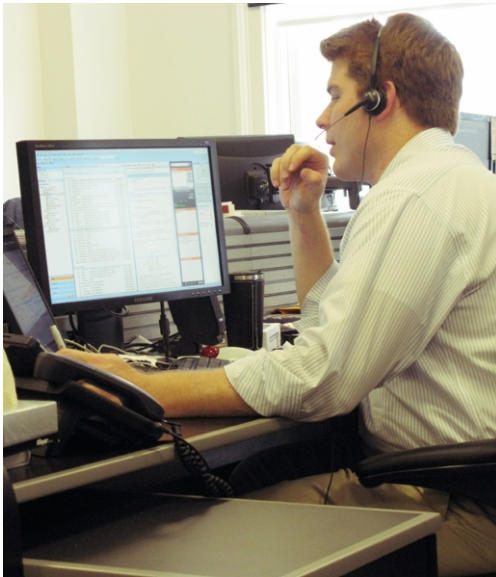


# RamSan Solutions

The World's Fastest Storage®

## Client: BIDS Trading

"The RamSans reduced OLTP latency by 70% on average and eliminated outlier events, all while nearly doubling peak transaction capacity."



BIDS Trading is an Alternative Trading System (ATS) developed by a consortium of 13 leading financial services firms that believed there was a need to create a highly liquid, low-cost, industry sponsored service for block traders. Since its inception in April of 2007, over 10 billion shares (including both sides of transactions) have been traded on the BIDS ATS.

The classic paradox of the block trader is the need to find legitimate trading counter parties without prematurely revealing trading intentions. BIDS Trading provides a level playing field for institutional traders (both sell-side and buy-side traders), creating a unique source of liquidity for large orders. No firm or trader has an advantage. Trader identities are never revealed and no confidential information about an order is exposed unless there is a bona fide opportunity to trade.

There are many ways to access the BIDS ATS. Traders can submit orders via their Order Management System, Execution Management System, algorithmic engine, or the BIDS Trader Web-based interface. Regardless of their route to the BIDS ATS, traders maintain control of their orders, and order details always remain

confidential. BIDS Trading provides unique tools to empower traders to successfully execute their trades. Traders can choose to auto-execute their orders or negotiate, they can set their minimum block size to help protect their orders, and they can filter out counter parties based on past trading behavior using BIDS Scorecards and Filters.

In addition, BIDS Trading users can access the New York Block Exchange (NYBX), a joint facility of BIDS Holdings and NYSE Euronext. NYBX is the first-of-its-kind trading venue to allow non-displayed or "dark" liquidity to anonymously access both the displayed, reserve, and hidden interest on the NYSE order book. It enhances traders' abilities to execute block orders by accessing NYSE's complete order book while keeping order details anonymous.

### The Challenge: Reduce OLTP and Batch Processing Times

The BIDS ATS application is hosted on IBM xSeries multi-core Intel servers configured in an Oracle 10G RAC cluster running Linux Red Hat. Online transaction processing (OLTP) accesses the Storage Area Network (SAN) through Brocade switches. To ensure that no information is lost in the event of a failure, the state of orders in the market is maintained in the highly-available Oracle RAC database cluster. As market volumes continued to grow in BIDS and new automated trading partners joined, transaction rates increased dramatically. Input/Output (I/O) activity in the Oracle RAC cluster became a performance limit for the system.

Oracle performance experts were brought in to tune the RAC configuration. Jim Lee, BIDS Chief Operating Officer explained, "In the short term, what we needed was very fast and reliable shared storage for the highly volatile transaction database. We reviewed enterprise hard disk RAID storage arrays with advanced caching and also solid state disk (SSD) technologies."

### Quick Facts

- **Customer:**  
BIDS Trading  
[www.BIDSTrading.com](http://www.BIDSTrading.com)
- **Industry:**  
Securities  
Broker/Dealer
- **Application:**  
OLTP
- **Operating System:**  
Linux Red Hat
- **Environment:**  
IBM xSeries, Oracle  
10G RAC cluster
- **Challenge:**  
Reduce OLTP and  
Batch Processing Times
- **Solution:**  
2 RamSan-400  
2 RamSan-440
- **Result:**  
Latency reduced 70%  
Batch process time  
decreased 50%

## The Solution: RamSan SSD Systems from Texas Memory Systems

Ultimately, the BIDS team deployed RamSan-400 RAM-based SSD systems from Texas Memory Systems (TMS). The RamSan-400s offered the lowest price/performance ratio of any solution evaluated. Key to the decision was the RamSan's enterprise-grade reliability. "We could not take on the risk of working with technology that was not proven and that was not exceptionally reliable and well supported," Lee stated. The RamSan's ease of implementation and operations, plus the RamSan's much smaller data center footprint were also important decision criteria. "We were able to install and configure the RamSan quickly and easily," Lee noted. "And we were able to test it and roll it into production quickly."

## The Result: Double the Trading Capacity

Jim Lee and the BIDS ATS team saw immediate results after deploying the first two RamSan-400 systems. The RamSans reduced OLTP latency by 70% on average and eliminated outlier events, all while nearly doubling peak transaction capacity. In addition, the BIDS ATS end-of-day batch processing times were cut by more than half.

Implementing solid state storage in an industry-leading stock trading system did present some momentary challenges. After the initial SSD deployment, Lee and his team planned and executed a move of the entire BIDS ATS to a new data center. The move had to be accomplished over one weekend so the system would be available to support clients Monday morning. During the transition, configuration issues occurred with the RamSan-400s. Lee called TMS technical support. "With the aid of the knowledgeable and helpful TMS technical support team," he noted, "we were able to get everything up in time for trading Monday morning."

The RamSan-400 deployment decreased transaction processing times while increasing system capabilities. After the initial success with SSDs from TMS, BIDS Trading soon made the decision to add more RAM-based solid state storage. Lee and his team deployed two RamSan-440s alongside the original RamSan-400s. The new RamSan-440 models provided over half a terabyte each of the world's fastest storage. They have RAIDed RAM primary storage and Flash back-up modules. World-class data protection features include single-bit error correcting code, IBM's Chipkill technology for multi-bit data errors, and soft error scrubbing where corrected data is entirely re-written and then re-verified. The RamSan-440s also offers IO<sup>2</sup> functionality allowing instant access to data after a system re-start.

BIDS Trading isn't finished with solid state storage yet. When asked about future plans to scale up the RamSans, Jim Lee replied, "We've already done it," referring to the RamSan-440 deployment. "And we are currently looking at adding some of Texas Memory Systems' RamSan-20 PCIe Flash cards into the mix to further reduce OLTP latencies."

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## About Texas Memory Systems

Texas Memory Systems designs and builds solid state storage systems for accelerating essential enterprise applications. The award-winning RamSan product line, known as The World's Fastest Storage®, delivers fast, reliable, and economical solutions to a broad base of enterprise and government clients worldwide. Founded in 1978, Texas Memory Systems continues to architect and engineer the future of solid state storage.

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