

## BENEFITS

With GemFire EDF, Customers can:

- Drive larger business volumes and high-quality trades and increase revenues and improve customer satisfaction
- Develop a reliable trading infrastructure to ensure business continuity even during system failures and avoid loss of revenue
- Identify temporal discrepancies in equities and derivatives markets and rapidly execute profitable index arbitrage buy and sell programs
- Ease of deployment and use enables quick development of robust trading platforms and avoid expensive in-house projects relating to infrastructure

## GemFire Enterprise Data Fabric for Securities Trading

Brokerage firms face the need to bolster their trading platforms to handle an increasing number of trades and increase their competitiveness in a market with dwindling trading margins. With increased competition and tighter compliance regulations, these platforms need to be high-performing and robust to execute more trades quickly and reliably to take advantage of opportunistic price points.

### Challenges in securities trading:

- Direct market access mandates the ability to process large volumes of orders, especially during the end of the trading day. If a brokerage firm fails to do so it faces potential loss of business or increased risk by consuming from its own positions
- Decimalization of markets has resulted in lower margins and availability of less liquidity at any price-point. Hence, extremely high trade execution speeds are needed to capitalize on favorable price points
- Large volumes of electronic trading create higher operational risk and threats to business opportunity. Therefore, avoiding system failures and downtime becomes extremely critical to avoid loss of revenue.

With a trading platform developed with a robust, real-time technology, brokerage firms can:

- Handle connectivity, market data, order routing and order execution efficiently and reliably
- Ensure high-quality trade execution, by processing large data volumes, adapt to market conditions and execute rapidly in order to get the best price

The GemFire Enterprise Data Fabric (EDF) offers high performance caching, high data availability, complex event processing (CEP) and data distribution capabilities, which not only improve the efficiency and throughput an electronic trading platform but also provide reliable mechanisms to replicate, and persist order/trade data for fail-over and fault-tolerance.

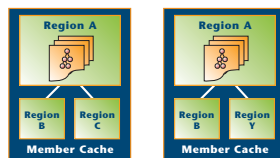
By enabling high-performance order execution for program/basket trading GemFire provides brokerage firms the ability to:

- handle large volumes of orders even during peak or end-of day trading and avoid turning down orders or incurring risk by consuming from their own positions
- attract and retain large institutional investors and increase revenues
- increase the diversity of securities held in the baskets



GemFire in Securities Trading Architectures

## GEMFIRE IN ACTION



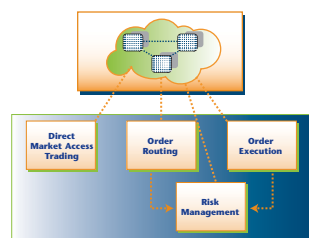
### High performance caching

- Extremely high-speed reads and writes into cache avoiding any data latency issues
- Shared data 'regions' (map-like data structures) with relevant information cached within applications
- Multiple topologies - local VM caches or server caches - depending on the application environment



### High Availability - Replication/Mirroring

- Region (map-like data structures) level replication (on multiple nodes) for 100% data backup at all times and ensuring business continuity
- Transaction logging with checkpoints for all object manipulation to facilitate reload upon failure
- Automatic reload of data when a failed application restarts
- Synchronous propagation of information to all mirrored regions to ensure data consistency



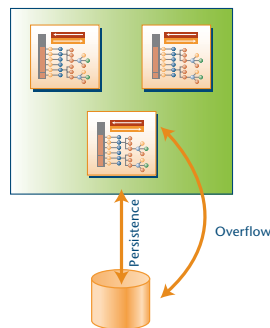
### Real-Time Stream Data Management and Complex Event Processing (CEP)

- Filter and query market data for relevant market movements to drive trading strategies

- Analyze processed trades for Transaction Cost Analysis (TCA)
- Identify best-price execution venues based on real-time data feeds

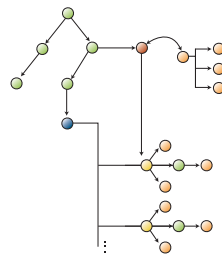
#### Data Distribution

- Rapidly share data across multiple applications within a trading platform
- Intelligent and efficient peer-to-peer communication for data change propagation
- Flexible models (with or without locking or acknowledgement) to synchronize data across multiple application caches



#### High Availability/Scalability - Persistence

- Increased reliability by persisting order and trading data on disk
- Flexibility to synchronously write data to disk or write changes in batches asynchronously
- Automatic reloading of caches from disk upon application restart
- Support for automatic overflow to disk based on LRU algorithms when in-memory cache is saturated



#### Trade/Order Hierarchy Representation

- Modeling of complex object relationships and references
- Representation of execution/order hierarchy information - parent orders, child orders representing baskets that get sent to the exchanges and order fills.
- Management of data in object format without the need for a relational store or O-R mapping tools

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