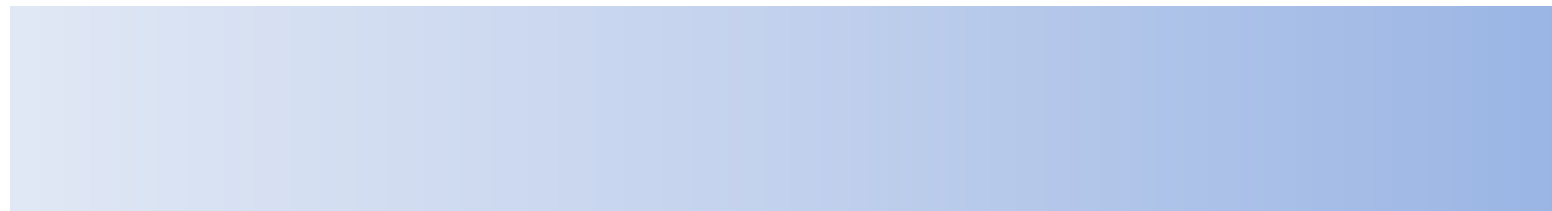
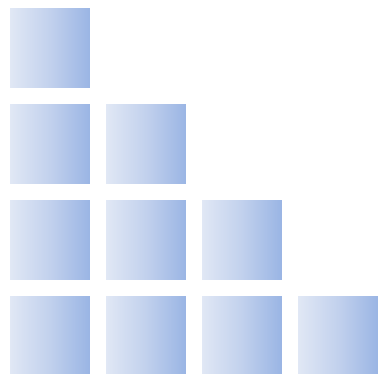

Strategic Integration of xVA, Margining and Regulatory Risk Platforms

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2nd Annual Credit Risk Forum
19th/20th May 2016, Amsterdam



Disclaimer

The document author is Arthur Rabatin and all views expressed in this document are his own and not those of his employer.

All errors and omissions are those of the author

Arthur Rabatin, London, May 2016

What is Derivatives Counterparty Risk?

Generally,

Counterparty Risk = f (Exposure At Default, Loss Given Default)

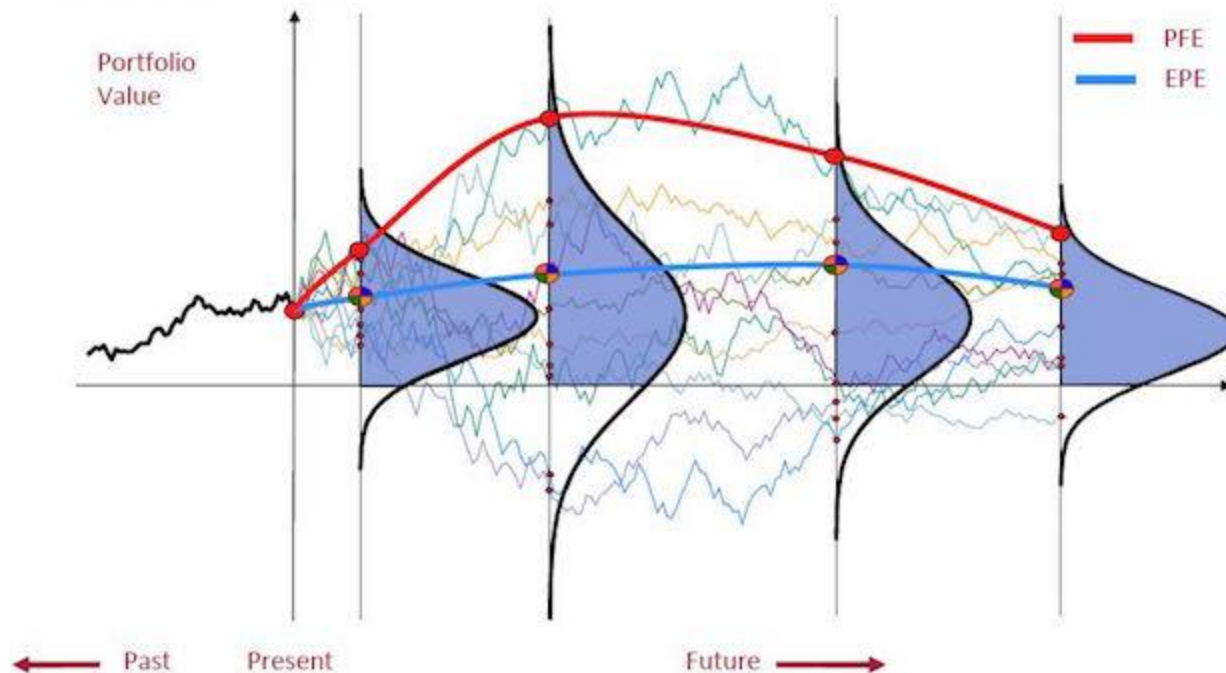
Derivatives Counterparty Exposure is complex:

- Exposure unknown at time of trade
- Future Exposure sensitive to
 - change in market prices
 - collateral valuation (including 'wrong way risk')
 - collateral operational mechanics (threshold, minimum transfer amounts, collateral switch optionality)

Measuring Derivatives Exposure (1) – Monte Carlo Simulation

Computing Exposure by Simulation

Example: Vanilla Swap



Source: Calculating CVA with Apache Spark (<http://blog.cloudera.com/blog/2015/03/calculating-cva-with-apache-spark/>)

Measuring Derivatives Exposure (2) – Proxy via Risk Sensitivities

Example:

SA-CCR PFE
Add-On
approximation
workflow

Disaggregate
Transactions

- Determine transactions in netting set
- Determine primary risk driver (asset class) per trade and create trade level view per asset class
- Decide treatment of hybrid transactions (either define primary risk driver or agree split of exposure with local regulator)

Define trade level
notional and
Maturity Factors

- Apply supervisory duration (IR and Credit Derivs only)
- Standardise trade notional for FX, Equities, Commodities
- Standardise trade notional for swaps with variable notional
- Unmargined - Apply standardised maturity factors
- Margined – Calculate standardised Margin Period of Risk
- Apply Supervisory Delta

Aggregate back into
Netting Set level
Exposure AddOn

- Calculate Effective Notional by aggregating delta adjusted notional per bucket defined in defined hedging set
- Multiply Effective Notional with Supervisory factor per asset class -> yields the add-on per hedging set
- Simple Summation of all add-ons per hedging yields AddOn (aggregate)

Source: <http://www.rabatin.com/public/Rabatin-SA-CCR-IT-Implementation.pdf>

Regulatory Risk Pipeline - Counterparty Risk

<i>Regulation</i>	OTC Bilateral Margining (IM and VM)	SA-CCR	CVA RWA (Alignment with IFRS 13 CVA)
<i>Purpose</i>	<ul style="list-style-type: none"> • Systemic Risk Reduction in OTC Markets 	<ul style="list-style-type: none"> • Credit RWA - Capital • Leverage Ratio 	<ul style="list-style-type: none"> • CVA RWA – Capital (SA-CVA)
<i>Implementation</i>	<ul style="list-style-type: none"> • Phased-in from Sep 2016 onwards for top broker dealers • Segregated, non-rehypothicated initial margin for uncleared OTC transactions with prescriptive haircuts for non-cash collateral • Risk-based model (using risk sensitivities) with notional based fallback. 	<ul style="list-style-type: none"> • Exposure calculation based on standardised risk sensitivities • Highly dependent on correct classification and standardisation of trades to identify correct hedging and netting set. 	<ul style="list-style-type: none"> • Full Forward Revaluation of trades with Monte-Carlo simulation of market paths • Sensitivities of CVA to exposure risk factors (IR, FX, Equities, Commodities) and counterparty credit curves • SA-CVA calculated using CVA sensitivities
<i>Methodology / Primary Inputs</i>	<ul style="list-style-type: none"> • Risk Sensitivities • Collateral Data 	<ul style="list-style-type: none"> • Risk Sensitivities • Collateral Data 	<ul style="list-style-type: none"> • Full Forward Revaluation • Full Trade and Market Data • Collateral Data
<i>Timeline</i>	<ul style="list-style-type: none"> • Phase-in Starting Sep 2016 	<ul style="list-style-type: none"> • Jan 2017 	<ul style="list-style-type: none"> • FRTB – 2019?

How is the Technology Roadmap Challenged?

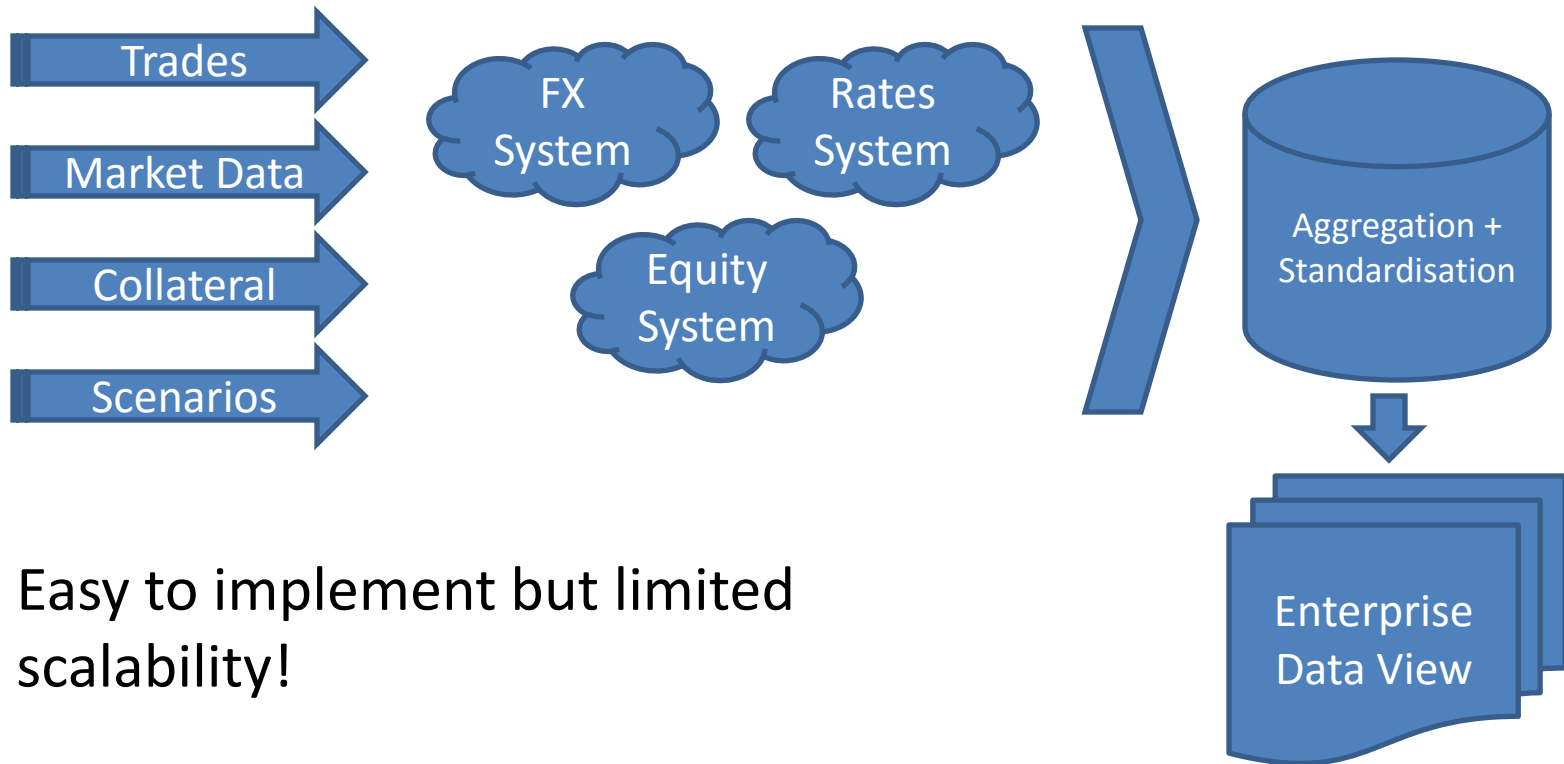
- Business Silos are being challenged –
 - Regulators are taking an Enterprise Risk View
 - Counterparty Risk requires cross-asset class capabilities
- Front-To-Back Silos increase operational costs and risk
 - Pre-Deal pricing of enterprise risk (e.g. xVA)
- Enterprise-wide risk aggregation requires enterprise-wide risk standardisation

Implementing an Enterprise Data Foundation



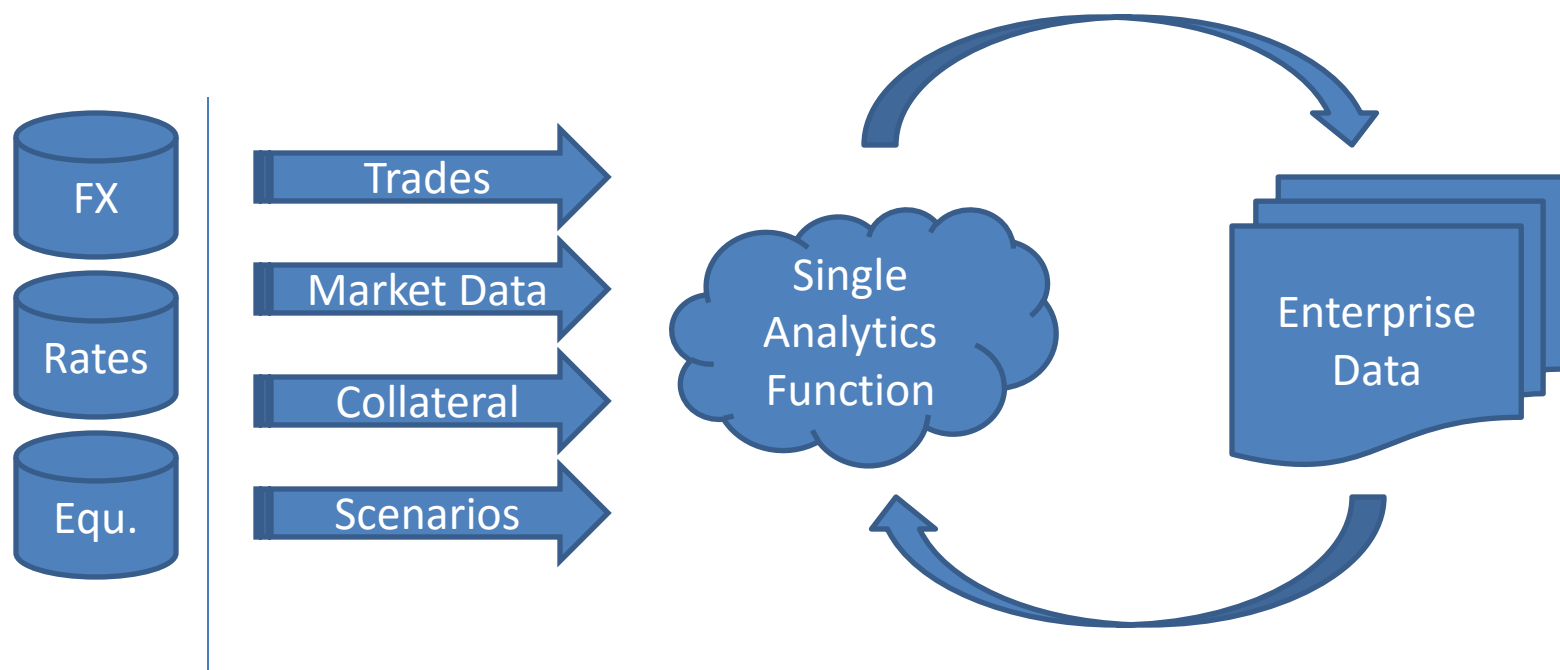
Standardisation becomes increasingly expensive further away from Reference Data level

Risk Calculation Framework – Traditional One-Directional Aggregation Model



Easy to implement but limited scalability!

Risk Calculation Framework – Analytics Centric Model



A single Analytics Framework allows cross-asset class portfolio level calculations, such as CVA sensitivities, by using portfolio level results as data inputs

Deciding a Strategic Approach

- Data Foundations are key to any technology roadmap
 - All regulatory risk requirements require enterprise wide standardisation
 - All banks will be required to calculate FRTB SA Market Risk for Capital Purposes
 - Consistent Treatment of collateralised and uncollateralised exposure
- A decision on the Analytics Framework depends on need for cross-asset class pre-deal pricing and hedging
- Banks which use only SA-CCR, SA (FRTB) and BA-CVA may not need a central analytics capability

Questions and Comments Welcome!

