The Dawn of Digital Reinsurance
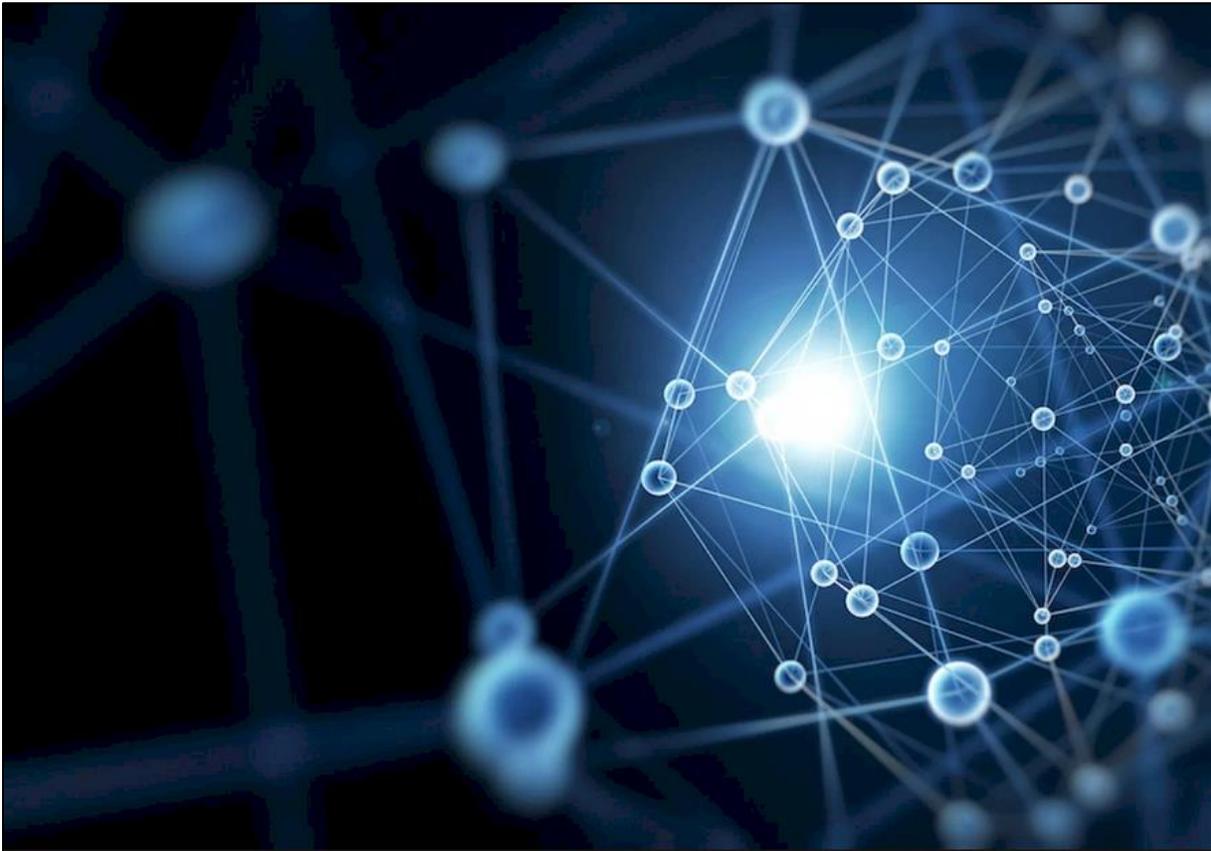

The physical science of matter and motion provides valuable insight for the effective digital management of risk.

In this first installment of the DelphX Innovation Series, we describe how a new reinsurance facility powered by transparent Distributed Ledger Technology is employing digital parallels to physical science to diffuse the impact of adverse events.

Background

The physics of diffusion enables the force of a speeding bullet to be absorbed and rendered nearly harmless by the energy-distributing property of graphene lattice incorporated within a bulletproof vest. That diffusion results from the efficient random-walk distribution of the bullet's force among the graphene fibers – conveying its energy down a gradient from cells of greater concentration to those of lesser concentration.

That property of absorption also causes fluid collected in a sponge to be efficiently distributed among its cavities in proportion to the relative size and fluid concentration of each cavity. Correspondingly, fluid contained in a saturated sponge placed in a vacuum will be released from each cavity in proportion to its relative size and concentration – with those containing higher concentrations sourcing respectively higher amounts of the outflowing fluid.

Science of Digital Reinsurance

A digital corollary to that balanced distribution process has been integrated into the patent-pending technology of a new risk-pooling reinsurance facility styled, "Quantem" to reflect its risk/collateral minimizing utility. The facility will be operated by a major global reinsurer to optimally diffuse the impact of loss among risk holders – rendering even a material event nearly harmless to any individual holder.

Ceded risks will be distributed within a transparent digital ledger that allocates each risk among all cedents in proportion to the net current size and concentration of risk ceded by each. While all cedents will have full viewing access to all elements of the ledger, their identity will never be disclosed.

Operation of the Quantem ledger will be perpetual and open-ended with the level of concentration of each new risk being determined at origination by the anonymous interaction of competing participants in the SEC-regulated DelphX Alternative Trading System (ATS) market. Demand in that market will be sourced from participants seeking to cost-effectively transfer (or speculate on) risk and its supply will be sourced from credit investors seeking to assume referenced risks in return for their ongoing receipt of attractive yields arising from negotiated annual risk-premium/spread.

The aggregate size of the ledger will dynamically increase as new risks are added and decrease as existing risks expire due to their maturity or settlement. As each new risk is added its size and premium/spread (risk concentration) will determine its positioning along the ledger's concentration gradient – incrementally adjusting the proportionate quota-share exposure of each other risk.

Credit Market Solution

The Quantem facility will be initially deployed in the global credit market to provide participants a low-cost and more efficient alternative to single-name credit default swap contracts. It will diffuse the impact of adverse credit events and provide a regulated security-based solution to the dwindling derivative-based CDS market.
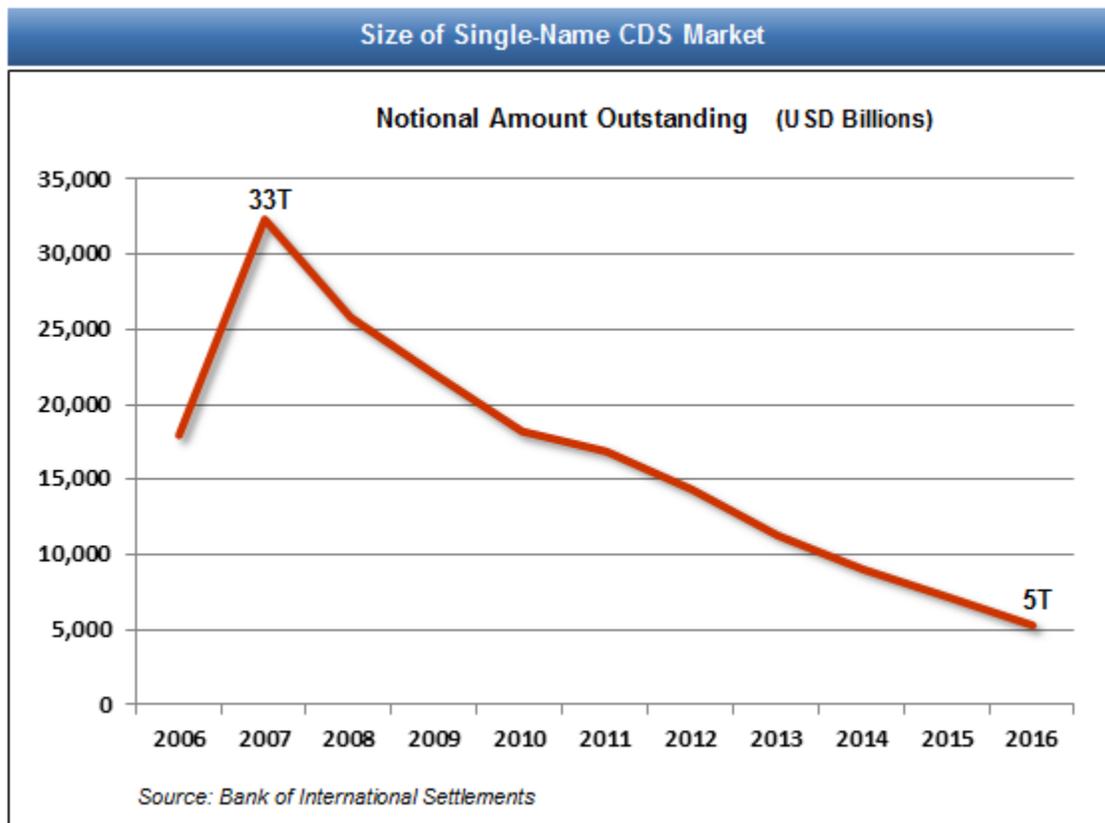
To accommodate that efficient transfer of credit risks and the supporting cash flows, Quantem will commoditize those risks/flows within a new form of digital…

Default Compensation Receipt (DCR) Securities that provide:

- Fixed negotiated spreads and maturities;
- MTM-collateralization by cash-equivalent assets held in trust by a highly-rated custodian bank;

- Lump-sum compensation payments to holders upon occurrence of a qualifying credit event involving the referenced corporate, municipal, sovereign, structured or other security; and

- Anonymous negotiation, origination and trading within the transparent DelphX ATS market.

To minimize the cost of DCR protection and efficiently source the required collateral, Quantem will also commoditize and reinsure the DCR risks through the sale of new digital…

Collateralized Reference Obligation (CRO) Securities that provide:

- Fixed negotiated coupons and maturities;

- Full collateralization by cash-equivalent assets held in trust by a highly-rated custodian bank;

- Deeply-discounted purchase prices reflecting the lower risks resulting from Quantem's reinsurance facility; and

- Anonymous negotiation, origination and trading within the transparent DelphX ATS market.

Note: All CRO sale proceeds are available to Quantem solely for use in funding the collateral requirements and compensation benefits of DCR holders.
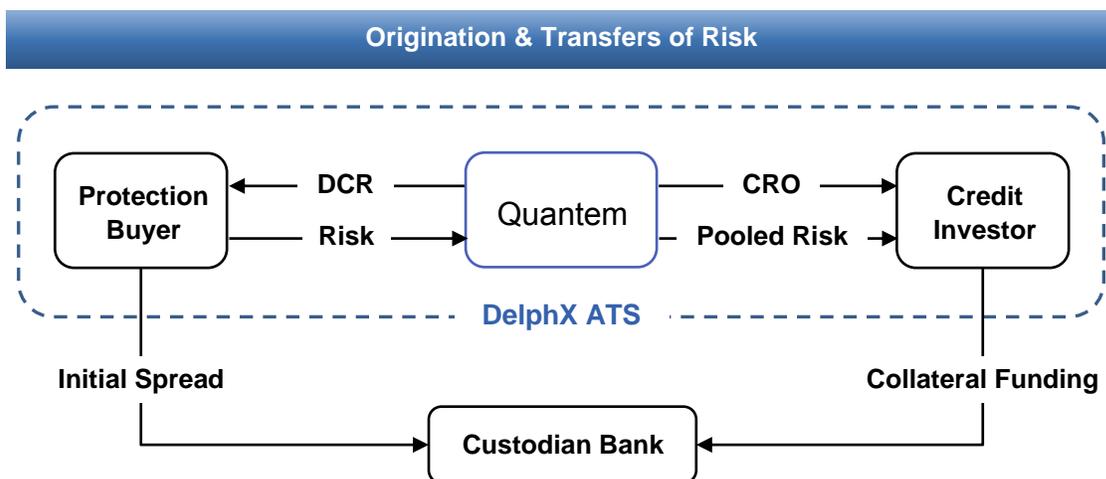
Lower Cost & Compelling Yields

The risk-mitigating utility of Quantem results in DCR spreads priced well below the cost of comparable CDS protection and low purchase prices for CROs. The enduring benefit of that lower cost of purchase is evidenced in the considerable post-claim yields payable to CRO investors. For example, an assumed annual ledger loss ratio of 4.0% (which is more than twice the aggregate mean rate of annual default of all U.S. corporate bonds since 1981), would produce the attractive post-claim CRO yields indicated below.

Post-Claim CRO Yields (Assuming 4.0% Annual Pool Loss Ratio)				
Coupon (DCR Spread)	CRO Price (% of Face)	Coupon Yield %	Treasury Yield %	Total Yield %
15	20	0.75	2.40	3.07
30	20	1.50	2.40	3.74
60	25	2.40	2.40	4.49
100	25	4.00	2.40	5.88
200	30	6.67	2.40	8.03
300	35	8.57	2.40	9.41
400	40	10.00	2.40	10.32
500	45	11.11	2.40	10.91
600	50	12.00	2.40	11.28
700	55	12.73	2.40	11.49
800	60	13.33	2.40	11.58
900	65	13.85	2.40	11.57
1000	65	15.38	2.40	12.59
1100	70	15.71	2.40	12.40
1200	70	17.14	2.40	13.31
1300	70	18.57	2.40	14.22
1400	70	20.00	2.40	15.13
1500	70	21.43	2.40	16.04
1600	70	22.86	2.40	16.95
1700	70	24.29	2.40	17.86

Market-Based Underwriting

The fixed risk-concentration of each new DCR added to the ledger is determined at origination by the clearing premium/spread resulting from the competitive interaction of participants in the

transparent DelphX market. That risk-concentration thus reflects the market's then-current equilibrium of supply and demand for protection relating to the subject CUSIP/ID.

That transparent interaction among symmetrically-informed market participants facilitates the efficient market-based underwriting and selection of new risks - avoiding adverse selection and subjective/uninformed assessments of risk-concentration. While the current DCR pricing for each referenced CUSIP/ID will over time increase and decrease on the DelphX market, the ledger's design facilitates the aggregate behaviour of pooled DCRs to gradually converge onto a normal (Gaussian) distribution.

As the market's current risk assessment of each CUSIP/ID increases and decreases, the MTM collateral requirements of holders of the related DCRs will correspondingly increase and decrease in response to those changing market prices. Consistent with the law of large numbers, however, as risks of some DCRs are increasing others will be decreasing – resulting in an increasingly predictable mean exposure within the ledger.

The consistent historical behaviour of participants in the single-name CDS market indicates that demand for DCR protection (and speculation) for a given CUSIP/ID will likely increase in proportion to the collective assessment of participants of the likelihood of a loss involving that security. If the risk assessment increases, the pricing and volume of DCR purchases for the subject issue will correspondingly increase.

As those freshly-priced DCRs are ceded to the ledger, their higher risk concentration will cause the aggregate concentration of risk for the subject CUSIP/ID in the ledger to correspondingly increase. Thus the collateral sourced by those higher risks will proportionately increase the ledger's aggregate collateral available for MTM adjustments, and minimize the impact of a related loss upon all other DCR risks.

Market-Based Adjudication

Quantem will employ its diffusion protocol to distribute the cost of DCR compensation payments among risk holders based upon the net size and concentration of each holder's ceded risk at the time of adjudication of the claim. That adjudication process will also be transparently accomplished through anonymous single-price auctions conducted within DelphX.

Upon the reporting of a credit event meeting the definition and conditions specified in the DCR documentation, a single-price auction will be immediately scheduled within DelphX to facilitate the sale of the collective offerings of the referenced CUSIP/ID by its holders. The clearing price of that auction will then be subtracted from the par value of the referenced security with the remainder constituting the compensation payable to holders of DCRs referencing the sold issue.
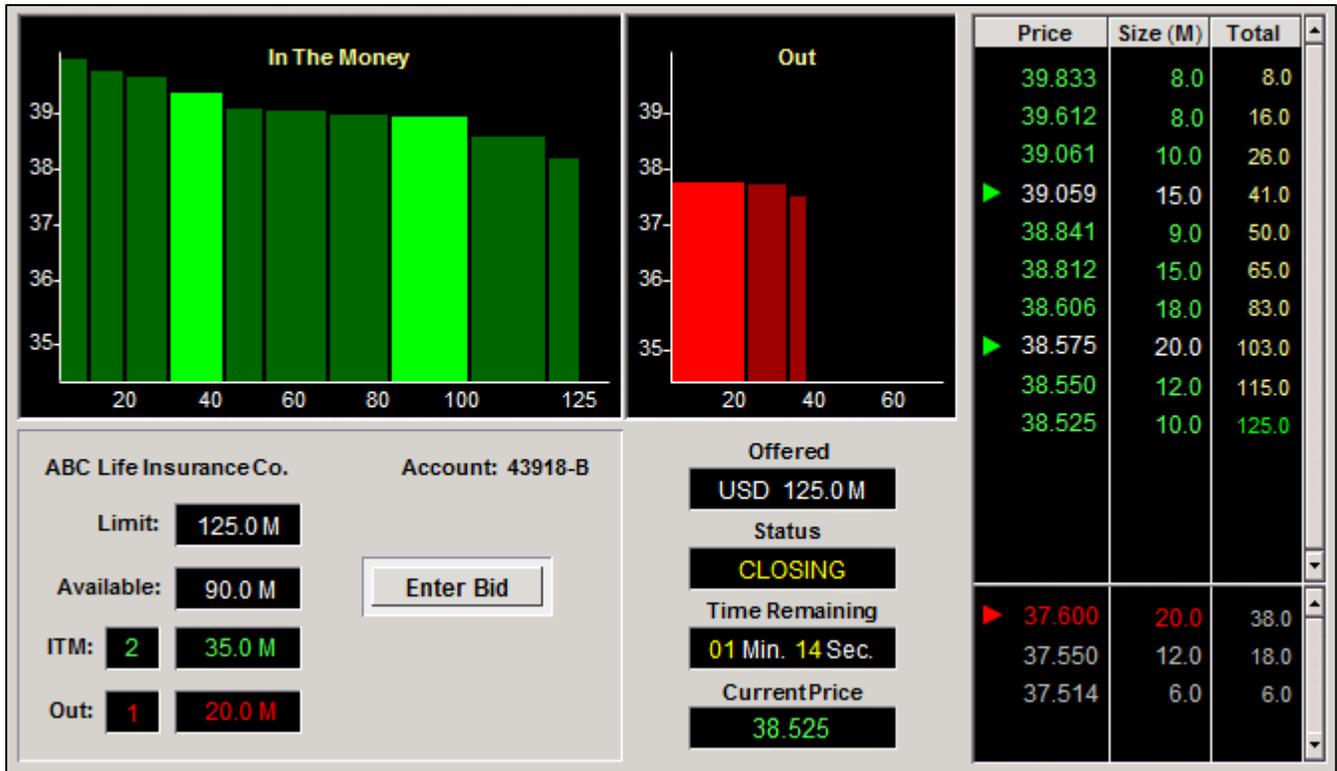
For more information, contact *info@delphx.com*

This article was first published in Insurance Thought Leadership Magazine