IBM

Business challenge
To manage an ever-increasing number of transactions as its business grew, Wanlian Securities needed to minimize latency in its trading systems and improve the speed of clearing.

Transformation
Wanlian Securities deployed super-fast enterprise flash storage to support its mission-critical trading systems and reduced trade clearing times from 240 minutes to just 90 minutes.

Business benefits

62.5%
reduction in trade clearing time, from 240 minutes to 90 minutes

100x
acceleration of storage I/O, from 10 to 0.1 milliseconds

15%
increase in CPU usage, enabling faster processing and greater efficiency

Wanlian Securities

Accelerating financial trading with enterprise flash storage

Founded in 2001, Wanlian Securities Co., Ltd. is a state-owned securities company based in Guangzhou, China. With 43 branches nationwide, the company provides securities brokerage, investment consulting, underwriting and settlement services for customers across the country, with a particular focus on southern China.

"IBM FlashSystem has helped us cut average response times for our Oracle databases from 10 to less than 0.4 milliseconds."

—Chen Zhaohua, Vice President, Technical Information Center Director, Wanlian Securities

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Meeting new demands

As the Shanghai, Shenzhen and Hong Kong Stock Exchanges continue to grow at an extraordinary pace, making China one of the world's busiest stock markets, Wanlian Securities, faced with ever-increasing transaction volumes, found itself struggling to meet demanding service-level agreements.

Chen Zhaohua, Vice President, Technical Information Center Director, at Wanlian Securities elaborates: "In the past, we relied on x86 processor-based servers, Hewlett-Packard EVA storage devices and Oracle database software to support our stock trading systems. However, the tenfold growth in trading volumes on the Chinese stock market within the last calendar year was putting tremendous pressure on our core transaction and clearing systems, which led to severe performance

bottlenecks in our back-end storage. This was negatively impacting our ability to meet service-level agreements for customers, and to ensure that we could book trades effectively and profitability at peak times."

With its Oracle database averaging a delay of 10 milliseconds during business hours, it was difficult for Wanlian Securities to keep up with the speed of the market. It had also become the norm for trade clearing to take 240 minutes, often taking until midnight to complete.

"Not only were such long clearing delays were hampering business efficiency, they were also increasing CPU utilization," states Zhaohua. "This resulted in low processing efficiency, which slowed down inquiries quite considerably—unacceptable in fast-paced stock exchanges."

To ensure that its customers could seize fleeting opportunities to buy and sell securities at the best prices,

Wanlian Securities needed to ensure that its mission-critical trading systems offered minimal latency. It was also vital to ensure extremely high availability and rapid recovery in the event of a technical fault.

"We aim for a recovery time objective (RTO) of one minute and a recovery point objective (RPO) of almost zero," says Zhaohua. "Not only was our storage architecture struggling to support increasingly busy trading systems and query needs, but also we could foresee a risk of experiencing unacceptable downtime during market hours. This situation was only going to worsen as we predicted transaction volumes would grow from 3 trillion to 5 trillion."

Wanlian Securities sought a new platform capable of supporting its core trading systems and meeting the growing demands for performance and recoverability.

Quick-as-a-flash storage

Wanlian Securities engaged IBM Systems Lab Services to refresh its trading platform infrastructure and create an entirely new data storage architecture. As well as replacing its outdated x86 processor-based servers with IBM® Power® 770 servers running the IBM AIX® 7 operating system to support its core trading systems, Wanlian Securities installed IBM PowerHA® SystemMirror® for AIX technology to provide high availability.

At the heart of the solution, Wanlian Securities replaced its HP EVA storage devices with two IBM FlashSystem® 840 systems to provide ultra-fast, ultra-low-latency storage. The company also deployed

IBM SAN Volume Controller, built with IBM Spectrum Virtualize™ software, to virtualize the production storage landscape and to facilitate data migration from the old to the new storage.

IBM Spectrum Virtualize software in SAN Volume Controller helps Wanlian Securities to enhance storage flexibility and performance by providing sophisticated virtualization and management capabilities. Using the IBM Spectrum Virtualize virtual disk mirroring function, Wanlian Securities ensured added redundancy for its core transaction and clearing systems data.

Zhaohua comments: "The IBM Systems Lab Services and Training team were a great help in migrating our Oracle software and data from the existing platform to the new Power and FlashSystem infrastructure. The IBM team also expertly configured the new IT environment to improve system performance."

While building an off-site disaster recovery (DR) center for Wanlian Securities, IBM recommended a remote disaster recovery and data protection solution for the core trading systems. Wanlian Securities now continuously backs up production data to a remote IBM Storwize® V7000 in its DR center, ensuring better data protection. IBM Storwize V7000, also built with IBM Spectrum Virtualize software, offers sophisticated software-defined storage capabilities such as automated tiering, thin provisioning and data compression.

"With IBM FlashSystem and IBM SAN Volume Controller, all critical data is stored locally on flash, mirrored across both arrays to practically eliminate the risk of downtime," says Zhaohua.

Fast, flexible, future-proof

By deploying IBM Power and FlashSystem technologies to support its critical trading systems, Wanlian Securities gained a high-performance platform that meets its ambitious recoverability requirements, keeps up with the breakneck speed of the Chinese markets and accommodates future business growth.

IBM MicroLatency® technology in the FlashSystem 840 devices ensures extremely short response times for the Oracle-based trading systems running on the Power 770 servers, helping Wanlian Securities ensure that its customers can optimize their investment strategies by trading at the optimal moments.

Zhaohua says: "Introducing FlashSystem has helped us cut average response times for our Oracle databases from 10 to less than 0.4 milliseconds, which is a 25-fold improvement in performance. What's more, we accelerated storage I/O by a factor of 100, from 10 milliseconds to 0.1 milliseconds, and reduced trade clearing times by 62.5 percent, from 240 minutes to just 90 minutes. All of this means that we are much better equipped to move at the speed of the market and handle an ever-increasing number of transactions."

Wanlian Securities' tested peak commission number jumped from 4,000 trades per second to 6,200 trades per second, while the reduction in database latency has improved CPU utilization.

"According to our estimates, CPU utilization has increased from 32 percent to 61 percent," remarks Zhaohua. "This means that our core trading systems are spending less time waiting for data and more time actually executing trades. As a side benefit, this means we are using our investments in processing hardware more efficiently.

"IBM has helped us eliminate performance bottlenecks on our mission-critical trading systems and provided us with a solution that is capable of meeting our demands for storage performance for the next three to five years."

Zhaohua concludes: "With the IBM solution, we can execute trades as fast as our customers need us to and accommodate business growth. We are highly confident that as the number of transactions at Wanlian Securities continues to grow, our IBM FlashSystem solution will keep us one step ahead of the competition."

Solution components

- IBM® AIX® 7
- IBM FlashSystem® 840
- IBM MicroLatency®
- IBM Power® 770
- IBM PowerHA® SystemMirror® for AIX and Linux
- IBM SAN Volume Controller, built with IBM Spectrum Virtualize™ software
- IBM Storwize® V7000
- IBM Systems Lab Services
- Oracle Database

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To learn more about IBM FlashSystem solutions, contact your IBM representative or IBM Business Partner, or visit the following website:
ibm.com/storage/flash

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