

First View on the New CVA Risk Capital Charge
Managing the Cost of Collateral

MICROSERVICES

The New Building Blocks of Financial Technology





CEO Message

Since the September 2015 issue of InSight, the news headlines have been occupied by the UK's relationship with the EU and the impact of 'Brexit', the Chinese economy falling to its slowest growth rate for 25 years and the Fed's historic rate rise. There have also been significant discussions and concerns around liquidity in some areas of the fixed income markets. This is an area of increased focus for Quantifi and one where we have invested significant resources to deliver sophisticated tools to help our clients more accurately measure and manage liquidity risk.

There has been a great deal of talk about the need for capital markets' to invest in technology. Leveraging better technology can increase flexibility, improve performance, reduce operational risk, and lower costs. Quantifi has invested heavily in BI and Big Data technology. Micro-services architecture is the next technology innovation that will fundamentally reshape the structure of risk technology. Our lead article written by Marc Adler, Quantifi's Chief Architect, highlights how Quantifi is adopting a micro-services architecture to allow our functionality to be consumed in different ways and more receptive to technological evolution.

This issue also includes a summary of a recent Quantifi whitepaper co-written by d-fine, a leading consultancy firm headquartered in Frankfurt, on the new approaches for calculating regulatory capital in response to the recently published CVA risk framework document published by the Basel III Committee.

In the coming weeks Quantifi will be hosting a series of breakfast briefings in London and New York. We have an exciting programme of topics, the first of which will focus on 'sell side risk technology'.

The last 12 months have been a period of significant progress for Quantifi. With recent industry awards and client wins, our technology is seen as a key differentiator in helping the market navigate through complex changes in market structure and regulation. Our significant re-investment in our solutions continues to pay dividends for our clients.

A handwritten signature in black ink, appearing to read 'Rohan Douglas', written in a cursive style.

Rohan Douglas, CEO, Quantifi

Cover Story

Quantifi Micro-Services Architecture

The increasing impact of emerging regulations, market unease and internal pressures have heightened the attention on risk technology and operations. With the traditional segmented approach to risk management no longer suitable, the application of integrated risk management is fast becoming best practice. With a focus on reducing costs and a desire to consolidate positions in as few systems as possible, firms are moving towards a more balanced, business aligned, and risk based strategy.

Contents

A First View on the New CVA Risk Capital Charge

The recently published consultative document 'Review of the Credit Valuation Adjustment (CVA) risk framework' by the Basel Committee introduces new approaches for the calculation of regulatory capital. This article explores the effect of two of the new regulatory methods introduced in the consultative paper. The new approaches considered are aligned to the CVA calculations under IFRS and the market risk framework under the Committees' Fundamental Review of the Trading Book (FRTB).

Infographic: Managing the Cost of Collateral

120 individuals from across the industry took part in the Quantifi webinar 'Cost of Collateral for Clearing' and were surveyed on the challenges associated with clearing and how they plan to address them.

News

NewOak Selects Quantifi's Single Solution for Pricing and Analytics

"We chose to integrate Quantifi into our solutions because their product complemented our existing technology framework while adding a high level of functionality. We were further impressed with Quantifi's market presence, reputation and the high level of support."
Steve Segretta, Managing Director, NewOak

Best Risk Management Technology Provider for Second Successive Year

Quantifi named Best Risk Management Technology Provider at the fourth annual MENA Fund Manager Fund Services Awards. Companies are evaluated on financial progress, growth, client satisfaction, genuine product innovation and adaptability in the face of new client demand and new regulations.

Risk Management Software of the Year for Financial Risk

Judged by an independent panel of experts, the CIR Risk Management Awards recognise organisations and teams that have significantly added to the understanding and best practice of risk management. "Quantifi is delighted to receive the Risk Management Software of the Year award, especially considering the tough opposition from four other credible risk technology providers." Roland Jordan, Head of EMEA Sales, Quantifi

Events

ComRisk 2016

Quantifi to present at ComRisk
London, 25-26th May, 2016

Forius Agri-Business Group

Quantifi invited to present at Forius
Louisville, KY, 15-16 June, 2016

In July 2015, the Basel Committee of Banking Supervision (BCBS) published a consultative paper on Credit Valuation Adjustment (CVA) risk to improve the current regulatory framework. In February 2016, the first improvements to this framework were introduced, based on the December 2015 Quantitative Impact Study (QIS)¹. A revision of the current framework addresses three issues:

- ensure all important drivers of CVA risk and CVA hedges are covered in the Basel regulatory capital standard
- align the capital standard with the fair value measurement of CVA employed under various accounting regimes
- ensure consistency with the proposed revisions to the market risk framework under the Basel Committee's Fundamental Review of the Trading Book

The consultative paper proposes two frameworks to accommodate different types of banks with respect to the ability to calculate CVA sensitivities:

- The "Basic CVA framework" (BA-CVA), based on a formula similar to the current standardized method
- The "FRTB-CVA framework" consisting of the standardized approach (SA-CVA), based on CVA sensitivities

A FIRST VIEW ON THE NEW CVA RISK CAPITAL CHARGE

By Quantifi and d-fine



To highlight the key differences of current and future calculation approaches for regulatory CVA risk capital charges, including the eligibility criteria for using the different approaches, this article focusses on BA-CVA and SA-CVA.

Qualifying banks need to follow general principles to calculate regulatory CVA in line with the FRTB-CVA framework

New basic approach (BA-CVA)

For banks not able or willing to provide sufficient CVA sensitivities, a new basic approach, which is closely related to the current standardized method, should be used. Improvements to the approach include an enhancement of the definition of eligible credit risk hedges.

New SA-CVA

To use SA-CVA the following requirements must be fulfilled:

1. The calculation of CVA sensitivities for given risk factors comply with general principles for the calculation of CVA
2. A methodology for approximating the credit spreads of illiquid counterparties is applied
3. A dedicated CVA risk management function and control unit exists.

Qualifying banks need to follow general principles to calculate regulatory CVA in line with the FRTB-CVA framework. There are two options for generating scenarios of discounted exposures: accounting-based CVA and IMM-based CVA.

One could in principle base CVA sensitivities on add-on approaches to exposure calculations, which would mean relying on MTM sensitivities only, although the consultation paper focuses on Monte Carlo simulation or equivalent methods that are able to calculate CVA as a proper hedging cost of counterparty credit risk (CCR).

Sample Calculations

For the sample calculations we selected synthetic portfolios, including real market data, in order to provide

an impression of potential CVA risk capital charges for end of June 2015. The sample portfolios consisted of interest rate and cross currency swaps (USD and EUR).

For the sample calculations we considered the positions of a medium-sized bank with two different types of counterparties:

1. Interbank portfolios with investment grade ratings.
2. Corporate client portfolios with investment grade ratings.

Simulation approach

We implemented a framework that matches the definitions from the consultative paper and the corresponding QIS instructions. For sensitivity calculations, a two factor semi-analytic model was used. Sensitivities were based on 1 bps tenor shifts for IR and Credit Spread Delta and relative 1% shifts for FX Delta, as well as relative parallel 1% shifts for IR and FX volatilities to calculate Vega sensitivities. All calculated sensitivities were input into an aggregation tool to compute the CVA risk capital charges. An important additional input for the calculation of capital charges is the corresponding risk weight for each counterparty. We selected investment grade financial and corporate counterparties, leading to the following risk weights for the old and new basic approaches:

Approach	Financial	Corporate
CRR	1.0%	1.0%
BA-CVA (option 1)	2.0%	1.5%
BA-CVA (option 2)	6.1%	1.8%

Table 1: Risk weights for the old and new approach

Calculation Results

Current Basel III CVA risk capital charge

This charge is calculated as a baseline scenario that defines the current capital charges for all banks without an available advanced approach. By applying the same rating for the financial and corporate counterparty there was no difference between CVA risk charges for the two portfolios. For the calculations, credit quality '3' was assumed with risk weight 1%. The EADs were calculated according to the Current Exposure Method (CEM) as described in article 274 CRR and the recognition of netting was applied according to article 298.



Future Basic approach for CVA risk capital charge

Calculations were based on EAD figures derived from SA-CCR, the new standardized approach effective January 1 2017². Considered by regulators as a more risk sensitive approach than CEM. SA-CCR recognizes netting and margin agreements in an enhanced way, and incorporates the IMM multiplier α to account for model inaccuracies. For interest rate swaps without CSAs the SA-CCR EAD is significantly higher. While CEM recognizes CSAs only for in-the-money trades, SA-CCR offers significant EAD reduction for both considered types of CSA trades, and also takes into account Margin Period of Risk (MPOR).

Results for the future basic approach show a significant increase in capital charges for all considered trades, compared to current Basel III results. It is evident that the new basic approach significantly increases the capital charge for both counterparties.

Future SA-CVA charge

Results for the future standardized approach display different behaviors in the calculation of capital charges. The most relevant factors are credit spread sensitivities, especially for the collateralized portfolios. For those portfolios with cross currency swaps, the FX Vegas are also of major relevance.

The future SA-CVA capital charge is highly beneficial for collateralized trades as it is the result of calculations with real CVA sensitivities. For trades with no CSA, SA-CVA is generally higher than the current capital charge, whereas for trades with CSA I and CSA II this order is reversed. Increasing MPOR from 0 to 20 days makes the trade riskier, and thus increases both CVA and SA-CVA for CSA II when compared with CSA I. MPOR also changes the distribution of sensitivities in credit buckets, which are dominant in SA-CVA calculations. So whilst the sensitivity of a credit parallel shift is always higher for CSA II, some credit bucket sensitivities for CSA II can be lower than those of CVA I which may lead to a smaller capital charge.

It is evident that the new basic approach significantly increases the capital charge for both counterparties

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[1] The internal model approach IMA-CVA that has been introduced in the consultative paper and both QIS has been eliminated later on. Elimination has been published in a consultation paper regarding credit risk RWA [4]

[2] Basel Committee on Banking Supervision. The standardized approach for measuring counterparty credit risk exposures. March 2014.

Conclusion

The most important result is the increase of the CVA risk capital charge under the new basic approach (BA-SVA) compared to the current standardized approach. The impact of the new CVA risk regulation framework on calculation methods and infrastructure of banks could be the turning point for many medium-sized institutes. This is due to many having only recently started calculating exposures and CVA within a Monte Carlo simulation based framework for IFRS 13 compliant accounting. The SA-CVA method may be an attractive way to reduce capital charges for CVA risk - provided that banks are able to install an active CVA desk that is managing CVA and CVA risk. This would be the first time the Basel committee recognizes the simulation methods used for accounting for regulatory purposes.

The impact of the new CVA risk regulation framework on calculation methods and infrastructure of banks could be the turning point for many medium-sized institutes.

Regular calculation of CVA sensitivities is not something associated with a Monte Carlo installation for month end IFRS reporting. Therefore, banks seeking to adopt the SA-CVA method will be interested in fast and accurate CVA sensitivity calculations. Research and technology solution providers are able to provide various approaches that support automatic differentiation methods, i.e. Malliavin type derivatives, alternative likelihood ratio methods or fast GPU implementations. Other methods for increasing efficiency may include more effective streaming algorithms and utilizing dependency graphs for analysis.

As a final point, in addition to the QIS on the CVA risk capital charge finalized in September 2015, the current QIS on CVA risk ends 13 May 2016.

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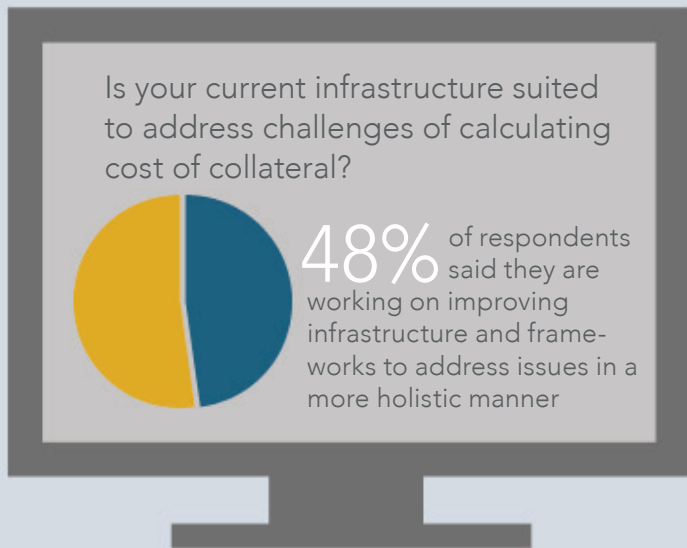
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Managing the Cost of Collateral

120 individuals from across the industry took part in the Quantifi webinar 'Cost of Collateral for Clearing' and were surveyed on the challenges associated with clearing and how they plan to address them.

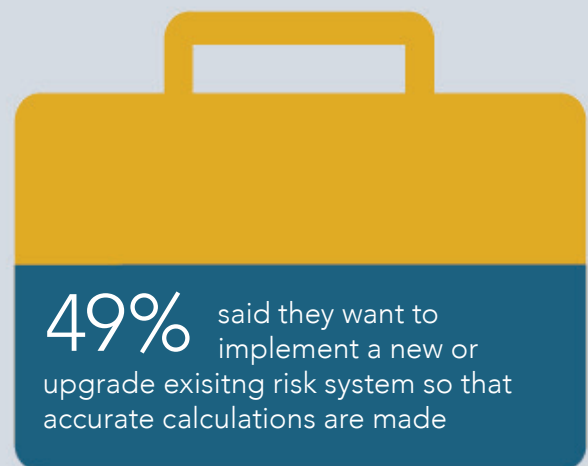


Main Challenges

- Measuring actual and optimal cost of collateral
- Calculating expected cost of collateral over the life of the trade
- Consolidated, transparent reporting across product/ CCPs/clients
- Gaining access to limited business resources to address the topic
- Deciding on counterparty, client and CCP selection.

What are your business priorities, related to calculating cost of collateral for the next 12 to 18 months?

Regulatory reforms increasing cost of capital



How do you plan to address these deficiencies?



78% of respondents are considering either an external or a hybrid (buy & build) approach to collateral management technology



The New Building Blocks of Financial Technology

by Marc Adler, Chief Architect

In these days of ever-increasing regulation, managing risk is a difficult task at the best of times. Over the years, I have seen the pain firms experience when attempting to integrate disparate systems and streamline front-to-back processes. There is evidence that, managed properly, a holistic approach to risk management pays off. In contrast, maintaining multiple systems is complex and consequently can be costly and often inadequate.

Single Solution

The increasing impact of emerging regulations, market unease and internal pressures have heightened the attention on risk technology and operations. With the traditional segmented approach to risk management no longer suitable, the application of integrated risk management is fast becoming best practice. Risk technology is undergoing its next wave of innovation with a new breed of single integrated solutions. With a focus on reducing costs and a desire to consolidate positions in as few systems as possible, firms are moving towards a more balanced, business aligned, and risk based strategy. In an ideal setting, end-users are favouring trading, portfolio management, risk, and analytics contained within a single platform, maintained by a single vendor, with one point-of-contact for support.

Firms want to minimize the number of different technologies that are in play, aiming to lower costs and improve resilience. They want to be able to upgrade functionality with minimal operational or organisational interruption in their daily workflow and to avoid punitive project costs for what is

sometimes limited added value. Technology providers that provide a single, extensible platform are becoming increasingly desirable.

Quantifi's single solution for risk, analytics and trading provides rich functionality spanning multiple asset classes. Built on the latest version of Microsoft .NET and C#, Quantifi is an extensible platform that provides full front to back office functionality. Quantifi provides unparalleled extensibility and scalability across all major components. This enables teams responsible for structuring, hedging, risk management, and control functions e.g. accounting to take an enterprise approach to risk management.

A Microservices Architecture (MSA) allows Quantifi functionality to be consumed in different ways

Quantifi's intuitive workflow, based on the Microsoft Workflow Foundation, allows for tailored trade-lifecycle workflows to be easily configured and deployed. Quantifi's API's also allows for much faster integration with other 3rd party or in-house systems as we are not faced with many of the issues that older legacy systems encounter.

Quantifi has stayed ahead of the competition by continuing to make smart investments in new technology that translate into long-term value for our clients. We recently invested in data distribution to adapt to the heavy demands of big data by utilising a NoSQL database environment.

Our investment has also reshaped how our architecture serves our clients. Quantifi has shifted to a microservices architecture to address the modern business imperatives of speed, agility and scalability.

Microservices – A Winning Paradigm

A key question we are often asked when engaging with our clients is "How can we leverage Quantifi and realise our value add without significant infrastructure change?" and the implied onerous costs that would go with that route.

At Quantifi our philosophy is to look for ways to best leverage new technologies. A key focus for the past 12 months has been to make Quantifi more open and flexible by separating out our architecture into microservices - essentially small, API-accessible, single-purpose components. A microservices architecture promotes developing, testing, deploying and managing of applications composed of autonomous self-contained components built around system functionality, with each running its own process. This latest initiative is fundamentally different from the way traditional applications are designed, developed and deployed. A Microservices Architecture (MSA) allows Quantifi functionality to be consumed in different ways that are most applicable to our client's unique business requirements. Our clients write applications that interface with Quantifi, and also seamlessly interface their existing systems with the data and services that Quantifi provides. This move to a MSA makes our solution more receptive to technological evolution and incremental change. Our individual microservices implement a different

Microservices is a software architecture style in which complex applications are composed of small, independent processes communicating with each other using language-agnostic APIs. These services are small, highly decoupled and focus on doing a small task, facilitating a modular approach to system-building (Wikipedia).

slice of functionality, with each microservice exposing an API that is accessible through REST and industry-standard JMS messaging. New "events" are propagated to a common messaging infrastructure. Clients can write applications to call (or subscribe) to these events, and display the information in a proprietary GUI. This new architecture enables Quantifi to offer "headless risk services", where customers can send requests to a service and receive risk results back, all without requiring a GUI.

Before embracing a new microservices architecture, the Quantifi development team carried out acceptance and usability testing by writing a stand-alone batch scheduling service that "snapped in" to the Quantifi platform. There were no hard references between the main Quantifi platform and the scheduling service. Going forward Quantifi will roll out additional value-added microservices that can be easily plugged into the existing system.

This move to a MSA makes our solution more receptive to technological evolution and incremental change.

Cloud Enabled

Cloud is a key enabler to reduce the complexity of building, implementing and operating microservices. Quantifi's cloud-service fabric helps connect and reliably serve various services to our clients, making applications more manageable, reliable and scalable. Processes within any organisation need to be able to respond and adapt to market conditions. This is where a combined cloud-strategy and MSA comes in. By utilising a cloud infrastructure, as business processes change, individual or multiple services can be dynamically unplugged or replaced as needed. With a cloud framework, Quantifi can operate within a dynamic environment.

Responsive to Change

The move to a MSA allows Quantifi to push new functionality out to clients more rapidly. Some of the key benefits to our clients include reduced disruption on their side, a faster time to market and ultimately an overall lower total cost of ownership. Improvements to individual services can also be deployed independently of the rest of the system and therefore not require a complete system upgrade. If a problem was to occur, it can be isolated to an individual component and be swapped out without impacting other services. This reduces the operational impact and lowers the level of support required. Components within a MSA are loosely coupled, making them more flexible and responsive to change. This allows Quantifi to release a different implementation for each individual service that would interface with a customer's internal systems. For example, Quantifi can release an authorization module that interfaces with a customer's own entitlement system. Quantifi can also release an individual service to consume data that a customer publishes over their own messaging system. In general the risk involved in changing or upgrading a single service is reduced.

Integration

Integration is one of the most important aspects of technology associated with microservices. Since microservices operate at a granular level, Quantifi can offer services on an a-la-carte basis so clients can select different services. These chosen services can be seamlessly integrated to co-exist with a client's existing framework to form a holistic system. This is important for a number of our larger clients who only want to replace specific functionality without the need to 'rip and replace' their entire system.

Scalability

With a MSA we have gained significant benefits around reliability, ease of modification and scalability. Quantifi currently supports horizontal scalability, using Microsoft HPC compute grid and vertical scalability using multi-core processing. Unlike a layered architecture where you have to scale everything together, with a MSA each individual component can be scaled separately. This scalability of services makes it easy for Quantifi to start up additional instances of a service to deal with periods of excessive load. Data and processing can also be load-balanced across the various instances of a service. This level of scalability also improves the resilience of the Quantifi platform.

Messaging

Another interesting feature of a MSA is messaging. JMS-based messaging and REST are two ways that applications can communicate with the Quantifi services. These are open standards supported by different programming languages. A customer can write an application in C#, C++, Java, or Python. There is no requirement for a customer to know C# and Microsoft .NET in order to interface with a Quantifi service thus avoiding the need to add additional resources or skill sets. The resulting financial benefits are overwhelming.



“In the mid- to long-term, we expect that the smart evolution, utilization and deployment towards MSA will be one of the bedrocks for the future evolution of front office, risk, and compliance systems innovation”.

Cubillas Ding, Research Director, Celent

Quantifi Microservices

Most firms have invested in technology capabilities to satisfy new practices and regulatory requirements, however, much remains to be done to operate efficiently. As traditional systems grow and more updates are bolted on they become too complex and inflexible to the extent that they become incompatible with new technologies and tools. Forward-looking firms are realising that in the new world, the ability to achieve scale, reliability and flexibility will be a winning factor all of which will facilitate a lower total cost of ownership.

Advantages of a MSA

- Flexible and responsive to change as each loosely coupled service is independent
- Easier deployment as each service is autonomous
- High scalability – can be scaled to enhance performance if demand for a particular service increases
- Easy and flexible integration with minimal disruption to business processes and systems
- Improves system resilience - failure of a component can be identified and fixed without impacting other services

Quantifi is very excited to roll out its MSA as it radically changes how we build and deliver our technology. Separating our architecture into microservices has reshaped how we serve our clients. A MSA makes initial implementation and future upgrades simple and low risk. Clients also benefit from unparalleled flexibility and customisation.

“In the mid- to long-term, we expect that the smart evolution, utilization and deployment towards MSA will be one of the bedrocks for the future evolution of front office, risk, and compliance systems innovation. Firms will be able to realize the benefits of reducing integration expense, increasing asset reuse, promoting business agility, and reducing business risk in an environment where the pace of technology innovation is accelerating”.

Cubillas Ding, Research Director, Celent

Forward-looking firms are realising that in the new world, the ability to achieve scale, reliability and flexibility will be a winning factor



Marc Adler
Chief Architect, Quantifi

Marc joined Quantifi in 2015. Before joining Quantifi he was Chief Architect of the Equities division of Citigroup, and formerly the Chief Architect of MetLife. He was the main designer of Lighthouse, Citigroup's first real-time business analytics system, which is currently being used across the Equities and FX divisions of the investment bank.



Best Risk Management Technology Provider

Quantifi has been named Best Risk Management Technology Provider at the fourth annual MENA Fund Manager Fund Services Awards. This is the second consecutive year Quantifi has received this award.

The MENA FM Fund Services Awards recognise companies that have shown excellence in providing services to the regions fund and asset management industry during the course of 2015. Companies are evaluated on financial progress, growth, client satisfaction, genuine product innovation and adaptability in the face of new client demand and new regulations. The judging panel comprised representatives from MENA Fund Manager, leading institutional investors and industry experts.

“We received a number of strong entries for this year’s awards from some of the most highly regarded service providers active in the region’s asset management industry. Quantifi emerged as the winner of Mena Fund Manager’s Best Risk Management Provider award after judges noted the very high standards of service and support for clients in the region”, comments Rob Langston, Editor of Mena Fund Manager.

Impact of the New CVA Risk Capital Charge

The recently published consultative document ‘Review of the Credit Valuation Adjustment (CVA) risk framework’ by the Basel III Committee introduces new approaches for the calculation of regulatory capital. With focus on XVA stakeholders including desk traders, risk managers, finance and technology professionals, this webinar, co-hosted by Quantifi and d-fine, explores the new CVA risk framework based on FRTB and SA-CCR.

View webinar: www.quantifisolutions.com/videos

Whitepapers

- Cost of Trading and Clearing in the Wake of Margining
- A First View of the New CVA Risk Capital Charge
- IFRS 13: CVA DVA FVA and the Implications for Hedge Accounting
- Sell-Side Risk Analytics - RiskTech Quadrant®
- OIS & CSA Discounting
- Buy-Side Risk Analytics - RiskTech Quadrant®

About Quantifi

Quantifi is a specialist provider of risk, analytics and trading solutions. Our award-winning suite of integrated pre and post-trade solutions allows market participants to better value, trade and risk manage their exposures and responds more effectively to changing market conditions.

Quantifi is trusted by the world’s most sophisticated financial institutions including five of the six largest global banks, two of the three largest asset managers, leading hedge funds, insurance companies, pension funds, and other financial institutions across 16 countries.

Renowned for our client focus, depth of experience, and commitment to innovation, Quantifi is consistently first-to-market with intuitive, award-winning solutions.

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