	EUR6M	EUR12M
1Y	-0,151 %	-0,540 %	-0,302 %	-0,193 %	0,154 %
2Y	-0,129 %	-0,525 %	-0,234 %	-0,139 %	0,204 %
3Y	-0,081 %	-0,506 %	-0,138 %	-0,032 %	0,282 %
4Y	-0,035 %	-0,460 %	-0,033 %	0,091 %	0,377 %
5Y	0,038 %	-0,416 %	0,086 %	0,215 %	0,484 %
7Y	0,276 %	-0,245 %	0,338 %	0,463 %	0,723 %
10Y	0,637 %	-0,013 %	0,721 %	0,834 %	1,043 %
15Y	1,079 %	0,269 %	1,147 %	1,203 %	1,349 %
20Y	1,270 %	0,423 %	1,334 %	1,365 %	1,468 %
30Y	1,411 %	0,489 %	1,410 %	1,472 %	1,493 %

Basis Swaps ×

Maturity	EUR1M	EUR3M	EUR6M	EUR12M
1Y	-38,2 bp	-14,8 bp	-4,0 bp	30,2 bp
2Y	-38,9 bp	-10,2 bp	-0,8 bp	33,0 bp
3Y	-41,7 bp	-5,5 bp	5,0 bp	35,9 bp
4Y	-41,9 bp	0,2 bp	12,4 bp	40,6 bp
5Y	-44,8 bp	4,7 bp	17,5 bp	44,0 bp
7Y	-51,7 bp	5,7 bp	18,0 bp	43,7 bp
10Y	-65,0 bp	7,4 bp	18,5 bp	39,1 bp
15Y	-81,4 bp	5,2 bp	10,6 bp	25,1 bp
20Y	-85,3 bp	4,5 bp	7,6 bp	17,7 bp
30Y	-92,8 bp	-2,0 bp	4,0 bp	6,1 bp

Swaption Straddles ×

Expiry	1Y	2Y	3Y	4Y	5Y	7Y	10Y	15Y	20Y	30Y
1M	4,3 bp	8,7 bp	14,5 bp	24,6 bp	37,4 bp	65,2 bp	109,5 bp	174,9 bp	233,5 bp	345,6 bp
3M	7,7 bp	16,0 bp	27,0 bp	43,7 bp	67,8 bp	114,0 bp	187,1 bp	290,8 bp	388,2 bp	592,3 bp
6M	10,9 bp	26,3 bp	47,6 bp	71,4 bp	98,7 bp	161,6 bp	262,6 bp	407,4 bp	532,2 bp	861,6 bp
1Y	20,1 bp	46,4 bp	78,7 bp	113,3 bp	151,7 bp	241,5 bp	382,8 bp	590,1 bp	775,9 bp	1 177,2 bp
2Y	42,2 bp	92,4 bp	148,9 bp	209,7 bp	269,4 bp	413,4 bp	627,3 bp	936,2 bp	1 211,8 bp	1 663,5 bp
3Y	66,3 bp	137,6 bp	217,4 bp	295,8 bp	378,7 bp	567,2 bp	833,0 bp	1 194,9 bp	1 492,0 bp	1 963,9 bp
4Y	87,5 bp	181,2 bp	277,1 bp	378,6 bp	477,9 bp	694,1 bp	982,7 bp	1 382,9 bp	1 709,3 bp	2 213,8 bp
5Y	110,4 bp	217,0 bp	324,0 bp	441,0 bp	567,0 bp	813,0 bp	1 100,0 bp	1 440,0 bp	1 800,0 bp	2 403,6 bp
7Y	140,9 bp	279,0 bp	424,0 bp	594,0 bp	777,0 bp	1 094,0 bp	1 471,0 bp	1 918,0 bp	2 445,0 bp	2 701,2 bp
10Y	179,8 bp	354,0 bp	524,0 bp	729,0 bp	959,0 bp	1 336,0 bp	1 792,0 bp	2 336,0 bp	2 968,0 bp	3 068,8 bp
20Y	234,9 bp	462,6 bp	684,4 bp	898,7 bp	1 096,5 bp	1 456,3 bp	1 925,3 bp	2 557,4 bp	3 043,9 bp	3 726,4 bp
30Y	250,7 bp	487,2 bp	705,9 bp	917,7 bp	1 126,5 bp	1 483,3 bp	1 972,0 bp	2 652,6 bp	3 177,0 bp	3 939,4 bp

Cell	Premium	Forward	PV01	% Delta	Volatility	Vega
4Y 2Y	181,2 bp	0,836 %	1,98	-10,6 %	57,5 bp	3,2 bp

Risks & P&L

Functionalities

- Full risks (tenor based)
- Risk explained P&L, with second order P&L explanation through re-computation of the risks at EOD
- Realized P&L with curve-by-curve granularity (second order cross effects are also captured)
- Many other reports allow effective risk management of a trading book: fixing reports, option expiry reports, past or future payment reports, security positions, ...
- Scenario analysis and stress testing
- Flexible risk representation

Highlights

- All measures are computed on deal-by-deal basis
- Results are displayed in a pivot table allowing interactive slicing and dicing of results (up to deal level)
- Risks are calculated thanks to auto-differentiation allowing high performance: the risks of a portfolio of 10,000 swaps of 10 year average maturity will require 0.5 second to compute

			Grand Total	CHASGB2L	CITTGB2L	
FX Spot Total			9	161	-152	
FX Spot	FX Spot Total		9	161	-152	
	FX Spot	FX Spot Total	9	161	-152	
		EURUSD	-275	35	-310	
		GBPUSD	87	-7	94	
		USDCHF	197	133	64	
Yield Curve Total			-272 233	288 387	-560 621	
Yield Curve	Delta Total		-195 456	297 002	-492 459	
	Delta	CHF3M Total	185 050	77 612	107 438	
		3M	-2 241	-829	-1 412	
		Z17	-349	-155	-194	
		H18	186	17	170	
		M18	178	13	165	
		U18	137	-8	146	
		2Y	-375	1 223	-1 598	
		3Y	-936	1 254	-2 191	
		4Y	-2 318	75	-2 393	
		5Y	248	-35	283	
		6Y	5 018	3 048	1 970	
		7Y	4 343	-1 837	6 180	
		8Y	6 374	-3 450	9 825	
		9Y	17 373	-479	17 852	
		10Y	40 026	9 135	30 891	
	12Y	38 957	17 963	20 994		
	15Y	23 616	764	22 853		
	20Y	6 749	-12 409	19 158		
	25Y	48 061	63 321	-15 260		
		CHF6M Total	51 001	40 269	10 732	
		CHF6M	6M	-1 783	-1 075	-708
			1Y	532	-5	537
			2Y	1 626	-66	1 691
			3Y	1 027	1 530	-503
	4Y		2 064	1 387	677	
	5Y		1 792	2 681	-889	
	6Y		-3 266	-1 268	-1 999	
	7Y	820	-2 723	3 543		

Hidden Fields

- Deal
- Keys
- Market Data
 - Column

Filter Area

Shift

Column Area

Counterparty

Row Area

Type

Table

Name

Row

Data Area

Risk

Defer Layout Update

Update

XVA

Functionalities

- All XVA measures (CVA, DVA, FVA, MVA, KVA) as well as exposures (EE, NEE, PFE, ...)
- FVA is fully configurable as there is currently no market consensus
- Full XVA risks (tenor based) are available for efficient dynamic hedging
- Incremental impacts of deals can be calculated without re-computing the whole netting set
- Marginal allocation up to deal level allows you to instantly view the main contributors to any measure
- Wrong-way risk is supported
- Exotic CSA features such as one-way, non zero thresholds, minimum transfer amounts are supported

Highlights

- The Monte Carlo engine is strongly optimized. American Monte Carlo (AMC) is the most effective calculation approach for XVA, and it is combined with vectorisation to achieve maximal performance.
- Full XVA risks are obtained through pathwise auto-differentiation, so we combine the benefits of a better accuracy (pathwise differentiation) with the spectacular performance of auto-differentiation.
- Specific care has been spent on the quality of regression in AMC so that the underlying distributions are preserved as much as possible.
- Flow compression to allow fast calculations even on large netting sets
- Overall, performance allows a real-time experience as opposed to reliance on overnight batches only.

	Total						Vo
	EFV	EE	NEE	EPE	EEPE	PFE	
Grand Total	-228 061 097	82 244 337	-310 305 433	75 320 610	90 210 082	949 182 493	
04-nov.-2017	-3 548 155	21 528	-3 569 683	21 528	21 528	800 106	
04-déc.-2017	-3 532 973	142 569	-3 675 542	81 056	81 056	2 638 835	
04-janv.-2018	-3 573 513	331 887	-3 905 400	165 575	165 575	4 289 169	
04-avr.-2018	-4 494 904	531 010	-5 025 914	346 285	346 285	7 615 218	
04-juil.-2018	-4 526 920	905 582	-5 432 502	532 717	532 717	11 344 447	
04-oct.-2018	-4 520 709	1 275 820	-5 796 529	720 020	720 020	13 782 900	
04-janv.-2019	-4 548 121	1 729 232	-6 277 353	923 187	923 187	15 544 093	
04-avr.-2019	-5 338 478	1 844 171	-7 182 649	1 074 720	1 074 720	18 424 172	
04-juil.-2019	-5 363 130	2 090 681	-7 453 811	1 219 630	1 219 630	19 524 793	
04-oct.-2019	-5 362 556	2 435 237	-7 797 793	1 372 830	1 372 830	23 331 429	
04-janv.-2020	-5 374 928	2 669 696	-8 044 624	1 517 978	1 517 978	22 876 005	
04-avr.-2020	-6 039 931	2 539 900	-8 579 831	1 619 834	1 632 771	22 407 911	
04-juil.-2020	-6 047 356	2 711 670	-8 759 027	1 718 795	1 730 560	25 231 727	
04-oct.-2020	-6 125 992	2 893 268	-9 019 260	1 817 382	1 828 159	24 815 638	
04-janv.-2021	-6 134 517	3 037 899	-9 172 416	1 911 901	1 921 843	28 329 942	
04-avr.-2021	-6 842 223	2 743 236	-9 585 460	1 970 445	2 000 438	29 165 177	
04-juil.-2021	-6 843 206	2 851 159	-9 694 364	2 028 988	2 069 400	28 807 994	
04-oct.-2021							

Hidden Fields

- Deal

Filter Area

Column Area

Population

Row Area

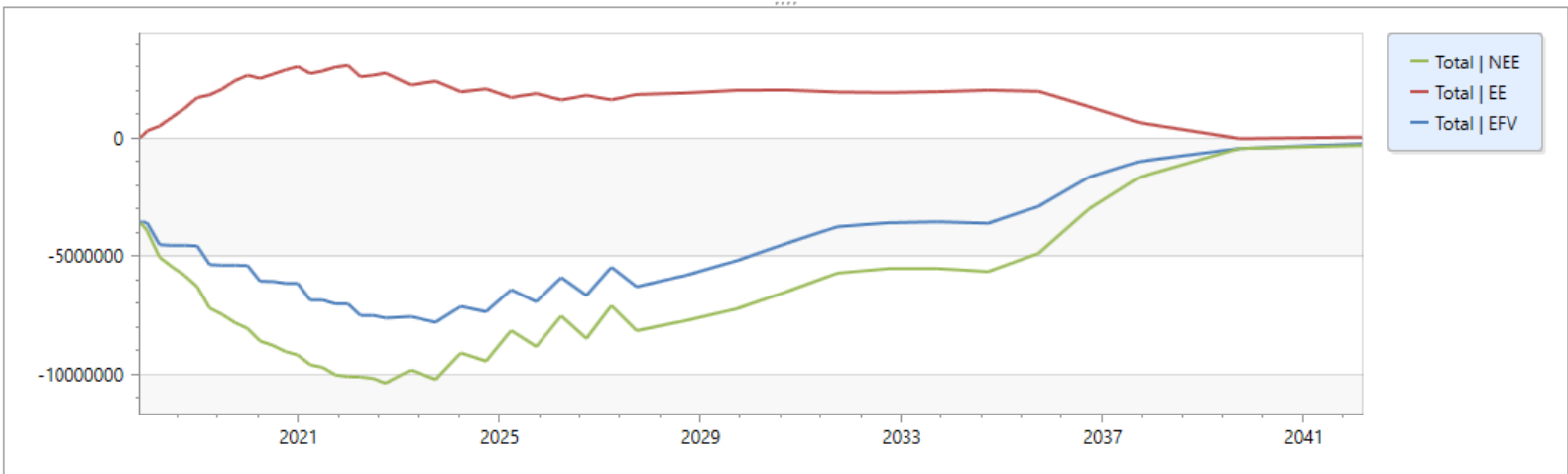
Date

Data Area

- EFV
- EE
- NEE
- EPE

Defer Layout Update

Update



Capital: Basel 2.5 & FRTB

Functionalities

- Most Basel 2.5 measures (VaR, sVaR, IRC, CEM, SA-CCR, CCR-IMM, CVA-SA, CVA-IMM)
- All FRTB SA measures (SBM, DRC, RRAO, SA-CVA, BA-CVA)
- All FRTB IMA measures (ES, DRC), where non modellable risk factors are configurable
- P&L attribution
- View aggregated measure and deal-by-deal components (PV, risk weight, ...)
- A capital dashboard allows the aggregation of all the capital measures

Highlights

- High performance risk engine for FRTB SA
- Marginal allocation up to deal level
- Capital optimization through risk reduction is possible. Marginal impact of risks in FRTB SA is a dedicated view allowing this kind of optimization. Incremental impact of deals is another solution.
- For historical VaR, the generation of present market data from past data preserves exactly the forwards

		Grand Total			
		GIRR	FX	CSR	Capital
Total Total		40 914 367	859 632	0	41 773 999
Total	176	-1 016	0	0	-1 016
	177	-1 030	0	0	-1 030
	178	-1 025	0	0	-1 025
	196	-1 016	0	0	-1 016
	197	1 030	0	0	1 030
	217	-1 027	0	0	-1 027
	238	1 030	0	0	1 030
	258	-1 025	0	0	-1 025
	276	-3 427	10 051	0	6 624
	277	0	300	0	300
	278	2 353	-259	0	2 094
	296	0	298	0	298
	297	0	-300	0	-300
	298	-2 353	259	0	-2 094
	316	0	298	0	298
	317	0	300	0	300
	318	-2 353	259	0	-2 094
	336	-5 634	1 022	0	-4 612
	337	5 657	-1 022	0	4 635
	338	-4	-1 056	0	-1 060
	356	9 813	35	0	9 848
	357	116	480	0	596
	358	111	481	0	592
	376	38 777	0	0	38 777
	377	-37 657	0	0	-37 657
	378	39 112	0	0	39 112
	396	-38 777	0	0	-38 777
	397	37 657	0	0	37 657
398	-37 586	0	0	-37 586	
416	-42 691	0	0	-42 691	
417	43 041	0	0	43 041	
418	42 975	0	0	42 975	

Hidden Fields

- Book
- Counterparty
- CSAId
- Deal Ccy
- DealType
- Description
- Last Update
- Maturity
- Notional

Filter Area

Column Area

Row Area

Population

Deal Id

Data Area

- GIRR
- FX
- CSR
- Capital

Defer Layout Update Update

Initial Margin

Functionalities

- SIMM for bilateral initial margin: versioning is included and underlying risks are converted in CRIF format. CRIF results are displayed together with the aggregated SIMM measure.
- Historical VaR/ES for cleared OTCs (e.g. LCH is an ES on 2500 dates)
- SPAN for listed products
- CCP basis spreads (such as CME vs LCH) are taken into account

Highlights

- High performance risk engine for SIMM
- Marginal allocation up to deal level
- Linked to MVA to see the expected cost of initial margin over the lifetime of a trade
- Marginal impact of risks allowing initial margin optimisation
- For historical VaR, the generation of present market data from past data preserves exactly the forwards

						Grand Total	
						Amount	Amount in USD
RatesFX Total						-202 860	-240 531
└ Risk_IRCurve Total						-195 456	-231 752
└└ CHF Total						266 836	316 388
└└└ 1 Total						266 836	316 388
└└└└ 10Y Total						101 445	120 283
└└└└└└ Libor3M Total						83 864	99 438
└└└└└└ Libor3M EUR						83 864	99 438
└└└└└└└ Libor6M Total						-12 885	-15 277
└└└└└└└ Libor6M EUR						-12 885	-15 277
└└└└└└└ OIS Total						30 465	36 123
└└└└└└└ OIS EUR						30 465	36 123
└└└└└└ 15Y Total						-10 332	-12 250
└└└└└└└ Libor3M Total						39 203	46 483
└└└└└└└ Libor3M EUR						39 203	46 483
└└└└└└└└ Libor6M Total						-22 581	-26 774
└└└└└└└└ Libor6M EUR						-22 581	-26 774
└└└└└└└└ OIS Total						-26 954	-31 959
└└└└└└└ OIS EUR						-26 954	-31 959
└└└└└└ 1M Total						113	134
└└└└└└└ Libor3M Total						91	108
└└└└└└└ Libor3M EUR						91	108
└└└└└└└ OIS Total						22	26
└└└└└└└ OIS EUR						22	26
└└└└└└ 1Y Total						1 013	1 201
└└└└└└└ Libor3M Total						677	803
└└└└└└└ Libor3M EUR						677	803
└└└└└└└└ Libor6M Total						532	630
└└└└└└└└ Libor6M EUR						532	630
└└└└└└└└ OIS Total						-196	-232
└└└└└└└└ OIS EUR						-196	-232
└└└└└└ 20Y Total						122 508	145 257
└└└└└└└ Libor3M Total						30 780	36 496
└└└└└└└ Libor3M EUR						30 780	36 496

Performance and Consistency

Performance

- Fully multi-threaded architecture. Calculations run in parallel
- Autodiff with 4 applications (calibrations, risks, marginal allocation, XVA risks)
- Monte-Carlo is American and vectorized
- One single call to the database to load all the market data required for a portfolio

Consistency and reliability

- One-to-one correspondence between the API and the GUI
- API fully testable. Test coverage close to 100%
- API can be 'instrumented' : user defined macros, task scheduling
- Automatic API code generation, like in Excel record a macro
- Most of the code regarding FX, Equities and Commodities is shared
- Most of the GUI is automatically generated, ensuring consistent look and feel
- Many hidden admin tools ensure efficient daily or periodic maintenance
- Straightforward release cycle (no branches). Same day bug fix in case of emergency

Performance Results

Category	View	Details	Time (s)	# Results	Size on disk(MB)	Comment
Risks	Risks	10,000 swaps	0.5	300,000	9.6	
P&L	Realized	10,000 swaps	2.6	42,500	1.2	40 revals
XVA	PV Grid	500 deals	0.9	45	~0	1000 paths, not dbd
XVA	PV Grid	500 deals	1.8	45	~0	5000 paths, not dbd
XVA	PV Grid	500 deals	1.5	16,000		1000 paths, dbd
XVA	Risk Grid	250 deals	5.0	45	~0	1000 paths, 1 factor
XVA	Risk Grid	500 deals	34.5	45	~0	1000 paths, 7 factors
XVA	Risk Grid	10,000 deals	63	180	~0	1k paths, 7 fact, flow compression
IM	SIMM	5000 deals	0.6	150,000		dbd
IM LCH	hVaR	1,500 swaps	26.4	3.75m		2,500 dates
Capital	SBM	10,000 deals	0.8	170,000	5	+0.7s for dbd
Capital	CEM	10,000 deals	0.7	10,000		

Results obtained with an i7-5960X processor (8 cores) and 16 Go of RAM

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