

Ensuring Integrity of Proprietary and Derived Market Information

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Introduction

Changing market dynamics are putting new emphasis on market-makers and other generators of proprietary contributed market pricing to ensure the integrity of their data. Structural shifts – such as the introduction of exchange-like Swap Execution Facilities (SEFs) – are exacerbating the pressures on financial institutions to get their pricing systems in good shape.

The ongoing changes are affecting markets everywhere. Although perhaps most visible in the international swaps market, concerns about data integrity are impacting a wide range of asset classes. These include both over-the-counter (OTC) asset classes – such as fixed income, foreign exchange and derivatives – and exchange-listed structured instruments – such as exchange-traded funds, warrants, turbo-warrants, certificates and indices.

Elsewhere, as firms seek to monetise the data they generate from their business activities, new demands for quality control are driving a renewed look at data integrity. With data sales emerging as a significant element of the overall revenue picture, financial institutions are striving to adopt best practices in response to customer demand for higher quality data services.

This paper discusses the obstacles to establishing robust pricing processes, and examines the market dynamics driving efforts towards improved data integrity and the evolution of best practices.

Contributed Data in the New Market Structure

A number of market dynamics are conspiring to change the way financial institutions monitor, manage and validate the data they generate and consume in support of their business activities. Increased scrutiny of data operations as part of a wider and heightened level of regulatory inquiry means institutions are taking a closer look at the integrity of their data contributions.

One major driver of this phenomenon has been the migration of previously OTC markets to exchange-like execution venues. So far, the most visible incarnation of this has been the requirement that firms execute swaps trades via SEFs, execution facilities that are designed to reduce the systemic risk inherent in the OTC swaps market.

While SEFs may replicate some aspects of exchanges, they differ with respect to price discovery: while exchanges centralise trading in a single venue, SEFs fragment liquidity in swaps across a decentralised marketplace. In the SEF marketplace, and indeed within a broad range of other OTC markets, the 'market' is comprised of prices, rates or quotes posted by market-makers or other price-makers.

Exchanges perform a duty of oversight of data quality, but there is no such function in the SEFs marketplace (although the CFTC's Rule 1.73/74 requires pre-trade credit screening through participating futures commission merchants). With no centralised data checking facility, it falls to the market-makers on SEFs to ensure the integrity of the data they post on the trading facilities.

SEFs act as the aggregation device for disparate market-maker quotes in swaps markets. In other segments, contributed quotes have long constituted the marketplace itself. Before the advent of multi-dealer platforms like FXall, banks historically posted their foreign exchange rates on dedicated Reuters pages. The same is true for fixed income markets, with bond market participants posting their rates on pages provided by suppliers like Telerate, Reuters and Bloomberg.

Between them, these contributions generate many thousands of daily data points – prices, rates and quotes that contributing banks and brokerages need to monitor to ensure quality. In some cases, particularly among interdealer and money brokers, contributed data is packaged into commercial information services. For some, these services generate significant sums in terms of revenue, placing pressure on the originators to ensure timeliness, quality and completeness of data.

Meanwhile, and more formally, key banks continue to contribute their rates for aggregation to generate values for Libor, the London interbank offered rate banks charge each other for overnight loans, and for other investment book of records (IBORs) operated globally. Essentially, the same practice applies to the daily central bank foreign exchange fixings. Both of these official benchmarks have been tarnished by fraudulent activity in recent years, which has in part driven the increased scrutiny of bank contributed data.

Regulations like Dodd-Frank's Title VII are forcing financial institutions to look more closely at the integrity of the data they report or publish to the markets. Title VII requires 'Dealers and major participants [to] submit swap and SBS [security-based swap] transaction data to regulated and registered swap and SBS data repositories, which process and store the transaction data for the CFTC and SEC to use in analyzing and regulating swap markets.'

Other regulators – partly in response to the Libor and related scandals – have introduced their own guidelines for handling contributed data. These include the International Organisation of Securities Commissions, the European Securities & Markets Authority and the Monetary Authority of Singapore. Each of them has outlined guidelines for participating banks' data contribution processes, addressing methodologies, governance and responsibility for enforcing controls over the contributions process.

Indeed, most recent examples of punitive action by regulators involve fixing of recognised industry benchmarks. Just this spring, Barclays Bank was fined £26 million by the UK Financial Conduct Authority after one of its traders attempted to fix the price of gold. In response, Barclays chief executive, Antony Jenkins, said the bank 'has undertaken a significant amount of work to enhance our systems and controls'.

This incident occurred the day after the bank was fined £290 million for attempting to rig the Libor rate in 2012, along with a number of other banks. These include UBS (\$1.5 billion), Rabobank (\$1 billion), RBS (€260 million), Deutsche Bank (€259 million) and others including ICAP, ING, JPMorgan and RP Martin. UBS and Citigroup avoided fines by cooperating with the regulators, in this latter instance the European Commission.

Finally, the SEC is moving forward with the proposed adoption of Regulation SCI – for Systems Compliance and Integrity – in response to the impact of a Nasdaq Stock Market outage last year that corrupted market prices. The regulation, plans for which the SEC expects to make public in 2014, will require key market participants to ensure they have comprehensive policies and procedures in place surrounding their technological systems. Although targeted at execution venues and clearing agencies, the reforms will have implications for banks, brokerages and other financial institutions.

With other regulators expected to follow suit, financial institutions realise they need to get their contributions processes under control. But regulation isn't the only driver. Firms see business benefits from ensuring the quality of their contributed data in terms of improved client perception, reduced reputational and other operational risk, and a more competitive service offering.

Contributed Data Challenges

While the incentives may be significant, getting data contributions under control is no trivial matter. The issues undermining data integrity are manifold. With thousands of data points to monitor, as well as inputs, pricing algorithms and delivery mechanisms, coming to grips with contributions processes can be a manually intensive and very expensive exercise.

As things now stand, OTC markets everywhere are characterised by large amounts of erroneous or corrupted data. This can be manifested in a number of ways, for example by the appearance of empty fields in quote feeds generated by contributed data, or by clearly outlying data values, where a contributed quote, rate or other figure is published at a wide variance from normal market activity.

There are a number of reasons why bad data creeps into the contributions system. Perhaps the most common is simple human error during manual entry of data values. So-called 'fat finger' errors can be responsible for out-of-market quotes and have been the cause of some high-profile losses for banks whose traders have entered the wrong values for trades.

Corruption in the contributions delivery mechanism is another potential cause. With many quotes generated by algorithms or autoquote systems, a corruption here can lead to bad data being sent to the contributions device. Garbage in, garbage out (GIGO) applies here and the result is a bad quote, or no data at all. Similarly, corruption can occur in the mechanism used to publish the data to the marketplace.

Whatever its cause, bad data raises a number of issues for firms that contribute their own data to the market, whether as market-makers on a SEF or as part of a commercial data-vending unit. Many OTC markets are growing more complex. There are increasing numbers of venues to make prices on – and many more data sets to maintain – particularly in derivative markets. As a result, the challenge of delivering timely and accurate data has itself become much more complicated.

At the same time, the expectations of data consumers have grown. With electronic trading systems dependent on the same GIGO considerations, input of erroneous contributed data can have extreme ramifications for consuming organisations.

Furthermore, ensuring data integrity in fast markets is difficult. There is a trade-off between the market's demands for low-latency market information delivery – even outside of high frequency trading set-ups – and the ability to ensure accuracy and integrity. As a result, manual intervention is becoming less feasible and much more expensive, even as the costs of getting data wrong become more punitive.

Current data monitoring processes are often unable to deal with the complications of today's high-speed data delivery systems and have difficulty identifying weak links in the data flow. Firms are often left unable to calculate update rates from multiple sources, or to monitor standard deviations of price in real time. This can allow erroneous data to slip through the cracks into the marketplace. Ad hoc situations may add to the likelihood of bad data getting through.

The implications of this situation are clear: firms posting bad quotes on SEFs or selling incomplete or erroneous data as part of commercial packages will face damage to their reputations and customer complaints. And those that decide to do something about it will be forced to employ large teams to engage in costly monitoring and exceptions management activity.

Implications for a Solution

The challenges associated with ensuring the integrity of contributed data, whatever its uses, are substantial and point to the need for a sophisticated real-time monitoring solution that can help mitigate the risk of reputational damage and business losses.

To address the integrity issues that pervade many data-driven, decentralised markets, a firm's monitoring system needs to perform a range of checks so that issues can be identified and addressed rapidly, and potential damage can be limited. The system needs to be able to identify and analyse deviations from accepted statistical norms. It must also be able to compare data against historical data on a tick-by-tick basis, again to help identify variances from expected values. This can provide a check on outlying quotes, whatever their cause.

The system must be capable of monitoring relative latency between contribution systems to ensure data is properly orchestrated. It needs to be able to calculate and update latency rates on a per-instrument basis.

The monitoring system must compare data values across multiple sources and check for empty data fields, as well as for zero and even negative data values. And it needs to monitor data spikes and spreads, to check that they are legitimate.

All of this needs to be achieved while adding value to the entire process. A successful data monitoring implementation can introduce best practices for contributed data into the organisation. For one thing, it can help establish technological standards for data integrity processes by ensuring a unified approach to developing the rules engines and interfaces that drive quote generation. For another, a robust approach to governance can put in place the kinds of audit processes and workflow that ensure compliance with a firm's regulatory obligations around data integrity.

At the same time, the monitoring system needs to establish a balance between cost of implementation and sustainability going forwards. Effective automation can and should drive substantial reductions in operational cost and regulatory risk. But any solution needs to be applicable to legacy set-ups and should not require major capital expenditure to put in place.

With this kind of solution in place, firms can start to focus their attention on how better to leverage the data they generate into new business opportunities, including the creation of new commercial data offerings and the possibility of offering managed data services to others.

The Benefits of the ITRS Geneos Proposition

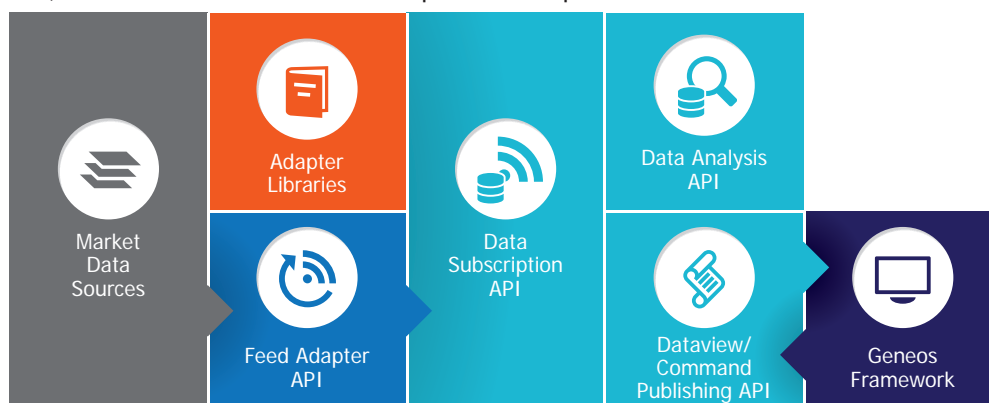
Adopting operational performance monitoring for data contributions can help market participants gain greater control of their data systems, while complying with regulations. ITRS's Geneos real-time application, process and business monitoring solution allows institutions to see the status of their data contribution and other critical systems. This gives them more insight into the business activities that depend on these systems and the health of the underlying data driving them.

Application teams need to quickly spot developing issues with data sources and proactively respond before their business is affected. Geneos Market Data Monitoring (MDM) provides an analytic framework that allows organisations to create customised market data monitoring solutions that range across latency, consistency and content.

By implementing ITRS Geneos MDM, financial institutions can start to analyse in real time the health and integrity of their market data processing, consolidation and distribution systems. This requires monitoring the entire data workflow, from the external data feed handler or internal pricing engine, through integration and aggregation systems, to publication either internally or to the marketplace.

Geneos consumes data from a variety of market data vendors and bespoke feeds through a feed adaptor application programming interface (API), as illustrated below. The data subscription API supports subscriptions and consumption of market data from multiple instruments across multiple data sources. The data analysis API runs programmatic analysis on the normalised and time-stamped data returned from those sources in real time. The dataview/command publishing API then publishes the statistics, alerts and monitoring content into the Geneos framework and defines user interactions in the form of Geneos commands.

Part of the monitoring requirement is to ascertain whether internal or external data from one or more sources is running slow or otherwise out of correct sequence. ITRS Geneos users can pinpoint the root cause of the issues impacting data integrity. By doing this early in the process, firms are able to minimise the potential of problems and costs later.



In addition, institutions can use ITRS Geneos to measure the raw latency of market data updates. This can be important as synchronisation is essential where multiple data sources are used to generate derived values.

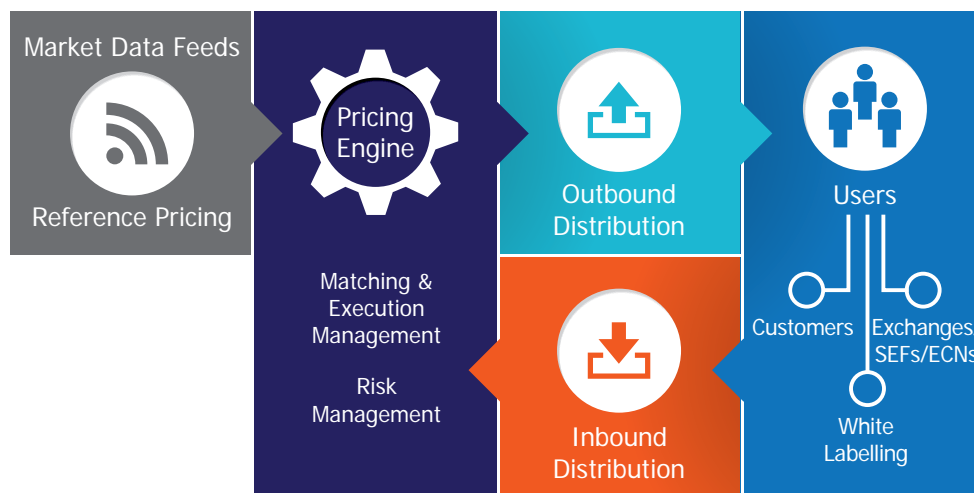
Financial institutions also need to compare data values from multiple sources. Using ITRS Geneos to alert users to outlier values through validation against alternative sources, firms are able to minimise the threat of fat finger and other errors that introduce possibly damaging 'out of the market' prices.

ITRS Geneos can also monitor spikes, by detecting when a price or rate exceeds a designated threshold. By alerting operational teams if there are no updates in a given interval, ITRS Geneos can also address the issue of empty data fields, allowing teams to move quickly to fix the cause.

The ITRS Geneos MDM solution provides a flexible custom interface to fit the individual requirements of financial institutions. Ensuring contributions consistency is a key capability as it is essential for institutions to know that their contributed data is publishing properly and consistently. Missed updates can manifest themselves as price spikes that can affect how users and applications trade the market. MDM will monitor a moving window of defined symbols for price fluctuations and notify if they are outside defined parameters and by what degree.

Knowing that internal and external market data feeds are supplying adequate throughput is a critical and often overlooked issue. The network team often sees a connection is up, but it is not monitoring it for data. MDM will monitor a defined set of symbols for update rates and allow the users to configure alerts for volumes or gaps that are both higher and/or lower than normal.

To monitor relative feed latency, users can script their own feed adapter shared library, allowing them to bring in any data feed to the system. Relative latency can be calculated both inter-vendor and intra-vendor by using a shared library to quickly match tick fields, as illustrated below.



MDM can allow administrators to override the underlying latency matching algorithm. It also allows users to control the display metrics (i.e., show only what's required). Users can also customise the latency algorithm to check the raw latency timestamps against the locally received timestamps. Finally, MDM provides the ability to create custom plug-in commands and choose the output method, for example file storage or HTML reports.

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About ITRS

ITRS Geneos provides real-time insight into the end-to-end health, performance and capacity of business transaction workflow. With over 15 years' experience in financial markets, we deliver out-of-the-box solutions that can be customised, ensuring prompt time to market and return on investment.

We work with over 120 leading financial institutions, including investment banks, exchanges and trading venues, hedge funds, brokers and data vendors around the world.

ITRS has offices in London, New York, Hong Kong and Manila.

For more information, visit www.itrsgroup.com

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