

# The IBM Financial Markets Framework

*Helping financial firms and exchanges seize competitive advantage through high performance and risk mitigation*



## Highlights

- Lower latency and increase throughput with a solution that supports massive data and transaction volumes
- Control risk and meet regulatory requirements for transparency by obtaining visibility across the enterprise
- Integrate holistic views of front-, middle- and back-office processes
- Manage market data with a solution built to support microsecond message speeds
- Move into new asset classes and geographies with a single core platform built to support multiple solution areas across business units

## Capture opportunities while mitigating risk in financial markets

Financial markets firms are under mounting pressure to respond to exploding increases in electronic trading volumes. High performance and low latency are the imperatives. As information becomes globalized, more regions than ever before are entering the financial markets and finding ways to capitalize on market uncertainty as even the most developed

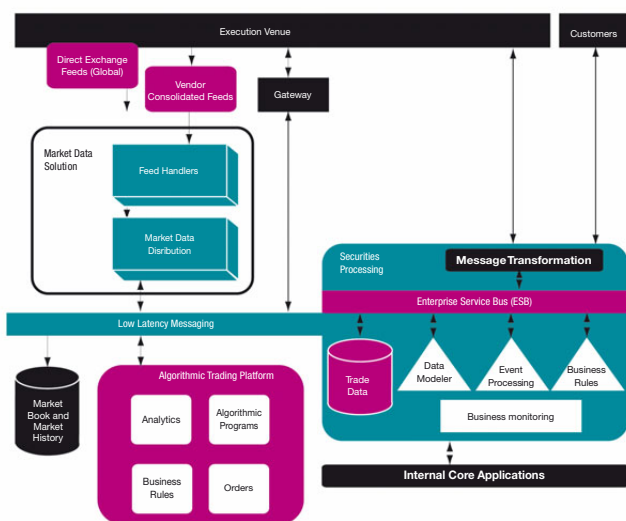
nations experience economic upheaval. At the same time, federal and regional regulatory requirements are becoming increasingly stringent as governments mandate increased transparency and compliance. Managing risk in real time is essential.

The IBM Financial Markets Framework addresses these needs, offering financial firms a vendor-neutral framework that supports the full trading lifecycle and addresses increasing data and transaction volumes, stringent performance requirements and the need for real-time risk mitigation. Purpose-built to provide support and integration across front-, middle- and back-office processes, the IBM Financial Markets Framework enables firms to leverage a single core platform addressing multiple solution areas across business units, including:

- Market data delivery, an algorithmic trading platform and securities processing for financial markets firms.
- A next-generation trading infrastructure, market surveillance and trade monitoring, and settlement risk management and monitoring for exchanges.

## Solutions for buy-side/sell-side firms

### A framework for financial markets firms



The IBM Financial Markets Framework supports front-, middle- and back-office processes for buy-side and sell-side firms.

### Experience microsecond, scalable market data delivery

Delivering market data at high speeds with the lowest possible latency is a chief concern among financial markets firms, including asset management firms and broker dealers, as well as investment banks and hedge funds. Financial markets firms

need to deliver market data with microsecond message speed and scalability to accommodate traffic fluctuations. The IBM market data solution is a robust, high-performance data platform that meets these needs, providing:

- Ultra-low latency connectivity to exchanges, consolidated data feeds and electronic markets.
- Feed-handler support for more than 100 data feeds, including major American, European and Asian data sources.
- Consolidated order book capabilities that enable a single market view of multiple data sources and feeds.
- High availability and load balancing.
- Support for entitlements, performance monitoring, single namespace and an integrated, Eclipse-based administrative desktop.
- Support for a wide range of client use cases, including ultra high-speed and remote market data distribution.
- A tick capture engine to capture the maximum amount of incoming data.
- The flexibility to apply filters to particular feeds for customized data gathering.

### Success story

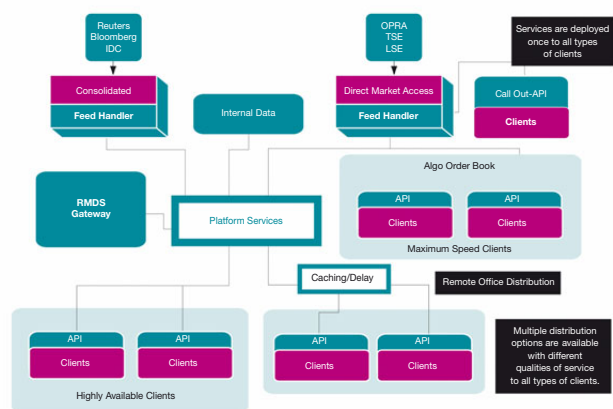
A private firm specializing in high-frequency, algorithmic trading uses IBM WebSphere® MQ Low Latency Messaging, the lowest latency and highest throughput messaging platform in the industry, to support their business objectives of cutting-edge high frequency trading.

The high throughput allowed for greater volumes of data to flow to the trade venues, enabling them to conduct a higher volume of trades and expand to additional trading venues while saving development costs.

### The backbone

The market data solution comprises a combination of powerful products, including IBM WebSphere Front Office for Financial Markets, which not only provides fast and scalable access to market data sources and trading venues, but is also a highly available, robust platform that offers multiple levels of service through high-speed multicast and point-to-point messaging support.

WebSphere Front Office for Financial Markets



The IBM market data solution provides the flexibility to apply filters to particular feeds for customized data gathering.

### Leverage a scalable, nonproprietary platform for algorithmic trading

It is estimated that 60 to 70 percent of all trades are electronic (automated, computer-based), and that number is growing—across the globe—with each passing day. With the market shift to algorithmic trading, financial markets firms today shoulder the demands of increased automated trading, which can yield

higher trade flow profits and greater ability to respond quickly to market fluctuations. To take advantage of this trend, firms need to be able to reduce the end-to-end latency of the trading platform. In addition, they need a scalable system that can grow with increases in data, order and trade flows. The ideal environment must create the perfect balance between dynamic adaptability and ease of management.

The IBM algorithmic trading solution is a nonproprietary platform built to manage real-time data feeds that addresses these needs, providing a broad overview of the trading landscape. Tested to scale to more than 125 servers, the solution can handle enormous volumes of data to keep latency at a minimum.

The solution provides:

- Analysis of both structured information, such as market data, and unstructured information, such as news feeds.
- Scalability over a range of hardware, including the latest x-86 System x® rack systems and blades.
- Support for complex analytics while data is in motion.
- Microsecond latency and response times.
- An in-memory database that is up to 10 times faster than traditional SQL databases.
- Support for historical analysis, with efficient storage and retrieval of time series data.

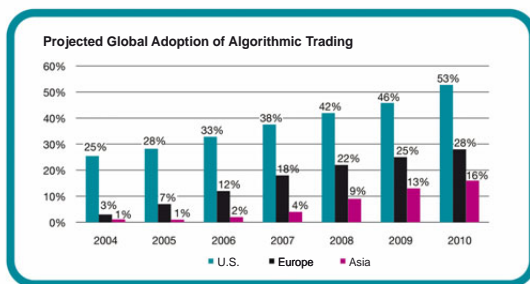
### The backbone

The backbone of the algorithmic trading solution is IBM InfoSphere™ Streams, which addresses a critical challenge that financial firms face today: time lost in decision making. InfoSphere Streams analyzes data on the fly enhancing overall efficiency and providing results faster than the post

analysis performed on stored data. This approach can capture more market opportunities for higher profitability and enhanced competitive advantage. InfoSphere Streams is a stream-processing technology that addresses a broad range of technical challenges facing financial firms today, including:

- Continuous data analysis at speeds that far surpass those of existing systems.
- Rapid adaptation to changing data forms and types.
- High availability, heterogeneity and distribution for the new stream paradigm.
- Security and information confidentiality for shared information.
- Building applications that can continue to scale as the business needs grow.
- High programmer productivity and reuse of existing assets.

#### Electronic Trading Trends



The growth in algorithmic trading is highest in equities and futures firms.  
Source: Aite Group, June 2010

#### Gain increased connectivity and reduced complexity in securities processing

Securities processing carries a unique set of challenges for financial markets firms. Existing systems in financial institutions for back-office trade services processing have been developed and grown over many years and are often an impediment to strategy or operational change. These systems can prove very expensive to maintain or comply to new regulations such as the annual SWIFT message updates or supporting the new SWIFT Net Funds MX messaging.

On the one hand, firms need the ability to eliminate multiple communication methods and to consolidate processes across multiple products and providers. On the other hand, firms also need the ability to increase communication—to interact with systems such as fund accounting, custody, billing and FIX. Firms must continue to seek ways to cut costs while adding value to customers by delivering new services and increasing operational efficiencies—all while positioning themselves in the industry and with their customers as leaders in the electronic delivery of financial services and information. The IBM securities processing solution is a central messaging hub for sending trading information required for settlements. It delivers multiple connectivity points to support a variety of industry standards.

The IBM securities processing solution delivers:

- A securities messaging hub with rapid and effective on-boarding, which promotes a streamlined environment and cost savings, as well as increased agility in new service delivery.
- A data and message model to support securities transactions.
- Reference processes and mapping for account management, subscription/redemption orders, price reporting and customer management.

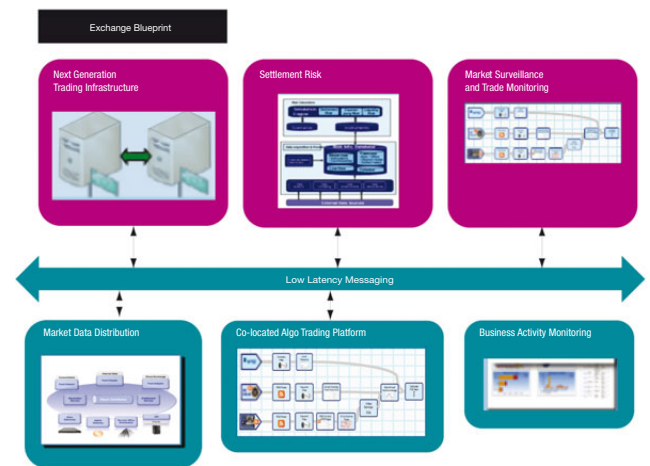
- Support for both SWIFT MX and MX, as well as a catalog of SWIFT integration maps that plug into the hub for future projects in areas such as “Corporate Actions.”
- Operational- and business-user interfaces for transaction monitoring and management.

### The backbone

The securities processing solution helps simplify these systems by providing a single standards-based platform where a common definition of data, processes and services provides for re-use and consistency across back-end applications and the enterprise. This service oriented architecture (SOA) approach also helps our customers rationalize their processes and integration channels onto one platform where the integration and the business state for these transactions across all applications in the back-office is maintained. The securities processing GUI then allows you to track and trace the progress of these transactions against a modeled life cycle. Built-in alerts help maintain this transactional management.

Offering an easy-to-use management interface, the securities processing solution delivers a range of capabilities, enabling management of the entire transactional life cycle by helping firms monitor the business state across components. As control passes from one component to another, this solution works behind the scenes to record events as transitions occur in the systems. Built-in alerts can report whether events occur (or do not) as planned, and monitoring and reporting are derived directly from payment events. The result is a best-practice data model providing a hierarchy of transaction objects and their relationships.

## Solutions for exchanges



The IBM Financial Markets Framework delivers support for exchanges seeking a next-generation trading infrastructure, settlement risk management, and market surveillance and trade monitoring.

### Support demands for high availability via a next-generation trading infrastructure

Exchanges face similar challenges as electronic trade increases, data flow becomes harder to manage and regulatory requirements set the stage for ongoing compliance demands. Stock exchanges need a high-performance platform capable of low-microsecond response times and throughput capable of handling millions of orders per second.

The IBM next-generation trading infrastructure solution addresses these needs by offering the lowest latency and highest throughput available among any of the current exchange systems. The solution is infused with software that is built for robust, high-availability demands, and is designed to work in conjunction with commodity hardware to help exchanges maintain consistent response times.

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*“Chi-Tech is continuously monitoring best-in-class trading technologies to meet the needs of our clients. To that end, we’ve incorporated IBM middleware into our platform, to meet their requirements and our high standards for speed and mission-critical reliability. We are continuing the worldwide rollout in our Chi-X Asia and North America exchanges, and we fully support the IBM Financial Markets Framework for the broader industry foundation that it provides to the Chi-Tech customer base around the world.”*

—Gregory E. Smith, Vice Chairman of Chi-X Global Inc. and CEO of Chi-X Global Technology Inc.

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### Success story: Chi-Tech

Chi-Tech, provider of high-performance trading technologies and services for exchanges, wanted to integrate a best-in-class messaging technology with its exchange trading platform. The company selected IBM WebSphere MQ Low Latency Messaging to drive high-speed communication of trade orders, events, market data and other critical messages throughout the components of the Chi-Tech Exchange Trading Technology Platform. WebSphere MQ Low Latency Messaging helps the Chi-Tech platform meet the speed, scalability and reliability requirements of today’s electronic markets and their trading participants. It has also helped Chi-Tech capitalize on the benefits of high speed processing—at greater than one million FIX orders per second, and at an average speed of less than 225 microseconds. The company now has a scalable infrastructure that also easily integrates with third-party systems, enabling ongoing growth and increased performance while reducing cost and risk for its clients.

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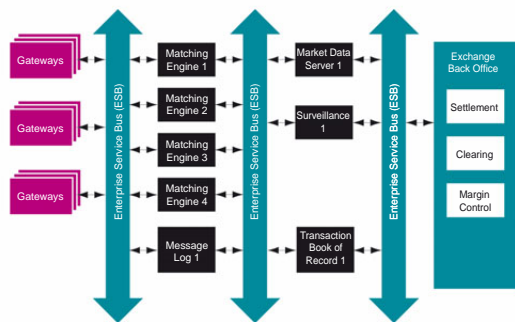
### The backbone

As part of the solution, IBM WebSphere MQ Low Latency Messaging is optimized for the high-availability, low-latency demands of financial markets, offering features that include:

- Very high messaging throughput with low latency.
- One-to-many multicast and point-to-point unicast messaging.
- Stream failover for high availability, with traffic rate and congestion control.
- Flexible, fine-grained message filtering.

WebSphere MQ Low Latency Messaging works in conjunction with IBM solidDB®, relational in-memory database software renowned worldwide for delivering data with extreme speed.

#### Next Generation Trading System



The IBM next-generation trading system solution offers flexible, fine-grained message filtering.

*“Our key objective is to deliver a leading-edge, accurate and reliable transaction backbone, building on our track record of innovation as a first-mover in electronic markets. Deutsche Börse is committed to augmenting its IT capacity with best-in-class partners.”*

—Dr. Michael Kuhn, CIO Deutsche Börse AG

#### Identify fraud patterns with market surveillance and trade monitoring

Exchanges and financial markets firms alike, including asset management and broker dealer firms, investment banks and hedge funds, are charged with trying to identify fraudulent trading patterns. For this reason, tracking and analyzing market activity in real time is essential to identifying and investigating possible regulatory violations. The IBM market surveillance and trade monitoring solution provides online, real-time business activity monitoring, with powerful capabilities for helping exchanges use advanced data mining, statistical models and sophisticated pattern mining to identify and act on potentially fraudulent activity. In addition, firms and exchanges can use these patterns to generate alerts.

The solution takes advantage of IBM’s substantial research and development investments to support a real-time surveillance infrastructure enabling exchanges to:

- Use advanced pattern mining capabilities and statistical models to review market information.
- Identify exceptions within large volumes of data.
- Develop profiles and test scenarios that can be used to create or update rules.

Features such as unstructured data analysis, identity resolution, event correlation and knowledge management help exchanges identify scenarios and exceptions for immediate qualification, investigation and correction. Advanced data mining capabilities help identify risky trading behaviors.

This rapid, highly scalable and low-latency solution is capable of analyzing high-volume streams of transaction and market information in real time—delivering the ability to find and report on events without “falling behind” the trading engine.



In addition, the solution delivers the ability to conduct complex data analysis and event notifications, while remaining highly reliable and available during trading hours. Exchanges and financial firms can enjoy a number of benefits, including:

- **Adaptability**—The ability to support new, optimized models, to adapt and learn from experience and make new associations as market conditions and technologies change
- **Minimized time and costs**—of analysis, detection and investigation through automation of monitoring activities and decision making
- **Reduced false positives**—by providing tools to effectively support qualification, analysis and investigation
- **Proactive monitoring and optimization**—of the surveillance process
- **Comprehensive coverage**—applying multistrategy analysis, discovery and detection techniques and practices across all possible sources of information to ensure that all possible violations are found
- **Support for security**—with the ability to audit all transaction information, news, alerts, associated rules information, related documents, record of activities and investigation, case information, etc., which must be time-stamped and recorded in secure logs and folders

### The backbone

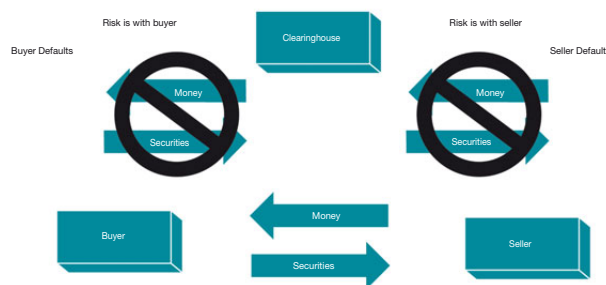
The IBM surveillance solution is based on IBM InfoSphere Streams, which enables aggressive production and management of information and knowledge from relevant data that has been extracted from high volumes of potentially irrelevant data, and IBM SPSS, which provides industry-leading predictive analytics technology.

### Manage settlement risk in real time

When a stock exchange decides to take on the additional role of a central counterparty, they are assuming the risk of either the buyer or seller or both defaulting. With a clearinghouse in place, investors can count on an institution that guarantees the execution of each transaction.

However, when the clearing activity is centralized, risks become centralized as well. For this reason, today's exchanges must be able to evaluate risk in real time—while the transaction is occurring—to establish the eligibility of buyers and sellers.

#### Buyer/Seller Default Risks



A clearinghouse must retain enough capital or have enough collateral so that it can always meet its obligations toward counterparties that have not defaulted. To achieve this, real-time risk management is essential.

The IBM settlement risk management solution enables exchanges and financial markets firms to measure and monitor risk associated with unsettled trades. It delivers out-of-the-box risk calculations and a real-time dashboard that enables exchanges to monitor and manage settlement risk in real time. The solution provides:

- Easy integration with the existing IT infrastructure—so firms avoid the additional costs of rebuilding or replacing current systems.
- Industry data models to more easily assess potential risk.
- An information server for rapid provisioning.
- A risk information database to help track historical patterns and information.

### The backbone

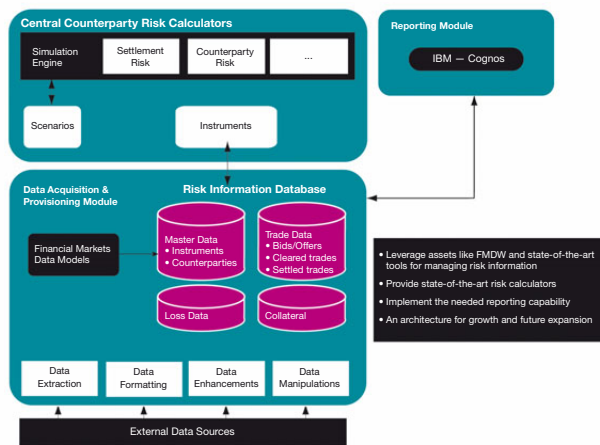
The settlement risk management solution is based on IBM Cognos® business intelligence and performance management software; the IBM Financial Markets Data Warehouse, which provides data warehouse design models, business terminology models and analysis templates; and IBM InfoSphere Information Server, a powerful data integration software platform.

## IBM delivers a complete framework for financial markets growth

Financial markets firms are increasingly faced with managing and monitoring enormous volumes of data. As global electronic trading accelerates, it becomes even more critical to

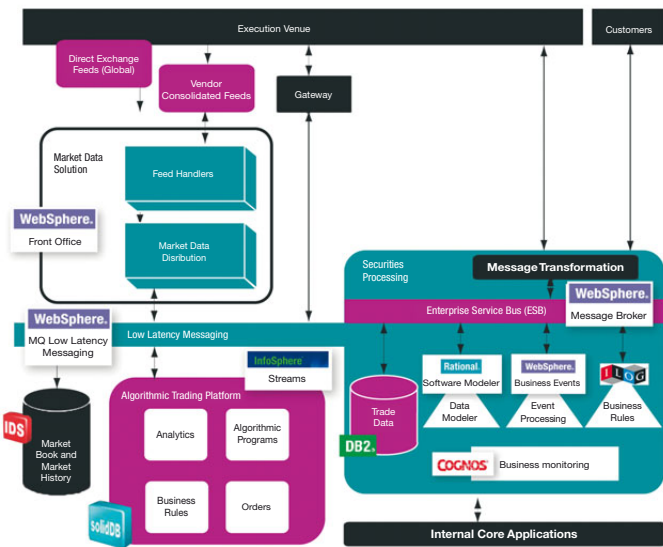
maintain high availability and throughput and low latency—to capture every business opportunity—while managing the risk associated with competing in a highly regulated and scrutinized industry.

### Settlement Risk



The IBM settlement risk management solution uses a simulation engine to assess risk while storing a multitude of data within a risk information database.

A framework for financial markets firms

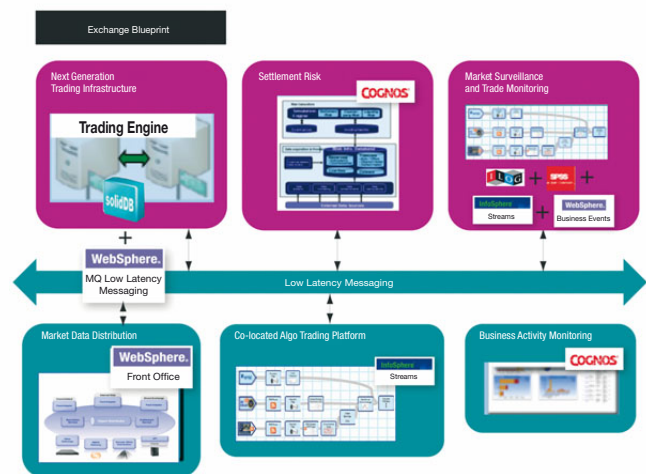


The framework utilizes elements of IBM’s entire software portfolio while leveraging the full range of IBM server and storage products as well as the industry-specific offerings and consulting expertise of IBM Global Business Services. Smarter systems from IBM are optimized for client needs and the workloads of financial markets firms. By redefining performance to be more than just the speed of the box, smarter systems can help contain operational cost and complexity while achieving breakthrough productivity gains. For financial markets firms, IBM’s portfolio of integrated systems offers a range of choices to help clients achieve increased trading performance, near linear scalability, ultra-low latency, faster time-to-market and up to 80 percent increase in system utilization as well as TCO savings.

The IBM Financial Markets Framework is designed to support not only the demanding requirements of financial markets firms today—but also opportunities for growth, competitive advantage and innovation well into the future.

The IBM Financial Markets Framework provides support across the full trading life cycle.

The IBM Financial Markets Framework addresses all of these challenges and more, helping financial firms and exchanges to seize opportunities while managing risk, with a solution that integrates across front-, middle- and back-office processes. Firms can look to IBM’s long-standing expertise in developing industry-specific solutions that deliver high availability and throughput, low latency and centralized visibility—while simultaneously offering real-time data analysis, pattern identification and advanced reporting to support stringent regulatory compliance requirements.



## For more information

To learn more about how IBM can help your organization leverage front-to-back-office process integration, support for high-performance and low-latency requirements, and real-time risk management, please contact your IBM representative or IBM Business Partner, or visit: [ibm.com/financialmarkets](http://ibm.com/financialmarkets)



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Software Group  
Route 100  
Somers, NY 10589  
U.S.A.

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