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Collateral Annual 2021

No margin for error

Microsoft founder Bill Gates speculates that the COVID-19 pandemic has set the global economy back 25 years, to say nothing of the personal tragedies and losses of freedoms we've all endured.

But, for collateral management, the opposite may be true. As the pages of this handbook will attest, the unexpected disruption wrought by the disease has provided a rude awakening to those lagging in updating their collateral toolkits.

As FIS (page 20) suggests, the size of the collateral movements in Q1 offered a useful preview of what will happen when the next wave of the Uncleared Margin Rules belatedly arrives in 2021.

Despite the delay, readers will not struggle to find a collateral manager who, after being buffeted by the volatility in February and March, is arguing that the time to invest in margin optimisation tools, enhanced straight-through processing capabilities and silo-busting technologies is now.

Echoing this point, CME (page 31) describes how collateral managers like calm and certainty, but got precious little of either for much of the year. It is further noted that continued reliance on Excel to manage the greater volumes of margin adjustments that are predicted going forward is not the way to regain a Zen-like state. According to Vermeg (page 50), the market should aspire for a no-touch collateral management world.

A central theme of this year's collateral annual was encapsulated by J.P. Morgan (page 8) as the unlocking of trapped assets by smashing internal silos and creating what Pirum (page 44) describes as enterprise-wide collateral management — a concept it argues is more achievable than ever thanks to the technological tools available today.

Looking ahead, Clearstream and HQLA^X detail how new technologies, especially of the distributed ledger variety, also offer ways to significantly enhance optimisation of assets and are becoming increasingly attractive options.

Finally, this annual answers the question on everyone's lips which is, what do Jaffa Cakes have in common with collateral management. Find out on page 16.

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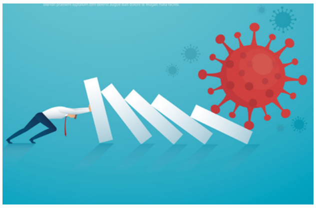

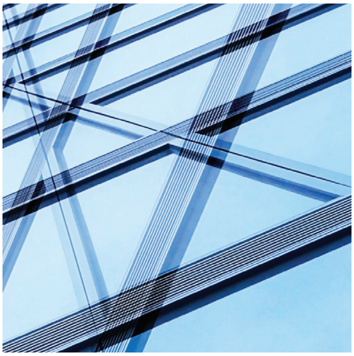
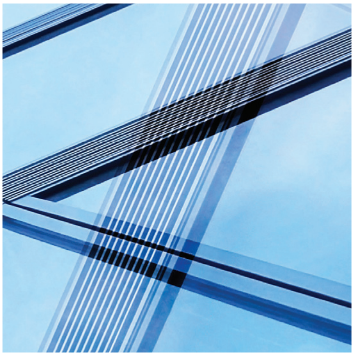

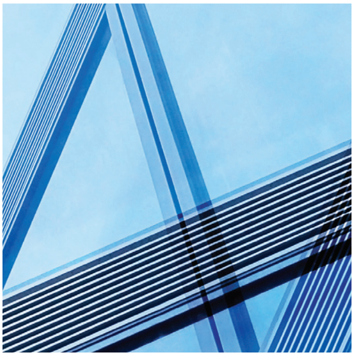
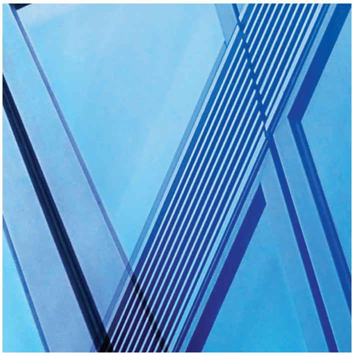

We clear the path

OCC has the largest centrally-cleared stock loan offering in the world with approximately $80 billion in cleared loan balances. Over the last 25 years, OCC has built an innovative and unique U.S. program for securities lending transactions where OCC steps in as the counterparty (with a two percent risk weight) and guarantees the return of stock or collateral. We continue to enhance and expand access to our stock loan program in order to offer clearing solutions and capital efficiencies for our members and the entire securities finance industry.

As the world's largest equity derivatives clearinghouse, OCC is committed to providing market participants with high quality and efficient clearing, settlement and risk management services. As a Systemically Important Financial Market Utility, we work to enhance our resiliency in order to reduce systemic risk, increase market transparency, and provide capital and collateral efficiencies for the U.S. capital markets.

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THE FOUNDATION FOR SECURE MARKETS

Inside this issue

Five drivers of collateral convergence

Michele Filippini
Collateral services product manager
J.P. Morgan

What is driving collateral convergence and standardisation across organisational structures, operating processes and technology, and what's next?

In a year marked by challenges and quick adoption of new solutions, the securities financing market is renewing its focus on collateral management innovations that will allow businesses to operate even more efficiently. What is driving collateral convergence and standardisation across organisational structures, operating processes and technology, and what's next?

Structural convergence

As institutions evolve their business structures, we continue to see business reporting lines come together, central funding units arise, and investment spending on collateral services increase. These trends not only create new efficiencies within individual institutions, but also raise the potential for new synergies across securities financing. The question is, can we come together to create an even more efficient industry? Yes, we can. Abundant opportunities remain, because many of the fundamental operational processes for managing collateral have not changed in several years — despite the emergence of market solutions that could provide greater efficiency.

Initially, led by some large investment banks who structurally aligned financing and derivatives collateral margining, optimisation and operations teams, many buy-side firms are following similar approaches and leveraging best practise or core systems processing through the convergence.

Used traditionally for securities financing, the broad adoption of triparty collateral management solutions to support the introduction of the Uncleared Margin Rules (UMR) has created a new way of managing collateral for firms trading and collateralising derivatives. Buy-side firms already leverage triparty as collateral receivers in financing; under UMR, use of triparty will materially increase to receive initial margin. Some buy-side firms are also embracing triparty to post IM, becoming collateral providers for the first time and further centralising collateral inventory to create efficiencies.

The next step could be to further optimise the derivatives operating flow when it comes to collateralising variation margin for over-the-counter (OTC) derivatives. Can the industry get comfortable with the transfer of legal ownership occurring not through bilateral physical settlement, but by way of books and records settlement through a triparty agent? The speed of collateralisation through triparty might have helped to minimise settlement challenges experienced by derivatives counterparties, such as settling large same-day margin swings via bilateral physical settlement, back in March and April. Such a change, however, would need to be broadly adopted across the derivatives market in order for the benefits of triparty to be widely felt.

Financing convergence

Creating central collateral business units has allowed firms to look at how collateral can be managed more holistically. Available collateral is no longer limited to margin assets provided by a hedge fund to an equity prime broker: now it is any unencumbered asset regardless of line of business, legal entity or custody location.

This has created significant interest in unlocking trapped assets to use them as collateral, and is an area we've addressed by working closely with clients across multiple markets. Trapped assets can be specific to a particular firm or legal entity where securities cannot be financed, or related to a security or market where operational, regulatory or legal inhibitors restrict the ability to mobilise and finance them. Some examples include emerging market equities, physical certificates or restricted share classes, or assets that are difficult to fund in their current custody location due to a lack of operational infrastructure or a depth of liquidity in the client base.

Trapped assets need innovative financing solutions to reduce drain on alpha. Further, the ability to efficiently mobilise them unlocks value, making them available to meet margin calls to a central counterparty clearing house or to collateralise an OTC derivative transaction. In combination with triparty solutions, including reuse technology, inter-entity funding can occur quickly and seamlessly.

Operational convergence

As businesses restructure and regulations change, operational support must continue to evolve. Operational challenges need technology solutions to maintain levels of straight-through processing but, with budgets often squeezed, they are too often asked to do more with less.

That's where data, analytics and insight from a collateral agent such as J.P. Morgan can help. We can provide a holistic view of their portfolios, including available collateral inventory, eligibility, allocation and exception management and diagnostic tools.

Inventory management remains the starting point for effective allocation and optimisation. Being able to view, simulate and allocate collateral held in any custody location and mobilise it to satisfy an exposure remains challenging for most operational groups. Technology-driven solutions such as J.P. Morgan's Collateral Transport can enable greater efficiency and help solve these problems.

The desire for increasingly sophisticated optimisation capabilities is also increasing as the front office continues to seek efficient collateral allocation in order to positively impact profitability. With collateral overlay functionality, multi-asset allocation orders and targetted client allocation, clients have access to granular and customisable capabilities that allow operational groups to meet the objectives set by their business unit.

Technology convergence

Managing collateral and identifying new solutions requires continuous technology development and exploration by collateral agents, clients and fintech providers.

Creating new efficiencies will require ongoing integration and standardisation across the industry wherever possible, with near term opportunities that include:

- Increasing the use of application programming interfaces (APIs) to provide system-to-system connectivity and create scale in data communication between agents and their clients
- Expanding online options for managing eligibility to support faster time to market, particularly critical in times of market stress. This could include the use of APIs to update schedules directly from clients' risk systems to more efficiently manage counterparty risk with minimal delay
- Embracing digitisation to accelerate legal execution and negotiation, by using e-signatures and document sharing, and the mobilisation of collateral by creating anonymised collateral tokens

Longer term, the ongoing exploration of digitising general collateral, through the use of distributed ledger technology, could increase the velocity of collateral across the ecosystem and ensure collateral is effectively being utilised across counterparties and exposures.

Data convergence

Within the collateral ecosystem, data and insight provide both challenge and opportunity.

Transmission: APIs have increased the ability to transmit data from vendor to client to third parties. However, with institutions that vary in size and scale, and technology budgets always under pressure, the road to a better connected ecosystem through true system-to-system integration remains a long one.

The industry should review current data flows and connectivity to determine whether the work already done to meet the regulatory deadline for the Securities

Financing Transactions Regulation is sufficient or if there are additional opportunities to improve.

Standardisation: This can encompass anything from identifying a trading volume data point for exchange-traded funds, a method of classifying an asset and whether it qualifies in an environmental, social and governance bucket, an legal entity identifer for an asset issuer or the consolidation of reference data and pricing vendors into a common technical architecture to reduce costs.

The technical limitations to some of these standardisation examples are often less of a barrier to change than the industry coordination and agreement required to reach the standard. Because different institutions, beneficial owners, risk managers and data providers could all have a separate view on the standard, industry trade bodies and associations should bring the market together to identify the framework for change. With viewpoints considered and consensus reached, unified standards could drive significant market improvements.

Analytics: The convergence of ideas and best practices in data analytics can lead to a more efficient collateral ecosystem. Pre-trade analytics support fully informed decisions at the point of trade. This could allow the client to identify the best venue or trade type to execute a transaction, the optimal counterparty from a risk and capital perspective, how flexible the eligibility set is, should the trade be cleared, should it be done via a swap or other securities financing transaction, should it be a pledge or transfer of title, etc. This pre-trade information can impact the profit-and-loss value of that transaction.

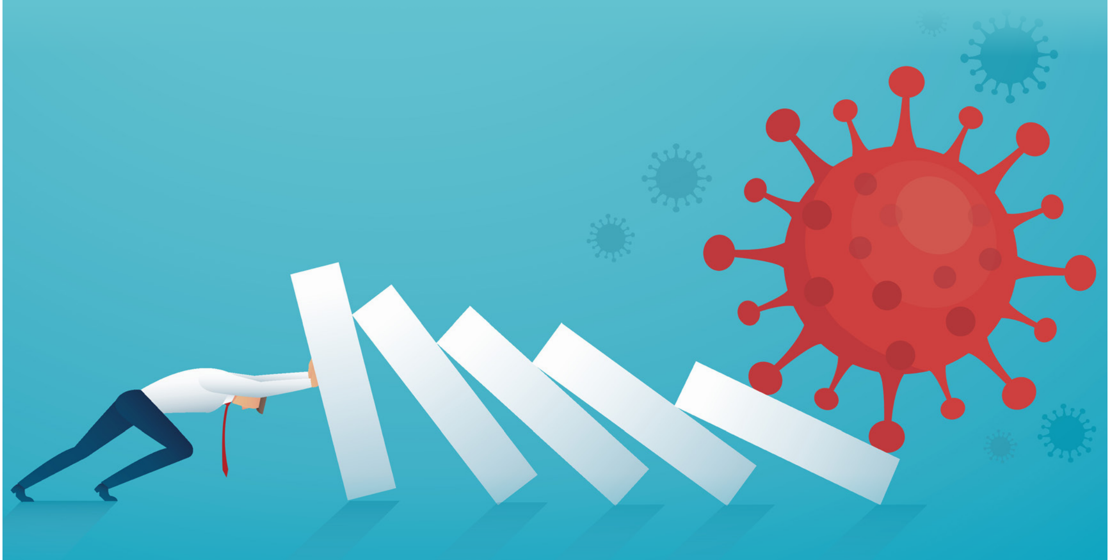
After the trade is placed, post-trade analytics identify the right collateral to select and how to settle it to minimise any impact to a binding constraint. For example, this data can be used to efficiently allocate assets to minimise excess collateral usage of capital as determined by the regulatory environment. Operations dashboards can highlight exceptions and provide workflow tools to ensure accurate settlement of transactions, thus reducing fail costs.

These five drivers are interlinked and need to be tackled in parallel. Fortunately, with the frequency of regulatory reforms seemingly reducing, resources and technology are freeing up to focus on the opportunities that additional convergence could create. Some challenges can be addressed unilaterally, while others demand broader engagement and standardisation.

As a global provider of custody and trading services, including agency financing and collateral management for triparty and derivatives, J.P. Morgan is deeply engaged with these industry developments. We remain committed to working across client segments and industry groups to embrace new solutions and drive efficiency with holistic solutions for financing and margining.

Michele Filippini
Collateral services product manager
J.P. Morgan

These five drivers are interlinked and need to be tackled in parallel. Fortunately, with the frequency of regulatory reforms seemingly reducing, resources and technology are freeing up to focus on the opportunities



Winning the fight against the crisis

As the world of banking, funding and financing deals with the ongoing challenges of the COVID-19 pandemic, Richard Glen, head of collateral management, and Banu Apers, head of securities lending and borrowing, outline how collateral management continues to evolve at Clearstream in the new digital age and why safer markets require safer infrastructure

For opticians, 20/20 means perfect vision. However, even those with perfect visual acuity couldn't have predicted the full scale of the pandemic that has swept the globe throughout 2020 and now presents new challenges that could potentially remain for many years to come, as the new normal.

Crisis management resonates with many across financial markets, and banking has adapted well to the current COVID-19 readiness situation. In 2020, global banking continues to evolve under the watchful eye of its college of regulators, and the industry has taken huge leaps forward as it has looked to adapt and comply with the likes of the Dodd-Frank Act, Basel III and European Market Infrastructure Regulation (EMIR). Crisis management and risk mitigation come hand-in-hand with safer markets, and collateral has been the common theme that has underpinned all regulatory initiatives since the outset of the financial crisis. In fact, investment in collateral management in the meantime has become a strategic objective for both banks and non-banks alike.

Safety first

When the rearranged GSF Summit took place in Luxembourg in January 2009 under the motto 'going beyond fragmentation', the traditional mechanics of safe markets and collateral management were discussed at length. In times of market uncertainty, counterparties considered the emerging trend of bundling collateral in central liquidity pools to make markets and the wider financial sector safer. They debated how market infrastructure could help to unlock trapped inventory and thereby support banks to mobilise collateral both swiftly and effectively in good times and in bad. Safer markets ultimately required safer infrastructure.

This seemed like a sensible objective. Within this context, however, the 'R' number started to rise. At this point in history, the 'R' number represented the rate of release of new regulation that would ultimately change the financial industry forever. In Europe, there was EMIR, then the Uncleared Margin Rules (UMR). This was followed by the

> ***The number of use cases for the mobilisation of assets, both in book-entry and tokenised form, for collateral upgrades and margin pledges continues to grow***

Let's wind the clock back to September 2008 when wholesale banking entered a new age. Liquidity tightened dramatically in the aftermath of the default of Lehman Brothers. Central banks and policymakers took immediate action and injected enormous amounts of cash as they attempted to stabilise wholesale markets. For the first time in its history, Clearstream's GSF Summit, a leading global conference for securities financing, was postponed in 2008 as traders, treasurers and securities financiers across the industry tried to make sense of what subsequently became the new normal.

Securities Financing Transactions Regulation, the second Shareholder Rights Directive and now the Central Securities Depositories Regulation (CSDR).

In the collateral management business, regulation drives change and when we think back to the messages from the 2009 GSF Summit, it is not only the location of that collateral and the ability to access liquidity that remains important; it is also the mechanics that make up the collateral management workflow that remain a source of constant discussion and now evolution.

The dawn of the digital age

As the UMR programme originally mandated by the Basel Committee on Banking Supervision (BCBS) and the International Organization of Securities Commissions (IOSCO) now reaches the fifth and penultimate phase, albeit delayed, in 2021, it brings a number of counterparties into scope that have never previously mobilised securities inventory or collateral to the extent that they will need to. In fact, many still underestimate the huge amount of operational and technological competence required to mobilise collateral effectively. Investing in this type of process during a normal business cycle, let alone a pandemic is both costly and complex, and this is why market participants continue to place their trust in partners such as Deutsche Boerse Group and Clearstream who continue to invest in industry infrastructure for the benefit and resilience of the wider marketplace.

Whilst 2020 will be memorable for the wrong reasons, in the financial sector it has truly seen the dawn of the digital age in wholesale banking. The technology that companies such as Deutsche Boerse Group deploy has not only allowed its employees and service providers to work safely and securely from home across all locations, it has also allowed it to support its clients in mobilising their global collateral pools seamlessly throughout, across different locations, time zones and investment venues. Whilst people cannot travel, collateral always needs to remain mobile, and mobilising and monitoring assets effectively in times of crisis relies heavily on automation and real-time processing. It also requires investment in capabilities that are designed to improve both existing and future collateral processes.

For the likes of Clearstream, this includes developing cross-border collateral management processes in Europe as we look to help market counterparties optimise assets for financing as well as to minimise intraday credit usage in our Luxembourg and Frankfurt hubs as well as across other sub-custodian locations. It also includes collaborating with fellow market participants in the Americas, Asia and Africa.

In securities lending, we also continue to invest in our ASL and ASLplus products which offer clients end-to-end automation when borrowing or lending securities. Whilst the settlement discipline regime mandated by CSDR seems to be delayed, we continue to discuss readiness with clients to ensure that they have access to critical liquidity if needed.

Separately, we’re also supporting market participants by investing in the future of collateral management. This includes the cloud-based user experience offered by CloudMargin as well as new digital collateral partnerships such as HQLA^{X}. The number of use cases for the mobilisation of assets, both in book-entry and tokenised form, for collateral upgrades and margin pledges continues to grow, and the need to navigate a fragmented collateral ecosystem is driving digital innovation and more importantly, investment in digital trust.

Innovating with data

Digitisation is also creating new opportunities for data. In collateral management, much of the complexity is driven by the huge amount of data that risk managers use to determine or assess eligibility of assets. Since the outset of the financial crisis, the industry has come a long way but continues to evolve. In 2008, new innovative functionality included the ability to dynamically apply increased haircuts to stale prices or to flexibly layer different eligibility rules together to create sophisticated collateral profiles for multiple asset classes.

In 2020, clients are looking to apply further filters to dynamically manage a number of different scenarios and trigger points as well as coordinate dialogue with different stakeholders both internally and externally. These include not only minimum prices and volatility ratios but also liquidity scores. With the growing importance of specific regulatory criteria, such as those required to manage cleared or uncleared margin requirements or access to central bank liquidity, the sophisticated nature of eligibility management will continue to evolve. As we edge towards the end of 2020, new investment parameters, particularly those focusing on environmental, social and corporate governance (ESG) criteria, will continue to drive innovation in collateral management. We believe there will be a continued focus on 'green' data as well as end-to-end common domain models as the industry seeks to harmonise and standardise many of its antiquated legacy systems.

Moving to a new European standard

Whilst data and digitisation create opportunities for banks to manage risk, balance sheet and exposure requirements more effectively, the ability to unlock new collateral and liquidity pools remains a key objective for clients and service providers alike. The keynote speaker at the 2009 GSF Summit was Luc Frieden, minister for finance and budget in Luxembourg, who spoke on 'winning the fight against the crisis'. This was at a time when Europe was at a crossroads. Markets were in lockdown, contagion spread from a localised outbreak to a truly global phenomenon. Even countries were no longer too big to fail. Safer markets required safer infrastructure. (All of this sounds very familiar.)

The rollout of TARGET2-Securities (T2S), whilst originally designed to harmonise and reduce the cost of settlement processes in Europe, was now focused on the safe haven of central bank money and central bank liquidity. Now, as we enter the new CSDR era, focus continues across the Eurosystem on a renewed push for harmonisation and standardisation. The Single Collateral Rulebook for Europe (more conveniently known as SCoRE) seeks to merge the legacy collateral management systems of the likes of Bundesbank, Banque de France and Banca d'Italia into a single collateral management platform covering the entire eurosystem towards the end of 2023. With further harmonisation of the existing TARGET2 and T2S process planned in parallel plus the inclusion of Eurobonds as collateral within T2S, collateral managers and triparty service providers face several compelling challenges both in terms of operational and technical complexity. Legacy systems and processes will require upgrades; clients and market participants will have to adapt to new messaging interfaces, new reporting and new processes that impact not only collateral management but also asset servicing and settlement.

However, in the long-term, new digital solutions that offer harmonisation and standardisation are positive for financial markets, and the changes will encourage participants to deploy new data and operational workflow to promote collateral mobility which, as the GSF Summit predicted, go beyond fragmentation. With new technology and innovative expertise coming to the forefront across both the vendor and middleware space, the future looks bright for banking, funding and financing.

> ***New digital solutions that offer harmonisation and standardisation are positive for financial markets, and the changes will encourage participants to deploy new data and operational workflow to promote collateral mobility***

A little while from now, when we look back on the current pandemic era and the lessons learned and we jointly reflect on the message from Luc Frieden in 2009, bankers and financiers will gather together, hopefully physically, and re-affirm that safer markets need safer infrastructure and that together, the world will be a safer place as a result.

Collateral management: Biscuit or cake?

Martin Walker
Head of product, securities finance and collateral management
Broadridge

Understanding the history of a favourite snack in the UK and the former Yugoslav republics can help us think about how to design collateral management departments and systems

Walk into a supermarket anywhere in the Yugoslav republics and you are likely to be confronted in the biscuit section by a large selection of a very British snack, the Jaffa Cake, a snack invented by Scottish biscuit manufacturer McVitie and Price in 1927. Though biscuit sized, sold next to biscuits and eaten as an alternative to biscuits to accompany hot beverages, Jaffa Cakes have some very non-biscuit-like qualities. A Jaffa Cake consists of three layers: a sponge base, an orange jelly layer and a covering of dark chocolate. But what does this have to with collateral management?

Jaffa Cakes in their 93 years of existence have seen an explosion in variety. There are multiple manufacturers and flavours and they are even available in milk instead of dark chocolate. Yet, all the varieties are clearly identifiable as the same sweet snack. Likewise, so is collateral management. The process of giving and receiving collateral in the form of cash or securities has also grown in a very wide variety of forms. Some of the more recent forms are driven by financial innovation but many of the others resulting from tougher regulation in the light of the great financial crisis.

The other parallel is the biscuit or cake dilemma. Jaffa Cakes have been involved in legal disputes in both the UK and Ireland relating to whether they are cakes or biscuits. For collateral management the question is whether it is a revenue generating front office activity or operational activity where the focus should be efficiency and control.

In the UK, Her Majesty's Customs and Revenue (HMRC) has long agonised about the classification of Jaffa Cakes. To quote its website: "Customs and Excise had accepted since the start of VAT that Jaffa cakes were zero-rated as cakes, but always had misgivings about whether this was correct." In 1991, it decided to take action and imposed value added tax on Jaffa Cakes. McVities, the inventor and primary manufacturer appealed. The nation held its breath and sipped its tea as highly-paid lawyers debated the question. To demonstrate the fundamentally cake-like properties of Jaffa Cakes, McVities baked a giant cake-sized Jaffa Cake. In the end the court decided on the essentials. If a Jaffa Cake was left exposed to the air for a long time, what would happen? Biscuits that are left exposed grow soggy, while cakes, if left exposed, grow dry and hard.

Science demonstrated the exposed Jaffa became dry and hard, like a cake. The judgement was made and consumption continued, untaxed. In Ireland a similar case was solved even more scientifically based on the moisture content of Jaffa cakes compared to the average moisture content of biscuits and other cakes.

The equivalent judgement in the front or back office dilemma for collateral management is, firstly, to understand why the question matters, secondly, to identify the criteria for making the decision. For Jaffa Cakes the question of cake or biscuit mattered for tax reasons. In collateral management the question of where it belongs in a firm's organisational structure matters for the following reasons:

- The choice of collateral provided has a direct impact on the profit-and-loss and risk positions of a firm
- Whether it is in the front office or operations has important implications for segregation of duty
- It influences the design of systems used for collateral management and the data they need contain and process

Before looking at the answer to that question it is worth considering the sheer range of types of collateral management that have emerged, often performed by different teams or systems within the same organisations. For much of their history collateral management systems focused on margin management for over-the-counter derivatives. Separate collateral processes existed in products such as futures, contracts for difference (CFDs) and securities lending, where the margin process was essentially integrated into the trade lifecycle. Forms of collateral management evolved where collateral management was placed with a third party rather than bilaterally exchanged, where the agent arranging trades received/managed collateral, where trades were cleared and both parties faced a central counterparty (CCP) and where cleared trades were executed via a clearing broker (see Figure 1).

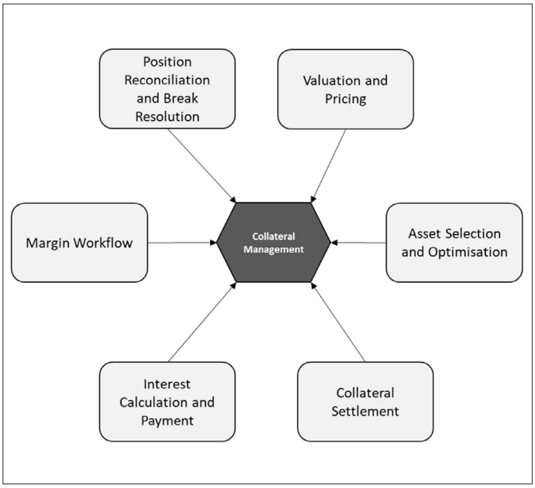
The problem with so many variations was how to identify the key elements that made collateral management. Only by identifying the essential characteristics (sponge, jelly and chocolate in the case of a Jaffa Cake) is it possible to design systems and operating models that allow a holistic approach to collateral management as

Figure 1: Collateral variations

opposed to progressively more complex systems and departments.

Looking across all the variations (see Figure 2) does reveal a small set of common themes, though in some cases the activity is performed outside the core collateral management system or department.

Figure 2: Flavour of collateral



Position reconciliation and break resolution: reconciling positions and resolving breaks is a process well served in different flavours of collateral management by different processes and systems. Securities lending has contract compare processes, OTC derivatives has a portfolio reconciliation while other flavours rely on a centralised golden source of the truth. A centralised collateral management department/system therefore needs to be able to integrate with reconciliation tools that are outside their direct control.

Valuation and pricing: valuations of trades and pricing of collateral to feed into exposure calculations are also functions carried out most effectively in other systems, so the central team/system needs to interact with incoming price and valuations feeds, rather than generate themselves.

Collateral settlements: the management of settlements is another area where other systems and teams are specialised in carrying out these activities and the key need is to have a clearly defined and implemented interface between collateral management teams/systems and settlements/payments. Though integrating collateral related settlements into a collateral management team or system can significantly reduce communication errors between both systems and people.

Margin workflow: This is the area that needs to have most flexibility because depending on the type of collateral management it is likely there are different participants involved, different degrees of straight-through-processing (STP) and different parties driving the overall process. For instance, if a CCP is involved it is likely the CCP's view of the trade would be treated as the golden source, valuations and margin calls will be driven by the CCP rather than the parties that originally entered it into the trade.

Interest calculation and payment: The use of cash as a form of collateral, particularly as variation margin and the processing of other cash flows from collateral (such as coupons on bonds) mean there is a general requirement to calculate interest and other cash flows. As with some of the other processes, depending on the asset class and type of trading, it is likely that the collateral management department/system will need to be able to perform calculations but also integrate to other systems and teams where calculations are more tightly integrated into the lifecycle of products.

The final area to consider that is common to almost all forms of collateral management is Asset Selection. It is consideration of asset selection that answers collateral management's "biscuit or cake" question, "is collateral management a front or back office activity?"

The optimal choice of assets to deliver as collateral (or substitute/recall) is influenced by multiple factors including:

- The acceptable set of collateral as specified in a credit support annex or other relevant legal document that specifies eligible collateral
- The opportunity cost of using collateral including potential returns/costs of using securities in securities lending/repo or cash
- The impact on measures such as the leverage ratio, liquidity coverage ratio and risk
- weighted assets
- Settlement costs of transferring collateral or positioning collateral in the right location
- The impact of client relations of recalling or substituting collateral

Making the correct decisions fundamentally needs a consideration of both risk and profitability i.e. front-office tasks. Fortunately, algorithms can be configured to have the appropriate objectives and constraints and can do most of the thinking, subject to a degree of human supervision and fine tuning. Leaving exception management and most of the client interaction to more operationally focused staff.

Overall, the combination of skills, activities and data required for effective collateral management make it an activity that is aligned to both trading and operations. In addition to a wide range of functionality and interfaces, a good collateral management system therefore requires a sophisticated permission-based model to control access to both functionality and data to avoid segregation of duty issues and the risk of fraudulent activities.

Depending on the skillset, size and location of the team it is also necessary to have sufficient flexibility built into core workflows to either add in additional four eye checks or allow maximum STP. The properly designed system and department is therefore far superior to a Jaffa Cake but does not provide such a good accompaniment to tea or coffee.

Collateral management in 2021

Ted Allen
Vice president capital markets collateral
FIS

Delays to the Uncleared Margin Rules until 2021 does not mean the problem has gone away. Now is the time to focus on your collateral management processes, and FIS can help

Let's start with some good news: 2020 is nearly gone and next year we can hopefully look forward to enjoying all those things that didn't happen this year. Just think what we might get in 2021: a COVID-19 vaccine, the Tokyo Olympics, an Ashes series, a Ryder Cup, a couple of rovers on Mars and the United Nations' International Year of Peace and Trust. It's not all good news of course. We can also expect a plague of locusts (well, cicadas really – check out Brood X), the end of Moore's Law, a return to commuting and wave five of the Uncleared Margin Rules (UMR). This being the collateral management issue of SFT, we will focus our attention on that last point and some related predictions for the year ahead that are driving FIS' strategies.

When the UMR delay was first announced, many in the industry breathed a small sigh of relief. At least that was one less problem to deal with in this car crash of a year. Of course, the problem didn't go away, it was just kicked down the road to be dealt with when things have settled down and we have all got back to normal. Normality, though, will take longer to return than many of us expected, so we will have to deal with the alternative reality. UMR projects that were summarily put on hold in early 2020 are now starting up again in earnest.

Those firms in wave five of UMR are now seriously engaging in preparations and are following five key steps. One: identifying when they are in scope; two: identifying which of their counterparties is in scope; three: working out their strategy for custody (third-party custodian or triparty); four: negotiating the legal documentation with their custodian and their counterparties; and five: upgrading their capabilities to calculate the standard initial margin model and exchange collateral.

Given the pre-pandemic predictions that there was a widespread lack of preparation and many firms wouldn't be able to comply with the regulations by the original deadline, the delay is helpful. The industry has had more time to prepare and fewer will run the risk of not complying by September 2021. Another benefit we are seeing from numerous clients is that the goal of the preparations has moved from doing the minimum tactically to taking a more strategic approach. Not just how to comply, but how to use this as an opportunity to implement fundamental improvements.

The delay is hailed by operations teams because it has allowed them to concentrate on improving business-as-usual. Mass working from home showed the benefits of automation in a model where there is less ad-hoc communication between colleagues in the office environment. The big swings in volumes and values of margin calls in the early days of lockdown put a huge strain on collateral managers and highlighted the value of an automated straight-through process. Firms have also had the time to make more strategic decisions about how they will adapt their operations to wave five, and they have had a preview of what the extra volumes will do to their business process. They have been able to understand the pinch points and get better insight into what they will need.

As an example, the over-the-counter (OTC) derivatives market saw an 80 percent increase in margin calls in March and was settling down to around 20-25 percent higher in April, May and beyond. This created tension, as firms grappled with the extra volume, whilst adapting to staff working from home.

Another pandemic pinch-point has been a slight increase in the prevalence of collateral settlement fails. Fails typically have one of four potential causes: incorrect SSIs, technology shortcomings, insufficient collateral on hand or counterparty insolvency. The first two can be alleviated with investment in collateral management technology to streamline the operational processes. The problem of insufficient collateral can be mitigated by investing in central inventory management and collateral optimisation to mobilise a greater pool of assets. Unfortunately, there isn't an easy technology solution to counterparty insolvency, but integrated cross-asset collateral management across the silos can act as the canary in the coalmine. A counterparty disputing, failing or delaying a collateral move can be an indicator of liquidity problems. Combining collateral management across products has helped. Those firms that have centralised the collateralisation across OTC and listed derivatives and combined this with the securities finance business have a good view on the overall client situation and are better able to identify and deal with problems quickly. Identification of the problem is best done early, and an integrated collateral process will pick this up sooner than if a firm is operating in silos.

Addressing these issues through strategic investments in technology and operations will make the wave 5 implementation smoother.

The delay has also given time to prepare strategically for solving the problem of how to minimise the impact of higher collateral requirements from the exchange of initial margin under UMR. The size of the collateral movements during the pandemic increased even more than the number of calls – on average, there was a two to five-fold increase in the size of margin calls across market participants. That's a useful preview of what will happen when wave five hits. There are essentially two approaches to this, which should operate in tandem: margin optimisation and inventory optimisation. When combined, they are effective tools to reduce the overall cost of collateral.

Margin optimisation tools help with reducing the amount of collateral required to achieve the desired risk profile. Margin optimisation analytics simulate the impact of a new trade across the various counterparty or clearing options to identify the best overall counterparty based on existing portfolios and the margin impact. This is another arrow in the traders' quiver.

Inventory optimisation tools are used to maximise a firm's use of their inventory to ensure that they have enough of the right quality of assets, in the right place, at the right time. Combining collateral management with securities finance and liquidity management means firms have a single decision-making point about how to allocate their inventory to collateral requirements, capital requirements, liquidity and the securities lending program.

Inventory optimisation, however, is dependent on knowing what assets your firm has, where they are, who owns them, and where they can be used. Unfortunately, many firms are unable to view and allocate their global set of inventory positions across securities lending and borrowing, repo, outright buys and sells and cross-product collateral management. Position data is held across multiple silos of systems and geographies without a real-time view of actual depot balances or a single point of consolidation. Disparate systems used across business lines and locations means that data normalisation is also problematic without common standards. These problems have a direct impact on economic performance. Firms without this global view of inventory are unable to optimise the allocation of positions during normal day-to-day activity. The goals of optimisation are to:

- Maximise the returns from the securities lending programme
- Minimise the costs of cash and non-cash liquidity management
- Minimise the costs of allocating positions for cross-product collateral management requirements
- Minimise balance sheet impact of securities allocations across the various programmes

Moving from assumed settlement and end-of-day reconciliations to optimising inventory allocations across the firm in real time reduces operational risk and increases efficiency.

Considering some further trends for 2021, vendors and industry associations are working closely on initiatives like the International Swaps and Derivatives Association's and International Securities Lending Association's common domain models (CDM). These are standardised ways of representing and communicating data relating to OTC derivatives and securities finance trades that have good potential if widely adopted. Common standards can reduce inefficiencies from having multiple representations of the same data within a firm and across the market. CDM, together with digitisation of collateral agreements and collateral schedules, will help reduce the number of disputed collateral calls and increase the potential for optimisation of operations and inventory.

We can also expect artificial intelligence and machine learning to gain ground in securities finance and collateral in 2021. Standardisation of data will help. FIS is investing heavily in this space and we're already seeing machine learning being used in repo, collateral management and securities lending to help traders decide when to borrow or lend and with whom to trade. Machine learning makes it easier to spot patterns and opportunities in liquidity and trading by looking at the behaviour of clients and trading partners. It can be used for collateral allocation decisions to influence where to allocate assets in the optimisation process. We also see applications of machine learning in determining settlement patterns for both cash and non-cash collateral. That means, firms can more accurately predict what settlements would likely fail or be delayed. This helps reduce the buffers needed for intraday liquidity management. There's a substantial cost for banks – the use of smart tools can reduce those.

There are many pieces in the collateral puzzle and numerous providers offering bits and pieces that need to be stitched together. FIS is uniquely positioned to offer the whole end-to-end collateral management and securities finance value chain, from a single vendor and in the cloud. Our solutions can be deployed in-house, but we have seen a considerable uptick in demand for cloud deployment over the last few quarters. Simplicity, scale and reliability are compelling virtues. You may find Occam's razor a useful maxim to finding a pragmatic optimal approach to collateral management.

The time and experiences gained in 2020 can be turned into opportunities for growth in 2021 and beyond. Now is the time to use that knowledge to drive investment and innovation and deal with what we know is around the corner.

Ted Allen
Vice president capital markets collateral
FIS

The size of the collateral movements during the pandemic offered a useful preview of what will happen when wave five hits. There are essentially two approaches to this, which should operate in tandem: margin optimisation and inventory optimisation

Collateral innovation with HQLA^X

Nick Short
Chief operating officer
HQLA^X

Nick Short explains how HQLA^X provide solutions for the collateral management challenges of today and tomorrow

It's been said before that innovation can be achieved by putting existing things together in a different way to create something new. This is something that could also be said of HQLA^X. We're coupling the benefits of distributed ledger technology (DLT) with existing triparty and custody infrastructure, to improve collateral ownership mobility for our clients.

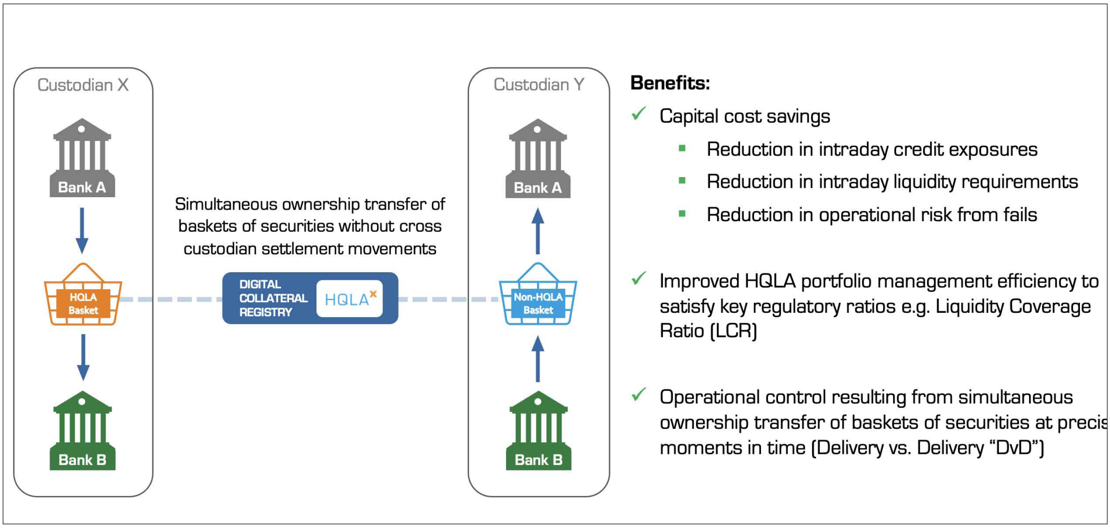
To begin with we're improving collateral ownership mobility between market-leading triparty agents and custodians to help our clients more efficiently manage their collateral portfolios in order to satisfy key regulatory ratios such as capital ratio, leverage ratio, net stable funding ratio (NSFR), liquidity coverage ratio (LCR). Initially, we're doing this to help financial institutions who are active in securities lending and collateral management in Europe. The HQLA^X post trade processing solution which we've developed with our strategic partner Deutsche Boerse Group, achieves this for securities lending collateral swap transactions by enabling ownership exchange of baskets of securities: one: without settlement movement between custodians or triparty agents; two: simultaneously (we call this DvD – delivery vs. delivery; three: at precise moments in time.

The benefits of the HQLA^X model are captured in the diagram below.

All of this is achieved across multiple collateral pools involving assets held for safekeeping at three leading European triparty agents, Clearstream, Euroclear and J.P. Morgan, all of which are all already connected to the HQLA^X platform. Additional triparty agents and custodians will connect in the future. Our digital collateral registry uses R3's Enterprise Corda DLT solution coupled with a Luxembourg legal framework to enable ownership exchanges of assets to take place simultaneously and at precise moments in time.

Despite all that's happened this year with the pandemic, we've continued to make great progress to address what we call 'specific pain points' for our clients and for the broader benefit of the securities lending and collateral management market. We're incredibly grateful to our clients and partners for the time they've invested to do this, and for the enthusiasm they've shown for the benefits of using the HQLA^X platform.

We've done this by innovating on top of our base-line product described above. This has been a very satisfying experience, involving focusing on detail, connecting the dots, challenging existing ideas, and a sprinkle of creativity to ensure that we arrive at solutions that benefit not only one client but the broader market. The reality is that there are many



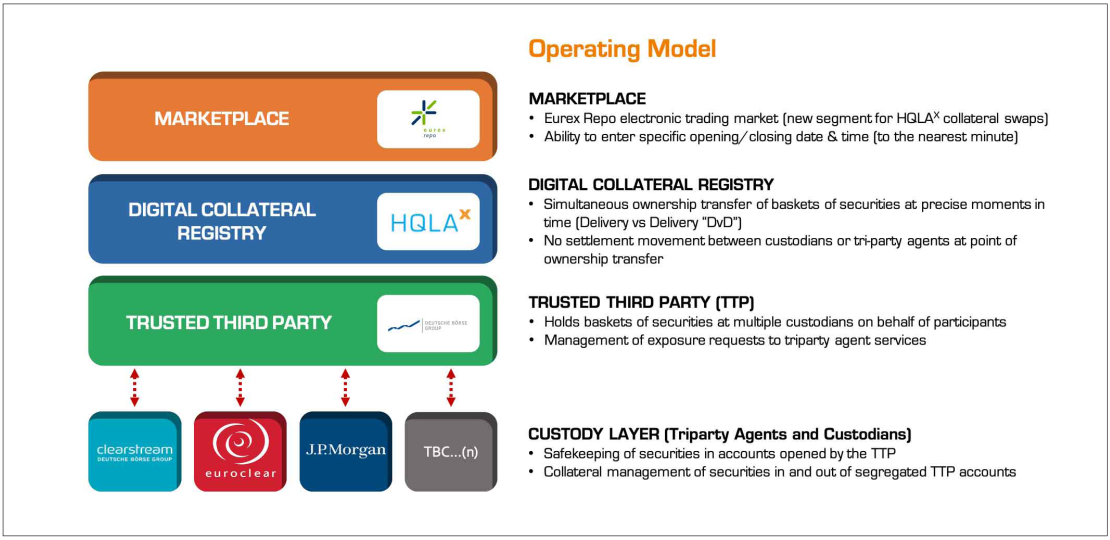
things we as a company could focus on, so we're careful about developing the ideas that will provide the most benefit to our clients. For the solutions that reach the top of the priority list, we run regular client roundtable meetings to help focus everyone on designing the solution, validating it, and to then get the solution up and running on the HQLA^X platform.

We call this 'agile innovation' where we iterate and improve via baby steps which don't attempt to change the collateral ecosystem in one go but instead move things forward pragmatically towards our vision of frictionless ownership transfers of assets. Throughout this process, the importance of connectivity - be it to counterparts, trading platforms, exposure management platforms, or market infrastructure providers - has remained key. Connectivity can mean a couple of different things. One: people connectivity, and two: technical connectivity.

This year many existing client and partner relationships have been enhanced, whilst many new client and partner relationships have been forged – all achieved this year mostly via remote conference calls rather than in person. It's been inspirational to see how everyone's adapted to the new way of working to the point where we've even run successful 'whiteboarding' sessions remotely. If anything, working remotely puts more emphasis on improved documentation so that everyone's clear on what's been agreed. In terms of technical connectivity, we've put considerable effort into defining flows in order to plug into existing infrastructure providers, and we've continued to streamline our technical connectivity to clients to facilitate their onboarding to HQLA^X. For example, we've worked with the Deutsche Boerse Trusted Third Party (TTP) to deliver a solution to make the Securities Financing Transactions Regulation (SFTR) reporting of HQLA^X collateral swap transactions as easy as possible for our clients.

One example of innovating on top of our initial product, is that we're working with a leading agency securities lender to enable their bank borrowers and beneficial owners to benefit from exchanging ownership of collateral and principal legs simultaneously via the HQLA^X platform. For borrowers, this will help avoid the capital costs that exist today because of intraday credit exposures and operational risk caused by the collateral and principal legs moving at different times. Beneficial owners will also benefit from a potential reduction in 'fails' risk.

Another example of where we're innovating on top of our base-line product, is in helping clients finance securities in local custody locations which for



various reasons are not easily financed today and are usually fairly static in nature. Many of our clients have expressed interest in financing local custody positions via HQLA^X collateral swaps.

We're also focused on ensuring that the ownership exchange of baskets of securities on the HQLA^X platform can be seamlessly repeated many times between participants (while the underlying securities remain in the same place). We call this 'DCR Reuse'. DCR (Digital Collateral Record) is the name given to the digital representation on the HQLA^X distributed ledger of the record of ownership of the basket of securities. There's more than one way of achieving DCR Reuse so we're working with clients and partners to arrive at the most optimum solution for all, and in the end, we may implement more than one solution. This is another exciting area of innovation for us, because it amplifies the benefit of effecting collateral ownership transfers without settlement movements.

Additional future variations on the DCR theme include collateralisation of an obligation using multiple DCRs which represent securities in different locations (custodians or triparty agents), or single DCRs which themselves represent securities in different locations. Both of these solutions will achieve greater collateral ownership flexibility for our clients.

We also plan to implement an intra-day solution to enable a collateral swap to start at, say, 10:15am, and to then mature later that same day at, say, 4:30pm. This is another advantage of using DLT to effect more flexible ownership exchange of collateral.

We're also hearing increasing client interest in collateral ownership mobility of non-European assets. One example of this that we're exploring is how the HQLA^X platform could help improve the financing efficiency of collateral swaps of US treasuries versus Japanese government bonds via the HQLA^X platform, by minimising some of the global timing issues which this trade faces today using existing settlement rails. More generally, we want to expand the HQLA^X operating model into other jurisdictions like North America and Asia to further increase the collateral pools connected to the HQLA^X platform.

The HQLA^X platform has also been built to accommodate new types of assets. One example of this are assets which are themselves natively represented on the digital ledger, and this is something which we've also looked at this year in response to client interest.

With the help of some of our clients, we've also been exploring creative ways to use the HQLA^X platform to help clients satisfy pledge requirements. These could be to offset counterparty credit exposures to a central counterparty or a bilateral counterparty for OTC derivatives, or to help source intraday cash liquidity with a clearing bank or central bank. We've accelerated our thinking in this space primarily for two reasons: first: clients have told us that HQLA^X could have helped them more efficiently satisfy collateral requirements during the market volatility earlier this year; second: clients are increasingly focused on getting ready for upcoming Uncleared Margin Rules phases.

These are just some of the areas of innovation which are achievable from representing baskets of securities on a distributed ledger via HQLA^X. Another key area of future innovation for us will be delivery versus payment (DvP). For the 'D' (i.e. securities) we've already connected multiple custodians and triparty agents to the HQLA^X platform. For the 'P' we're excited about the prospect of connecting various representations of cash on ledger (e.g. cash 'coins') which in turn will help us apply the benefits of the HQLA^X platform to repos.

We initially chose R3's Enterprise Corda DLT solution to help us achieve instantaneous and simultaneous exchange of ownership of baskets of securities for our clients as described above. We make onboarding as easy as possible for clients by providing clients with the option to have their DLT node hosted entirely by HQLA^X to start with. This is another example of us taking pragmatic 'baby steps'.

However, there are many additional benefits that DLT will bring to our clients in the future. These include the ability for counterparties to both see the same representation of the trade and record of basket ownership, thus reducing the need for time consuming reconciliations throughout the life of the trade. DLT also provides the prospect of instant communication between counterparties, custodians and triparty agents, and provides the possibility for regulators to have an improved real-time transparent view of collateral ownership. Many clients have expressed interest in running their own Corda nodes, so we know that they share this vision of the additional future benefits that DLT will bring for HQLA^X transactions.

There are many additional benefits that DLT will bring to our clients in the future. These include the ability for counterparties to both see the same representation of the trade and record of basket ownership, thus reducing the need for time consuming reconciliations throughout the life of the trade

At HQLA^X we strive to strike a happy balance between agility and obtaining sufficient client feedback upfront to ensure we're all focusing on the things which provide the greatest value to our clients.

I'm excited for what the future holds for HQLA^X and I'm proud of the progress we've made towards achieving our vision to accelerate the financial ecosystem's transition towards frictionless ownership transfers of assets.

We relish the opportunity to implement these new ideas for the benefit of our clients.

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Collateral in the era of global pandemic

Neil Murphy
Business manager
triResolve

CME's Neil Murphy unpicks how the outbreak of COVID-19 caused a perfect storm of disruption for collateral managers

Collateral managers – similar to their colleagues in risk management – prefer calm and certainty. Within their remit they will often be responsible for validation of large data sets and managing a number of time-sensitive tasks targetted at minimising counterparty risk. To manage this responsibility their daily checklist will likely include tasks that help them answer the following questions:

- Do we have an accurate record of all our trades?
- Are the trades valued correctly?
- Do our collateral valuations reflect the latest security prices and haircuts?
- Have we made all our margin calls on time?
- Is the collateral proposed by counterparties eligible?
- What is the optimal collateral to pledge to each counterparty?

- Has the correct collateral been received by our custodian?
- What is the cause of any margin call disputes?

In the early weeks of 2020, news of the COVID-19 outbreak was very much a problem far from key over-the-counter (OTC) markets, and disruption was minimal. Collateral managers remained calm (and perhaps even unaware). However, by late February the picture was beginning to change. With infections spreading quickly across the globe markets saw a steep increase in uncertainty. And with uncertainty came widespread market volatility, an increase in credit spreads and falling asset prices. Any of these items on their own would typically create a knock-on impact for collateral managers; an increase in average margin call size, higher call volumes and potentially larger disputes. None of which would be helpful for a collateral manager trying to remain calm.

Bad news for collateral managers

By mid-March any semblance of serenity was out the window for collateral managers. As global infection numbers continued to rise, stock markets experienced record falls, yields on US treasuries fell to their lowest in history and oil prices declined at a rate not seen in 30 years. Now, more than ever, the role of a collateral manager was critical.

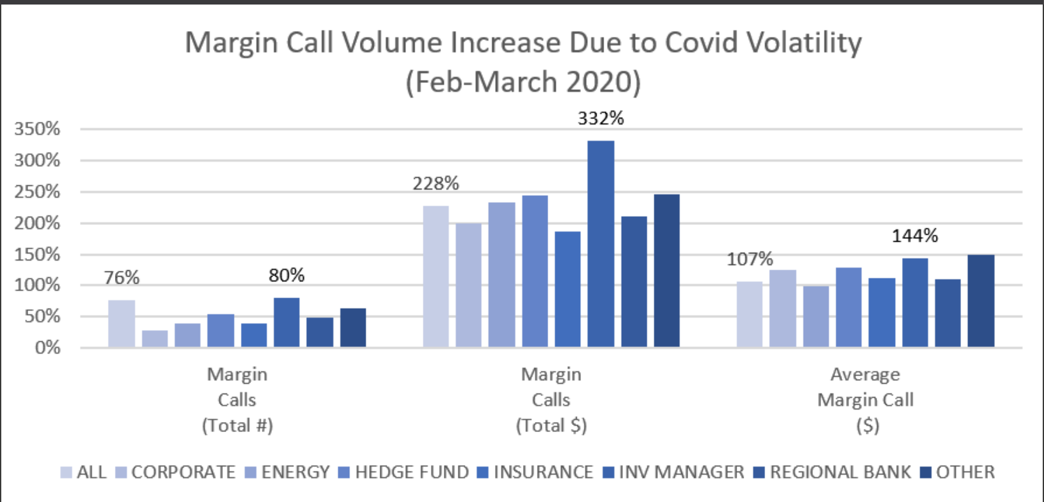
The daily tasks at hand don't change for a collateral manager during periods of volatility – they simply increase in both volume and importance. Added to an increased workload, many firms would also have had to factor in an increased focus on deadlines and settlement failures. Throw in unprecedented working conditions and you get a perfect storm.

How big a problem?

TriOptima's network services – which are used by more than 230 firms to calculate and exchange both variation and initial margin calls, and by more than 2,000 parties to reconcile approximately 90 percent of all OTC trades – provide an ideal tool to observe the breadth and impact of market disruption. Viewed through this wider lens the impact on collateral managers was significant.

Since the onset of COVID-19 and associated market disruption, TriOptima has observed record volumes of both margin call activity and portfolio

Figure 1 Monthly % increase in key margin metrics, by sector (February-March 2020); Source: TriOptima



reconciliation. Average daily margin call volumes seen in triResolve Margin nearly doubled during March from the previous month (which were already trending above average). Added to this, the triResolve portfolio reconciliation service saw record trade volumes and sizable variation in MTM numbers, both key drivers of margin call disputes. And, while spikes in margin call volumes can cause consternation to the collateral manager tasked with managing the margin call lifecycle, far more stress comes from an increase in disputes.

Not only do these create additional workload, but these are also pointers to increased risk. A trade ‘break’ or a margin call discrepancy potentially indicate uncollateralised credit risk and, like the virus itself, market contagion was a very real risk during this period. While the market was fortunate not to see the widespread failure of firms during this period, the sizable increase in key metrics created new levels of stress for those tasked with managing collateral and reconciliations.

Analysis of triResolve Margin activity during the period of March 2020 points to a 76 percent increase in the average number of margin calls, however, looking at the value of margin calls we saw an increase of more than 200 percent. As figure one shows, a deeper dive into the data indicates we should perhaps sympathise with the collateral managers working at investment management firms – who had to manage the steepest increases across the board; margin call volumes (80 percent), margin call value (332 percent).

Business continuity challenges

Unprecedented market turmoil is bad enough but having to manage this while firms simultaneously enacted their business continuity plans, added a new dimension to the challenge facing collateral managers. With numerous operational steps in the margin call lifecycle, this typically requires collateral managers to access multiple platforms, from front office to payments systems. For those firms not able to access all the required systems remotely this required some staff to be physically present in the office in order to keep the wheels turning. In contrast, those firms with web-based systems simply required their staff to have an internet connection at home.

Firms don’t like to shout it loudly, but Excel is still widely used by many firms as a core part of their collateral system. For those firms still reliant on manual tools such as spreadsheets or email, they were further hamstrung. Unable to respond easily to the increase in margin call volumes they were forced to rely on staff working longer hours. Something already a challenge as many staff juggled working from home with family duties. One collateral manager at a large UK hedge fund, dependent on a manual Excel-based approach, described this period as “a complete nightmare, with margin call volumes increased by five-fold”.

In contrast, while we observe triResolve Margin users processing record margin call volumes, we note that they were able to do so inside their normal business hours and within the time constraints documented in their legal agreements. Commenting on the period of market turmoil, a spokesperson for Leonteq Securities noted: ”The record volatility levels resulted in margin activity across most of our collateral agreements simultaneously. The use of triResolve Margin’s automated margin call workflow allowed for sufficient capacity for Leonteq’s collateral managers to focus on key controls.”

The ability for our clients to easily cope with the unprecedented volatility isn’t explained simply because triResolve Margin is web-based. Although many users commented this certainly made things easier for them. The operational edge that served users so well during this period came from the combination of a web-based platform and a highly automated workflow. This allowed clients to both send and receive calls, as well as investigate differences in a fully automated way. So, as volatility caused volumes to increase, users weren't sinking under a need to manually process each margin call or investigate each dispute. Instead, system auto-rules added the required muscle, supplementing the role performed manually at so many firms.

And while auto-rules were widely used by triResolve Margin clients prior to the recent period of market disruption, one knock-on has been an increase in their uptake during recent months. In fact, as the crisis ramped up, our team of client managers worked directly with clients to help them quickly activate auto-rules so as to best cope with volumes as they increased from day to day. One client, an international energy firm, moved to adopt auto-rules across their entire portfolio of collateral agreements; allowing both incoming & outgoing margin calls to be completely managed by the system, and alerting the Collateral Manager events which required further analysis & approval.

TriOptima analysis of the duration to manage this firm's entire set of incoming margin calls – measuring time from calls being received to completion of the collateral pledge process – shows the total time required to complete calls fell from several hours to fewer than 60 seconds. While the associated manual touch-points for the user fell to zero.

A future vision for collateral

Investigation into, and lessons learned, from the COVID-19 outbreak may be lengthy and painful for governments worldwide. In contrast, the shortcomings faced by some collateral managers were hiding in plain sight.

Over-reliance on legacy technology, a near absence of automation at some firms, a lack of investment in keeping up-to-date with industry best practice and short-termism that sees people thrown at inefficient processes rather than strategic fixes are among the key lessons to be learned. With the twin stresses of volatility and reduced capacity continuing, firms are looking at a 'new normal'.

> ***Over-reliance on legacy technology, a near absence of automation, a lack of investment in keeping up-to-date with best practice and short-termism that sees people thrown at inefficient processes rather than strategic fixes are among the key lessons learned***

To best cope, firms should quickly consider moving to update their technology to take advantage of new web-based tools which allow for easy remote access and system interoperability.

Firms should seek to implement high levels of automation, not simply to streamline the processing of margin calls but to achieve optimal risk mitigation. This means a cohesive and integrated approach to both collateral management and portfolio reconciliation, where disputes can be quickly identified and pro-actively resolved.

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- Agility and scalability to comply with changing industry standards and grow your business
- Award winning software, expertise and service from the market leading collateral management system

Initial margin: The final straight

BNP Paribas collateral gurus offer a look at the final phases of the Uncleared Margin Rules and examine the road ahead for those affected

The decision to delay full implementation of margin requirements for non-centrally cleared derivatives has been welcomed by the industry. Not only does it avoid a last-minute rush in the context of the 2020 financial crisis but it represents an opportunity for firms to rethink their approach to derivatives.

Preparing September 2021 wave

In April 2020, the Basel Committee and the International Organization of Securities Commissions (IOSCO) announced a further extension to the final implementation phase of the initial margin (IM) requirements for derivatives contracts that are not cleared through a central counterparty. These requirements are designed to reduce systemic risks related to over-the-counter (OTC) derivatives markets, as well as provide financial institutions with appropriate incentives for central clearing while managing the overall liquidity impact of the requirements.

As defined in April 2020, covered entities with an aggregate average notional amount of non-centrally cleared derivatives that are greater than €8 billion (phase six firms), become subject to the requirements from 1 September 2022. Meanwhile, the 1 September 2020 deadline is postponed to 1 September 2021 for phase five firms, with a threshold of €50 billion.

David Beatrix, head of product, Collateral Access, at BNP Paribas Securities Services, describes these delays as a sensible response to concerns that the pandemic crisis may slow down firms' preparation to new rules, especially buy-side ones.

"At the root of this reform is a desire to move from a 'survivor pays' principle, to a 'defaulter pays' principle, to avoid firms using their own capital to absorb losses implied by a counterparty bankruptcy. Another effect is that this will also promote central clearing," he explains. "There is a realisation on the part of the Basel Committee and IOSCO that IM compliance is not just a copy-and-paste of the variation margin (VM) process; it is a new process with a steep learning curve."

The margin requirements for non-centrally cleared derivatives are broadly aligned across North America, Europe and Asia Pacific, although there are nuances with regard to exemptions. For example, equity options are out of the scope of margin requirements in the US rules, but were only exempted in the EU up until 4 January 2020.

Who's affected?

Among the buy-side community, asset owner institutions (particularly insurance companies, pension schemes and sovereign wealth funds) are expected to be the most affected by the changes because of the size of their derivatives positions and their consolidation under one single entity, says Beatrix. Asset managers will only be impacted if they have delegated mandates from asset owners or if they manage funds that use OTC derivatives above the €8 billion threshold, which remains rare.

Furthermore, when asset owners delegate the management of their assets – usually across multiple managers – they also often delegate middle and back-office functions. This can make it challenging to calculate IM due to the potential for fragmented calculations across multiple managers.

"We have already had discussions on this topic with clients who are tempted to replicate what they already do on VM – in other words, to leave their investment managers to manage the VM independently from each other," Beatrix explains. "This works well for VM because numbers are additive, but IM is a risk-based calculation and, as such, fragmenting the calculation process can involve higher IM amounts once accumulated across investment managers."

Optimising collateral

Another issue on which BNP Paribas Securities Services can guide clients is collateral optimisation. The market is concentrated around securities as collateral, but many phase five and phase six firms do not necessarily own large volumes of these financial instruments so may have securities that are not considered eligible by a counterparty.

Jérôme Blais, head of business development and client solution, triparty collateral at BNP Paribas Securities Services, observes that although cash is acceptable according to the regulations, counterparties prefer not to have cash left on the books of their custodian.

"We are working with firms to combine custodial and collateral management services with collateral transformation," he says. "This means that when clients require high-quality liquid assets, they can initiate an order to our trading desks to convert less liquid or less highly-rated assets into high-quality assets to be posted to their counterparties."

Beatrix adds: "In addition, we are helping those who find it challenging to fully implement UMR by calculating IM amounts using industry standards and connecting to market utilities which are key to margin and portfolio reconciliations."

Testing ideas

Blais explains that firms are increasingly viewing his team as a resource, where they can test ideas.

"We have been spending an increasing amount of time this year supporting clients as they determine the most effective model for their business, whether that is triparty, using an outsourcer for collateral management or developing their own system in-house," he says. "This is also why we made the strategic decision to invest in a triparty collateral service, which has created the fifth global offer on the market."

"This was a sensible move given that in Europe, triparty now accounts for more than 95 percent of IM," he adds.

Jérôme Blais
Head of business development and client solutions – triparty collateral management
BNP Paribas Securities Services

We made the strategic decision to invest in a triparty collateral service, which has created the fifth global offer on the market. This was a sensible move given that in Europe, triparty now accounts for more than 95 percent of IM

Critics' concerns

Inevitably, the new margin requirements for non-cleared derivatives have not been universally welcomed.

"While the objectives are praiseworthy, we must also recognise that they don't address demands to raise the thresholds to avoid having so many counterparties becoming subject to margin requirements," says Blais.

There is also some concern around possible future treatment of cross-currency swaps. The Basel Committee and IOSCO have said they will evaluate the risks of not subjecting the fixed physically-settled foreign exchange transactions associated with the exchange of principal of cross-currency swaps to the IM requirements.

Then there is the cost factor. The buy-side often seeks a directional position to hedge risk or take a specific view on some assets or groups of assets, which could imply some significant IM numbers. As a result in many cases, posted collateral implies a net funding cost, which cannot be compensated with collateral received, as the latter is simply not reusable.

Careful planning required

"Most of the industry has opted for the SIMM or standard IM model because it recognises risk offsets, which is an important factor for banks, and for the industry as a whole. It implies that if you have a market risk-neutral portfolio, the IM numbers are going to be lower, which will minimise funding costs," says Béatrix.

He also refers to firms taking the opportunity to review their roster of service providers.

"They may have realised that they have a reason to take a strategic look at their service model and implement a more streamlined approach across the entire chain of services," Béatrix notes.

While phased implementation of the final stage of the new margin rule should reduce the incidence of rushed implementations, it is vital that buy-side firms continue to push ahead with their compliance planning. Reorienting derivatives activity is not achieved overnight – it requires months of careful planning.

David Beatrix
Head of product, Collateral Access
BNP Paribas Securities Services

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The role of central counterparties in securities lending

Options Clearing Corporation's Matt Wolfe details how the US equity derivative clearinghouse has gone above and beyond to ensure its members are protected from defaults and extreme market volatility

Many readers of Securities Finance Times will have some level of understanding about central counterparties (CCPs) and Options Clearing Corporation (OCC), while some may not be familiar with the role of CCPs or OCC in the securities lending marketplace. We thought an excerpt from a recently-published OCC paper on central clearing would provide a good refresher for some readers and a good introduction for others. As a systemically important financial market utility (SIFMU), OCC has invested heavily in its systems, processes, and people to promote stability and integrity in the markets it serves. We utilise sophisticated tools to measure various types of risk to ensure we hold a sufficient, but not excessive, level of collateral to guarantee that the contracts that we clear are fulfilled. As you will see from reading our paper, we are transparent about our risk management framework and encourage industry participants to understand and learn from us.

Despite OCC's history of clearing securities lending transactions since 1993, the buy-side of the market, specifically agent lenders and beneficial owners, have not yet had a chance to realise the benefits of OCC's clearance, settlement, and risk management services. We are striving towards this goal, and hopefully this introduction will be particularly informative to those participants.

Clearinghouses are critical market infrastructures that have functioned remarkably well since their inception, and their performance during the 2008 financial crisis ushered in a new embrace of central clearing as a proven risk mitigant for financial markets. Throughout those volatile times, cleared markets continued their orderly and transparent function to the benefit of the investing public and the economy at large.

Policymakers in the US and around the world took notice and mandated that a number of previously-uncleared markets should be restructured to reap the benefits of CCP risk management. The resulting increase in CCPs' systemic importance also led to significantly enhanced regulatory requirements and guidance for CCPs across jurisdictions. During the past decade, CCPs committed unprecedented resources to delivering the enhanced financial and operational resilience demanded by policymakers, regulators and market participants. CCPs' smooth functioning during the dramatic markets of this year's pandemic demonstrates that these efforts are serving the markets well.

OCC, founded in 1973, is the world's largest equity derivatives clearing organisation. OCC operates under the jurisdiction of both the US Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC). In addition, OCC has been designated by the Financial Stability Oversight Council as a SIFMU under Title VIII of the Dodd-Frank Wall Street Reform and Consumer Protection Act (the Dodd-Frank Act). As a SIFMU, OCC is also subject to oversight by the Board of Governors of the Federal Reserve System. OCC is the sole clearing agency for exchange-listed equity options in the US and operates as a market utility.

OCC, clearing firms, exchanges, and market participants have a common interest in maintaining a robust risk management framework so that defaults are rare, and that in the unlikely event that there is a clearing member default, the prefunded financial resources of the defaulting clearing member can, in most cases, cover its obligations to OCC. This is the fundamental characteristic of a 'defaulter pay' model, and, we believe, the cornerstone of CCP resilience.

Evolution of CCPs and CCP regulation

CCPs provide markets with risk mitigation through counterparty substitution whereby the CCP becomes the counterparty to every trade—the buyer to every seller and a seller to every buyer. CCPs also engage in multilateral netting, which reduces the risk in the overall system. As the first line of defence against a default, CCPs establish membership criteria and monitor their members against these criteria. CCPs also collect margin to cover the expected period from the time of a default until the positions are closed out. Portfolios are marked-to-market, evaluated throughout the trading day, and settled at least once a day (they can also be settled intra-day). In addition, CCPs establish default funds, typically funded by their members, to cover potential exposure to the nonperformance of any member, thus mutualising the risk of member failure. CCPs also have default management procedures and can draw on pre-funded resources, known as the default waterfall, to assist them in managing a default. Finally, CCPs have in place recovery and wind-down plans.

The success of the CCP model was perhaps best demonstrated when handling the Lehman Brothers bankruptcy during the financial crisis of 2008. As Peter Norman described in his book, Risk Controllers: Central Counterparty Clearing in Globalised Financial Markets: "Within a week of the Lehman bankruptcy, most outstanding open positions relating to these trades had been neutralised or 'hedged' ... within two weeks, most of Lehman's customers were transferred to other investment companies. By late October 2008, CCPs in most leading financial markets had reported success in managing the biggest default in financial history without cost to their member companies."

OCC's perspective on CCP resiliency, recovery and resolution

OCC is a registered clearing agency under SEC jurisdiction, clearing US exchange-listed options and securities lending transactions. As a registered derivatives clearing organisation (DCO) under CFTC jurisdiction, OCC clears transactions in futures and options on futures. This is a fairly narrow product mix. For example, OCC does not clear over-the-counter (OTC) derivatives. As a registered clearing agency, OCC is a self-regulatory organisation under the Securities Exchange Act of 1934. Self-regulatory organisations are charged with an important public trust to carry out their self-regulatory responsibilities effectively and fairly, while fostering free and open markets, protecting investors, and promoting the public trust.

OCC operates as an industry utility and its governance and business model is different from publicly-traded or vertically integrated CCPs. OCC is owned by five options exchanges and governed by a board of directors that includes nine clearing member representatives, five exchange representatives, five public directors and one management representative. As a result, 70 percent of the board is composed of clearing members and public directors.

OCC is the sole clearing agency for listed equity options in the US and, as noted, operates as a market utility. Over 95 percent of OCC's revenue is generated from clearing fees, and OCC manages its resources under an SEC-approved Capital Management Policy that establishes how OCC sets its target regulatory capital level, how clearing fees are set, and how it will manage its capital in relation to defined thresholds. For example, capital exceeding the target capital requirement and not needed for investment in OCC's infrastructure or initiatives is used to lower the cost of participation in the markets we clear, first as skin-in-the-game and second as a basis for reduced clearing fees or refunds.

To strengthen its risk management framework given its designation as a SIFMU, OCC has embarked on a transformation during the past five years. As part of this transformation, we have made material enhancements to our margin methodology, revised our default fund methodology, implemented a new approach to liquidity stress testing, and elaborated and obtained approval for our recovery and wind-down plan.

OCC is the first derivatives clearinghouse in the world to use a large-scale Monte Carlo-based risk management methodology. We have put in place a sophisticated and conservative margin methodology called the System for Theoretical Analysis and Numerical Simulations, or STANS. As part of this methodology, OCC has adopted a conservative approach related to the confidence level that the initial margin would be sufficient to cover losses incurred in liquidating an individual portfolio. In addition, OCC applies margin add-ons to address concentration, wrong way, liquidity, and de-correlation risks, using a 10-year lookback as an anti-procyclicality tool.

In 2018 we enhanced and changed our methodology for determining the size of our default fund, driven by enhanced stress testing capabilities that include a range of historical and hypothetical market events, including ‘extreme but plausible’ scenarios. This includes a ‘cover two’ approach that allows OCC to cover the concurrent default of its two largest clearing firms that would generate the largest aggregate credit exposure in ‘extreme but plausible’ market conditions. This approach exceeds US regulatory standards applicable to OCC and better aligns OCC with other systemically important derivative clearing houses.

Additionally, we have implemented a new approach to liquidity stress testing and determining the adequacy, sizing, and sufficiency of OCC’s liquidity resources. OCC’s liquidity risk management framework is designed to ensure that OCC holds sufficient qualified liquid resources to meet settlement obligations with a high degree of confidence under a wide range of foreseeable stress scenarios, including the default of the clearing member organisation or group that would generate the largest aggregate payment obligation in extreme but plausible market conditions, which is the US ‘cover one’ standard.

Finally, in the unlikely event that OCC’s pre-funded resources are depleted and credit and liquidity shortfalls remain, OCC has a defined set of recovery tools in its ‘rules and its recovery and orderly wind-down plan’ (approved by the SEC in August 2018) to ensure that it continues to deliver clearing and settlement services, which is in clearing members’, exchanges’, and market participants’ interest. These recovery tools include clearing member assessments, voluntary contributions by clearing members, voluntary tear-ups, and involuntary partial tear-ups.

I hope this provides a good perspective as to how carefully we think about risk management at OCC. In addition to our CCP paper, you can learn more about OCC’s recovery and wind-down plan on our website. We encourage the readers of Securities Finance Times to read our CCP paper and reach out to us to learn more about our clearance and settlement services.

Matt Wolfe
Vice president, securities lending
OCC

OCC is the first derivatives clearinghouse to use a large-scale Monte Carlo-based risk management methodology. We have put in place a sophisticated methodology: the System for Theoretical Analysis and Numerical Simulations

Centralised management is possible

Enterprise-wide collateral management: dream, nightmare or emerging reality. A selection of the Pirum team was asked for their views on this important topic

Recent events have shifted the collateral spotlight back towards the topic of enterprise-wide collateral management (EWCM). Whilst many definitions of EWCM exist, ultimately most would agree it is fundamentally the centralised management of a firm's sources and uses of collateral. This refers both to the inputs such as exposures and inventory, etc. As well as the outputs such as instructing collateral movements, collateral optimisation, etc. Several members of Pirum's senior team were asked to share their views on this important topic.

Enterprise-wide collateral management (EWCM) has been a topic of conversation for decades, is it still a valid objective for financial institutions?

Karl Wyborn: In my opinion, recent events have made it both a more valid and more attainable objective. Taking these elements one at a time. When the concept of EWCM emerged between 15 and 20 years ago it felt like an obvious end-point to the creation of multiple different collateral management disciplines within a bank. Back then, it was an aspiration rather than an intention.

Today, the environment has changed significantly. For many well-documented reasons, the cost of collateral has increased significantly and hence the economic benefit of managing collateral efficiently has increased. In addition, regulators are more focused on collateral than ever before.

Finally, and the most recent development, within the context of the COVID-19 pandemic, those programmes that are centralised have proven more robust by comparison with those that are more fragmented. This is arguably as much a function of the technology that leads to and drives the centralisation of these processes. Whatever the ultimate cause-and-effect, it's hard to argue that managing collateral on an enterprise basis is anything but a business imperative.

Moving on to the second element, in contrast to 15 to 20 years ago, technology now exists that fundamentally facilitates and supports an enterprise-wide model. Historically, the technology challenge was, at a high-level, twofold: no single platform existed that could effectively manage the very different collateral workflows of multiple instruments and asset classes. And, secondly, there was the absence of the real-time connectivity that would provide a suitably accurate view at any given point in the trading or operations day.

I'm very happy to say, both of these technical challenges are now materially resolved. Vendors today, and I'm duty-bound to point out that Pirum is

Todd Crowther
Head of collateral management
Pirum

A firm requires a holistic view of available inventory, required margin, inventory eligibility and a cost model for driving efficient collateralisation at an enterprise level one of these, deliver platforms that combine real-time exposure data from a wide range of cleared and bilateral instruments, available inventory from multiple locations; and, additionally, the means of digitising collateral and eligibility schedules to both determine what can be posted for coverage as well as to provide the advanced processing and connectivity necessary to execute alpha-generating optimisation strategies.

Notwithstanding the advances in technology, what hurdles do financial institutions still face as they embark on an EWCM strategy?

Rob Frost: The hurdles to achieving enterprise-wide collateral management can be broken down into three areas.

First of these is what we call at Pirum, 'visibility' i.e. the means of capturing all of a firm's sources and uses of collateral within a single platform. The key here is the timeliness of the data capture and presentation. A real-time, or near real-time, view is a necessity. This is principally a systems and connectivity challenge.

Secondly, beyond understanding assets and exposures, there are a series of downstream challenges. These range from the tools or infrastructure necessary to analyse the data through to making and executing optimisation decisions.

We see firms addressing the challenges through internal target operating model rationalisation, and by addressing external market structure constraints and general operational 'frictions' of the collateral management lifecycle. In certain senses, these have historically proven more difficult to overcome as they go beyond 'simple' technology challenges.

Thirdly, there are more cultural and structural challenges associated with creating change in complex financial institutions. Silos, knowledge gaps, differences in the definition of 'optimal' all serve to make the change necessary to achieve an enterprise-wide solution more problematic.

Trying to walk before we run, what are the foundational capabilities of an effective EWCM model?

Todd Crowther: At a high-level, one can break down the steps to the implementation of an enterprise-wide model into a series of underlying disciplines.

Rob Frost
Global head of product
Pirum

The challenge of collateral optimisation has been the fact that there were often silos that prevented a model from being applied across multiple business lines, collateral venues and underlying products

At a foundational level, a firm requires a holistic view of available inventory, required margin, inventory eligibility and a cost model for driving efficient collateralisation at an enterprise level.

Thereafter, and again a major industry challenge is the digitisation of the data sources such as the collateral schedules. Whether securities finance transactions, over-the-counter derivatives or cleared activity, a raft of challenges exist around the digitisation of collateral eligibility data. The digitisation of schedules is, however, fundamental to an effective EWCM model. I'd go as far as to say, without this, you're sunk.

Secondly, as noted above, a real-time view of inventory is required. I think we've said enough about this already. It's perhaps worth adding, where we reference this real-time view, we are not overlooking the importance of data accuracy. Garbage-in, garbage-out, as the adage goes.

Thirdly, a firm needs to implement a solution that collates (perhaps calculates) and centralises those datasets which drive efficient collateral funding. This includes not only eligibility but also on various financial resource constraints. Without, I hope, stating the blindingly obvious this underscores the importance of digitisation point above.

And finally, the fourth challenge is that of resource optimisation and transfer pricing. It's all well and good having the systems in place to make the 'perfect' collateral decision from a centralised hub. If the cost of collateral itself cannot be calculated, carried out nor attributed appropriately or accurately, the incentives to both implement a solution and/or create the behaviours necessary to drive better outcomes will be absent.

Where an institution has reached 'base camp one' in terms of EWCM, what might we consider a phase two evolution.

Frost: Where a financial institution has achieved the 'basics' of enterprise-wide collateral management, no easy task in-and-of-itself, there are a series of further steps that can be taken which, again, offer real economic benefits.

Most common among these are the optimisation models that a financial institution uses to decide which collateral assets to use. Collateral optimisation models have been around for some time of course. The challenge historically has always been the quality of the inputs the fact that there were often silos that prevented a given optimisation model

Karl Wyborn
Chief commercial officer
Pirum

We believe that a vast majority of institutions are leaving real money 'on the table' where there are, quite understandably, gaps in their process from being applied across multiple business lines, collateral venues and underlying products.

With the continued march of regulation, traditional collateral optimisation models could not cope on scale with the various binding constraints driving firms to introduce more complex, dynamic constraints into their optimisation process including capital or risk capital liquidity, leverage, return and certain regulatory constraints.

Another important consideration is that of forecasting collateral requirements. This forecasting is both pre-trade, generally presented as total cost of ownership and post trade, in terms of a walk forward over a period of days to estimate how much collateral may be needed. Accurate views on both the pre and post-trade analysis can again deliver meaningful benefits.

Finally, another area of importance is the ability to effectively mobilise collateral to the target requirements. This can be achieved through the efficient deployment of collateral via directed or semi-directed allocations and cross venue settlements where a process is put in place which carefully balances the cost of collateralisation with the cost of movement.

From a Pirum standpoint, what has been the approach to supporting clients' EWCM needs?

Crowther: Beginning 20 years ago, Pirum embarked on a journey the final destination of which was to establish a support model that allowed our clients to implement their version of an enterprise-wide model.

This approach comprises five key elements:

One: Connectivity network. This has always been Pirum's strength. Our challenge historically was to break out of the securities finance space and expand our offering into other instruments such as repo, cleared derivatives, uncleared derivates etc

Two: Real-time data accuracy. By leveraging our existing, software-asa-a-service deployed, post-trade processes and data feeds, the journey to an enterprise-wide collateral solution is not only fast to implement but is also low cost to maintain on an ongoing basis.

Four: Cross product visibility. Through our CollateralConnect product, our clients can observe and monitor, on a real-time basis, all of their obligations, digitised eligibility and available inventory on a global basis. Per my comments above, this is the foundation stone of any enterprise-wide model.

Four: Collateral inventory management. Having the data to hand and the means of executing an enterprise-wide strategy, the next step is that 'walk forwards' mentioned above. By further leveraging Pirum post-trade margin and exposure workflows, we have recently implemented an inventory management service within CollateralConnect to help clients manage their collateral sources and uses including providing collateral projections. This allows our clients to forecast requirements and their coverage ability on a look-forward basis.

Five: Collateral optimisation. We are now working with our established CollateralConnect client base to launch the next generation of collateral optimisation services. We're very excited at the advancements we are making in this area, and can't wait to tell you about it, so watch this space.

Anything that you'd like to add in conclusion?

Wyborn: We believe that a vast majority of institutions are leaving real money 'on the table' where there are, quite understandably, gaps in their process. CollateralConnect is the Pirum response to this challenge. As we bring these clients on to CollateralConnect we witness the material advancements they can make. It excites me to see where we will be in six to 12 months with this solution.

No-touch collateral management world

Wassel Dammak
Head of product strategy
Vermeg

Wassel Dammak explains why firms should leverage technology to drive efficiency and invest in a profit-making collateral IT infrastructure

Past pandemics have driven people to innovate their way out of problems and reinvent environments, eliminating difficulties for a new state. While containing COVID-19, managing short-term disruption has been, and still is, a priority since the beginning of the year, credit risk, treasury and collateral departments need to prepare for the future by transforming their legacy IT stack to be cost-effective, flexible, regulatory compliant and built to be scalable and resilient.

Technology could be the main enabler for such transformation provided the vision of the target operating model is articulated, agreed and shared among the teams working around the collateral space. In a few years, collateral resources will be a collection of cloud-enabled inter-connected microservices talking seamlessly to each other, integrating easily to existing systems, interacting with external utilities and providing timely auto-recovering mechanisms. The orchestrator of such resources can ask for a robot or a human intervention in a digital manner whenever the automation is stopped: welcome to the no-touch collateral management world.

The path to such a world starts with the analysis of business processes using techniques like process mining to understand where the inefficiencies and bottlenecks are to begin transforming. The journey needs to be agile, delivering benefits in quick cycles, at a low cost and keeping in mind that the targeted final state might (and will certainly) change.

Efficiency drivers

Typically, technical efficiency is driven by technologies that decrease the cost of the collateral IT infrastructure. Moving an application to a cloud or adopting PostgreSQL could achieve significant cost savings, especially when the application has a true microservices architecture.

Operational efficiency could be increased by getting rid of all the residual manual processes hidden within the straight-through processing chain like interpreting and double-keying massive amounts of data. Using 'intelligent' components that parse the data, transform it, enrich it, interpret the requests and route them to the microservice that triggers the corresponding process is key to eliminate those inefficiencies and related costs.

Further efficiency can be achieved by optimising the use and prioritising the source of the collateral assets, a process that takes into consideration multiple dimensions (liquidity buffers, regulatory constraints, high-quality liquid asset availability, etc) to propose the best allocations of collateral assets, review permanently past allocations against available inventory and learn from the historic data to make informed decisions across an enterprise multi-asset inventory.

Profitability enablers

Financial institutions need to think of the best IT model between outsourcing to services providers, subscribing to utilities or keeping internally a certain set of services deemed sensitive from a data or a competitive perspective. There won't be a unique model applicable to all firms but rather a fit-for-purpose setup that fulfils the objectives of each institution.

Firms looking to offer collateral services need an architecture with a store of technical and business components that can be packaged in multiple ways to adapt to clients' requirements, in a competitive environment characterised by squeezed margins and continuous changes. The flexibility of such architecture allows users to react quickly to market threats and opportunities, maintain constant readiness thanks to its transformational nature.

Those firms leverage the same store of components to offer on the top a catalogue of business services offered with a rapid client onboarding and a quick time to market. Services like margining, reconciliation, optimisation, SIMM monitoring, margin settlements, etc, can be 'activated' in a matter of days or weeks with an open, resilient and ready to run application.

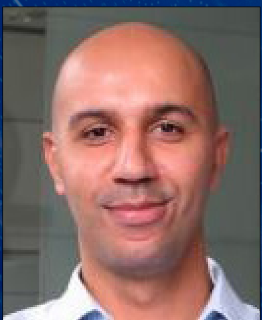
Mutualising the IT infrastructure could be another solution to amortise its cost and monetise its automated and standardised capabilities. The architecture must cater to a multi-banks-in-a-box model with all security and data segregation constraints. More added-value services are not shared to keep the competitive edge.

Choose the partner

The right partner is the one who can help financial firms achieve efficiency, maximise profits while transforming their IT legacy stack towards a target state that is flexible, compartmentalised and permanently ready to adapt and deliver value in short cycles and timeframes.

At Vermeg, we offer a comprehensive digital store with a set of technical and business components to enable and accelerate such transformation. Adopting a compartmentalised-approach with a technology that can interoperate and seamlessly integrate with existing systems is a key driver of our product strategy.

We accompany firms in their transformation and offer support through a cost-efficient, end-to-end collateral management service via a cloud-hosted software-as-a-service for financial institutions seeking to avoid the burdens of buying, supporting and running the software and the related hardware.



Wassel Dammak
Head of product strategy
Vermeg

The path to a no-touch collateral management world starts with the analysis of business processes using techniques like process mining to understand where the inefficiencies and bottlenecks are to begin transforming.

BNP PARIBAS

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BNP Paribas Securities Services is an asset servicing specialist offering a complete multi-asset class, middle-to-back office solution, covering all major markets in the world. As of 30 September 2020, we had USD 12.1 trillion in assets under custody and USD 3.0 trillion in assets under administration, making us the fifth biggest global custodian in the world and the only European player among the top 5 global custodians.

Our coverage is one of the most extensive in the industry, with a proprietary network spanning 26 countries, local expertise in 35 countries and a global reach covering 90+ markets. This enables us to safekeep 90% of our clients' assets on average within our own network, which helps reduce operational risks for us and our clients while providing operational efficiencies, due to improved settlements, income and corporate actions deadlines.

Our network also enables us to provide on-the-ground knowledge to our clients in terms of local regulations and market practices. This multi-local expertise, combined with the rich diversity of our people (over 12,000 employees of more than 100 different nationalities) and backed by the strength of the BNP Paribas Group, a leading bank in the Eurozone, enables us to help leading financial institutions achieve their strategic ambitions in cross-border investment and distribution, across all asset classes.

Alongside custody, clearing and fund administration, BNP Paribas Securities Services provides a wide range of Market and Financing Services to support the increasingly sophisticated requirements of institutional investors and financial intermediaries, including Securities Lending. With an in-depth knowledge of local markets, across multiple asset classes and currencies, we can enhance the return on our clients assets through an efficiently managed, risk-adjusted programme. Our clients remain in full control of their lending and collateral management programme through customisation. We are here to provide support and product expertise as we offer continuous access to our securities lending trading teams and product specialists. Our clients benefit from timely trade processing and settlement thanks to our global and local presence and, as we offer both principal and agency lending programmes, clients are able to choose what best fits their risk profile.

www.broadridge.com

Broadridge, a global fintech leader with $4 billion in revenue, provides communications, technology, data and analytics. We drive business transformation with solutions for enriching client engagement, navigating risk, optimising efficiency and generating revenue growth, helping our clients get ahead of today's challenges with products that streamline and simplify the securities finance industry.

Broadridge offers a suite of global, front to back office securities finance solutions for buy side and sell side. This includes integrated or standalone systems for securities lending, repo, collateral management and collateral optimisation, and an end to end transaction reporting solution for SFTR and CSDR.

Broadridge's solutions help customers to comply with new regulations, increase efficiency, improve strategic decision making and make more intelligent use of capital, balance sheet and liquidity.

For more information about Broadridge and our proven securities finance, collateral management and transaction reporting solutions, please visit our website.

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EquiLend is a global financial technology firm offering trading, post-trade, market data, regulatory and clearing services for the securities finance, collateral and swaps industries. EquiLend has offices in New York, Boston, Toronto, London, Dublin, Hong Kong and Tokyo.

EquiLend's services include:

- NGT, the securities finance industry's most active trading platform
- Collateral Trading, enabling funding and financing desks a centralized way to execute and manage trade structures with their counterparties
- Swaptimization, automating global equity total return swaps trading workflow
- EquiLend Post-Trade Suite for securities finance operations
- DataLend, providing performance reporting and global securities finance data to agent lenders, broker-dealers, beneficial owners and other market participants
- EquiLend Clearing Services, offering trading services and CCP connectivity
- EquiLend SFTR, a no-touch, straight-through solution for Securities Financing Transactions Regulation
- EquiLend Spire, a front-, middle- and back-office platform for securities finance businesses

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Calypso Technology, Inc. is a cloud-enabled provider of cross-asset front-to-back solutions and managed services for financial markets, with over 35,000 users in 60+ countries.

These solutions include our award-winning post-trade processing, collateral and securities finance platform which helps clients resolve today's complex collateral management needs, offering:

- End-to-end solution with seamless integration
- Centralised, real-time view of inventory
- High levels of STP through configurable workflows
- Triparty integration
- Connectivity with AcadiaSoft MarginManager
- Flexible platform to adapt to changing needs
- Deployment on-premise, hosted or hybrid

Providing coverage of both bilateral and cleared products, Calypso helps buy-side, sell-side and service providers to minimise use of cash, and reduce margining and funding costs.

Complete automation of collateral management operations, combined with algorithm-based allocations, enable clients to find the 'cheapest to deliver' collateral and reduce the number of collateral calls and disputes.

Collateral trading desks can use Calypso Securities Finance to access repo and securities lending markets to release contingent liquidity and reduce overall funding costs.

The solution is compliant with new regulatory requirements such as the Uncleared Margin Rules (UMR) and the Securities Financing Transactions Regulation (SFTR).

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Clearstream is a global leader in post-trade securities services with more than EUR 14 trillion in assets under custody, making it one of the world's largest settlement and custody firms for domestic and international securities. In its role as international central securities depository (ICSD) headquartered in Luxembourg, Clearstream provides the post-trade infrastructure for the Eurobond market and services for securities from 57 domestic markets worldwide. As a central securities depository (CSD) based in Frankfurt, Clearstream provides the post-trade infrastructure for the German securities industry as well as CSD services for a large number of domestic markets across Europe and beyond. As an integral market infrastructure, Clearstream is a key contributor to the stability and resilience of international financial markets and ensures the highest standards of safety for customer assets.

With the fully-fledged Investor CSD offering now running cross-border, customers benefit from our OneCollateral Management Service (OneCMS) which represents the collateral management arm of Clearstream's T2S offering. Assets held at the CSD can be automatically mobilised for use at the ICSD. In the next phase Clearstream's CSD will offer "ICSD like" collateral management services settling in T2S.

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FIS is a leading provider of technology solutions for merchants, banks and capital markets firms globally. Our more than 55,000 people are dedicated to advancing the way the world pays, banks and invests by applying our scale, deep expertise and data-driven insights. We help our clients use technology in innovative ways to solve business-critical challenges and deliver superior experiences for their customers. Headquartered in Jacksonville, Florida, FIS is a Fortune 500® company and is a member of Standard & Poor's 500® Index.

Sitting at the intersection of technology and finance, FIS is focused on delivering fresh ideas and inventive solutions to help our customers adapt and thrive in an ever-changing environment. With a blend of software solutions, cloud infrastructure, global service capabilities and deep domain expertise, FIS is capable of supporting virtually every type of financial organisation, including the largest and most complex institutions in the world.

Whether on the supply or demand side, FIS' comprehensive range of market data, securities finance and collateral management solutions gives our clients the efficiency to run smarter operations and the agility to capitalise on opportunities.

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HQLA^X is an innovative financial technology firm founded by financial market practitioners. Our core clients are financial institutions active in securities lending and collateral management, and our shareholders include market-leading service providers in the global financial ecosystem.

Our long-term vision statement is to accelerate the financial ecosystem's transition towards frictionless ownership transfers of assets. We aim to achieve this vision by collaborating with our clients to design, develop and deliver innovative, technology-driven solutions for specific pain points in the financial markets.

Our immediate value proposition and mission statement is to improve collateral mobility amongst market-leading triparty agents and custodians. In the HQLA^X operating model, there is no movement of securities between custodians. Instead, a digital collateral registry is used to record ownership of baskets of securities, whilst the underlying securities remain static in the custody location of the collateral giver. This enables banks and broker dealers to execute delivery versus delivery (DvD) ownership transfers for baskets of securities across triparty agents and custodians, providing capital cost savings due to reduced intraday credit risks and intraday liquidity requirements, as well as reduced operational risks.

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www.jpmorgan.com/securites-services

J.P. Morgan offers innovative solutions to collateral providers and receivers, helping institutions efficiently manage collateral against securities and derivatives transactions and address financing, funding and liquidity requirements.

Banks, broker-dealers, asset managers, insurers, central banks and pension funds can optimise their collateral portfolio with sophisticated analytic and eligibility tools and flexible bilateral and tri-party structures. J.P. Morgan's global capabilities, supported locally, help institutions manage collateral around the world or onshore, in order to meet increasingly complex financing and liquidity requirements.

A leading global custodian, J.P. Morgan operates in approximately 100 markets and provides a comprehensive suite of settlement, asset servicing, tax, FX, securities lending, cash and liquidity products.

John Davidson
CEO

www.theocc.com

OCC is the world’s largest equity derivatives clearing organisation. Founded in 1973, OCC is a cost-effective, customer-driven organisation that delivers world-class risk management, clearance and settlement services to 20 exchanges and trading platforms for options, financial futures, security futures and securities lending transactions. It operates under the jurisdiction of the US Securities and Exchange Commission (SEC) and the US Commodity Futures Trading Commission (CFTC). OCC has been designated by the Financial Stability Oversight Council as a Systemically Important Financial Market Utility (SIFMU), which reflects OCC’s critical role within the US financial markets infrastructure. In 2018, OCC cleared 5.24 billion equity derivatives contracts, representing its highest volume year ever. In 2019, OCC cleared 4.97 billion equity derivatives contracts. OCC stock loan activity was down 4.7 percent with over 1.3 million new loan transactions.

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Pirum offers a secure, centralised automation and connectivity hub for global securities finance (Stock Loan and Repo), cleared and uncleared derivatives and other bilateral transactions. We enable the complete automation of the post-trade and collateral lifecycle. Our position within the post-trade collateral landscape enables clients to seamlessly access counterparts, tri-party agents, trading venues, market data companies and CCPs, as well as regulatory reporting facilities.

We combine an in-depth understanding of both the collateral management industry and state-of-the-art technology to provide highly innovative, modular, and flexible solutions. Supporting established and emerging financial institutions, Pirum's pioneering approach consistently reduces operational risk while increasing processing efficiency and profitability.

Pirum's innovation and customer focus have resulted in widespread industry recognition and multiple awards. Pirum has been named Global Post-Trade Service Provider of the Year five years in a row at the International Securities Finance Awards and won the RegTech Insight Awards 2020 (Best solution for SFTR with IHS Markit).

www.smartstream-stp.com

info@smartstream-stp.com

Founded in 2000, SmartStream has evolved from a dedicated reconciliations provider to become a market leading provider of software solutions that deliver automation and control to buy-side and sell-side firms.

The company has grown rapidly, introducing new solutions and winning multiple industry accolades. SmartStream helps organisations make the journey towards digital transformation by providing a range of solutions for the transaction lifecycle. AI and Blockchain technologies are being embedded throughout the solutions, which are also available in a variety of deployment models.

www.cmegroup.com/services/trioptima.html

info@trioptima.com

2000+ firms globally use triResolve, the market leader for portfolio reconciliation, collateral management and repository reconciliation. triResolve Margin provides an exception-based, end-to-end collateral solution with complete coverage for all phases of UMR. triCalculate provides SIMM sensitivity and IM calculations.

triReduce is the leading multilateral compression service running cycles across OTC IRS currencies, FX, credit and commodities. triReduce's benchmark conversion service will assist the market in the conversion to new RFRs, expandable to all IBORS/ CCPS. triBalance – a multilateral risk mitigation service - reduces systematic risk and optimises the cost of bilateral as well as cleared IM exposures. TriOptima is now part of CME Group.

As the world's leading and most diverse derivatives marketplace, CME Group (www.cmegroup.com) enables clients to trade futures, options, cash and OTC markets, optimise portfolios, and analyse data – empowering market participants worldwide to efficiently manage risk and capture opportunities.

CME Group exchanges offer the widest range of global benchmark products across all major asset classes based on interest rates, equity indexes, foreign exchange, energy, agricultural products and metals.

VERMEG

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VERMEG is a specialized software house covering three main market segments in financial services: Banking, Capital Markets and Insurance.

Our business solutions are designed to address the challenges linked to the transformation of the financial services industry. As information system architects, we ensure our clients can achieve cost reductions and Time-To-Market control in the modernization of their information systems.

In addition to offering standard software solutions that meet evolving digitized needs, VERMEG provides tailor-made solutions based on our own tools, project and business expertise.

VERMEG has over 1350 employees, with presence in Australia, Belgium, Brazil, China, UK, France, Germany, Japan, Hong Kong, Luxembourg, Mexico, Netherlands, Singapore, Spain, Tunisia and United States. The company supports more than 550 clients in 40 countries.

Securities Finance and Collateral Management Solutions for Every Firm

- Optimize lending, funding and collateral decisions
- Reduce counterparty and operational risks
- Enable efficient and high-growth operations
- Flexible to firms of all sizes in any location
- Meet regulatory and market requirement

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