



# Kingdom Central Securities Trading System, Reliable and User-Friendly Solution for Chinese Securities

—Building a Highly Efficient Data Platform with 8-Core Intel® Xeon® 7500 Processors and Microsoft SQL Server 2008

## Success Story

Microsoft SQL Server 2008  
8-Core Intel®Xeon® 7500 Processor  
Finance and Securities

### Challenges:

Ever since year 2006, securities firms have brought forward higher requirements on the performance, reliabilities, ease of use and price/performance ratio of securities trading systems along with the fast development of Chinese securities market and the rapid growth of trading volume. Securities firms need a centralized system for unified data management to improve the efficiency of service response.

### Solutions:

To meet the increasing demands on the reliability, ease of use and efficiency of trading systems, Kingdom adopted Microsoft SQL Server 2008 and 8-core Intel® Xeon® 7500 Processor as the base of data platform for the central securities trading system. This strong combination of the latest software and hardware does not only meet all the requirements of securities firms, but also saves billions of system construction cost of Chinese securities firms.

### Benefits:

- High reliability
- Ease of use
- Better price/performance ratio
- High performance

## 1. Challenges

Now there are more and more different types of products and services in the finance and securities market ,and the trading volume grows fast, the existing trading systems would not meet the developing demands of the industry in every aspect from the trading volume, promptness to stability. Securities firms need to integrate business and technologies to boost the improvement and innovation in their operation, so Chinese securities firms have brought forward higher requirements on the performance, reliabilities, ease of use and price/performance ratio of securities trading systems, including the following aspects:

- Securities firms need a Central securities system for unified data management and integrated resources to improve business responsiveness;
- Large securities firms have a requirement on the trading performance that it shall process more than 5,000 securities trading requests per second and above 10,000 inquiry requests per second;
- For reliability, the securities firms require the system to provide 7×24 services with an annual downtime no more than 3 minutes;
- The system interface should be user-friendly.

The general agency business platform for enterprises can help the firms integrate resources, realize information sharing and improve their core competitiveness. Kingdom Sci-tech Co., Ltd. is a professional software provider for finance and securities. It has dedicated in providing better price/performance ratio solutions for securities trading systems. It is the leader in Chinese Securities Application Software Industry and a key software company supported by the nation. Its annual revenue reaches 1 billion yuan.

As a solution that has been strongly recommended to Chinese Securities firms by the company, Kingdom Central Securities Trading System adopts Microsoft SQL Server 2008 and the 8-core Intel® Xeon® 7500 processor, which is designed for enterprises with strict demands of data, for its data processing platform.

## 2.Solutions

Since the visits of large securities firms are measured in tens of millions of users and there is a high requirement on the promptness and accuracy of trades, Kingdom needs to solve the problem of how the securities trading system solution would ensure the data read efficiency and system reliability in data center on the premise of realizing unified data management functions. And therefore, Intel recommends Kingdom to choose the advanced 8-core Intel® Xeon® 7500 processors, and Intel will participate in the R&D, upgrade, test and deployment of Kingdom solutions to help Kingdom reduce the development cycle and improve the competitiveness of its products with Intel's rich project and technology experience.

“Our securities trading system based on SQL Server and 8-core Intel® Xeon® 7500 processors effectively satisfied our customers’ requirements on processing efficiency, high reliability and ease of use. According to our pressure test on the customer production system, together with the current and anticipated development of the Chinese securities market, we believe that the system performance is sufficient to meet the needs of the customers for the next 5 years.”

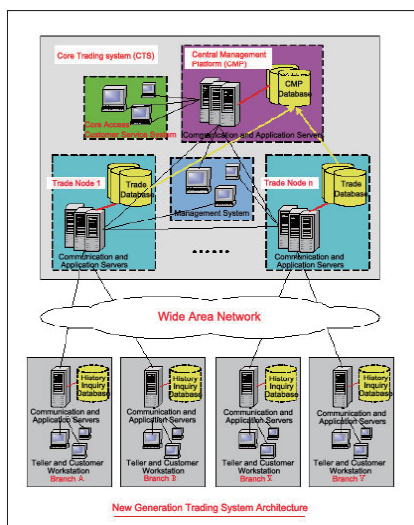
Du Yuwei, CTO  
Shenzhen Kingdom Sci-tech Co., Ltd

### Kingdom Central Securities Trading System Architecture:

The Central Securities Trading System includes the Core Trade system (CTS) and Branch Trade system (BTS). The core system usually consists of multiple trade nodes, and multiple nodes form a distributed trading system. The actual trade nodes to be deployed need to be determined according to the business scale of the securities firm. The Core Trade System performs administrative tasks through Central Management Platform (CMP). This is illustrated in the following figure:

The functions of various components of the system are as follows:

- Core Trade system (CTS)**  
 The Core Trade system (CTS) is the core of the new generation trading system of securities firms. It consists of database server group, application server group, communication server group and external interface gateways. It is responsible for processing the service requests from branches or Core Access Customer Service System. It provides complete processing for all trading transactions, and all the real-time data inquiry functionality. For large scale securities firms, multiple trade nodes mean tens of millions of customers and tens of thousands of transactions per second. To meet the needs of securities firms, each of the Kingdom securities system trade nodes should provide services for as many as 9 million customers and is capable of processing 6,000 transactions and 30,000 inquiries per second.



Clearly, the huge amount of transaction data poses challenging requirements on the response speed of CTS. Therefore, the Kingdom securities system employs servers that are equipped with 8-core Intel® Xeon® 7500 processors based on Intel® micro-architecture (codenamed Nehalem). These processors provide much higher intelligenc

e, scalability and reliability. Compared with the processors of previous generations, the processors based on Intel® micro-architecture enable Kingdom to adopt a more intensive data center deployment so that the database performance can be increased by 3 times. The 8 cores and 16 threads of Intel® Xeon® 7500 processors meet the needs of multi-threaded applications and provide sufficient room for extension of enterprise applications. The 4 advanced high-bandwidth interconnected links (supporting the direct interconnect of processors) provide the performance required and the space reserved for the higher-level data center integration, which ensures the securities firms to achieve a leap-frog improvement in computing performance. Each processor is configured with 24M shared 3-level cache which significantly improves data transfer rate and the bandwidth between the main memory to the processors and reduces latency, so that system response time can be guaranteed, and the needs of securities firms for fast response systems are satisfied.

- Central Management Platform (CMP)**  
 The Central Management Platform (CMP) is setup for multiple nodes of securities firms. Through CMP, administrators can effectively monitor and control the operation status of multiple nodes and devices. If a securities firm only deploys one node, CMP may be deployed on the same hardware device as the core trading system to form a complete central trading system.
- Branch Trade system (BTS)**  
 The Branch Trade System (BTS) is the interface of the new generation trading system to the external world, which includes teller and client terminals, various peripheral systems, branch communication servers, application servers (middleware), etc. BTS is an access interface for clients, operators or external partners, and it also provides access to various peripheral systems.
- Core Access Customer Service System**  
 The Core Access Customer Service System includes online trading system and call centers, etc.

Since the server center adopted Intel® Xeon® 7500 processor, its enhanced 45nm high-k metal gate (HKMG) process expands memory interconnect technology, resulting in 8 times the memory capacity of prior generations, which enables the servers to show better performance and energy efficiency when running in the Kingdom securities trading system: supporting high-density deployment in the data center; effectively ensuring highly efficient concurrent data transfer for many customers and real-time data transfer and fast access to database server.

Intel® Xeon® 7500 processor is highly intelligent and highly scalable. In terms of scalability, compared with the previous generations, it boosts database performance up to 3 times; improves performance up to 3.7 times in virtualized environment; increases memory bandwidth up to 8 times; the server consolidation ratio reaches 20:1.

#### Kingdom Central Securities Trading System Architecture:

- **Database**

In the database service layer, the system employs Microsoft SQL Server 2008 to provide all the data services. Its centralized data storage and management improves the efficiency of information processing and reduce the disk space required by data files. In terms of system stability, servers based on Intel® Xeon® 7500 processors ensures 24/7 non-interrupted operation of the system and the Intel® Machine Check Architecture (MCA) can guarantee the continuous operation of the system even when it detects an uncorrectable error, which can minimize the negative impact of downtime on service processing. This meets the needs of the securities firms on system reliability and stability.

- **Communication Servers**

Messaging middleware, which is responsible for the delivery and distribution of information. These servers are deployed at the core system and the branches respectively.

- **Application Front-end**

The client usually uses MVC architecture (Agent/Bridge architecture) to achieve the separation of data processing and data display. At the same time it also improves the maintainability, extensibility, portability and component re-usability of the application systems, and it supports automated system upgrade.

- **Application Servers**

Application servers are transaction middleware, which are responsible for processing all the business. The business logic may exist in the form of loadable business modules. Different business modules may all run on the same host, or on different hosts respectively.

- **Communication Servers**

Messaging middleware, which is responsible for the delivery and distribution of information. These servers are deployed at the core system and the branches respectively.

- **Application Front-end**

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and it supports automated system upgrade.

#### 3.Benefits

The Kingdom securities trading system based on Microsoft SQL Server 2008 and Intel architecture platform effectively meets the needs of the customers on trading efficiency, high reliability, and ease of use. The combination of Intel's breakthrough technical experience and Kingdom's industry experience creates a securities trading system with better price/performance ratio for the securities industry.

Currently, the securities trading system solution of Kingdom has the highest market share, and more than 1/3 of the securities firms in the securities industry in China have adopted this solution. These securities firms saved more than 1 billion Yuan in total in building their trading systems. According to the pressure test of Kingdom on its customer production system, together with the current and anticipated development of the Chinese securities market, the system performance is sufficient to meet the needs of large securities firms for the next 5 years.

- **High performance:** according to the performance data of securities trading systems based on minicomputers, the performance of securities trading systems based on Intel® Xeon® processors + Windows + SQL Server greatly exceeds the performance of minicomputer systems with the same number of CPUs. At the same time, the cost of the system is less than 1/3 of minicomputer systems. Furthermore, the use of Intel 8-core Intel® Xeon® 7500 processors gives even higher computing capability for enterprise servers.
- **Stable operation:** By using Microsoft Windows Server clusters and SQL Server's replication technologies, the needs of the customers on system reliability can be effectively satisfied. At the same time, servers based on Intel® Xeon® 7500 processors have leading stability in the industry, which ensures long term non-stop running of the securities systems, and meets the needs of enterprises on system reliability and stability.
- **Cost saving:** Intel® Xeon® 7500 processors are highly compatible, which allows easy migration and offers high IT stability. This saves large amount of cost for enterprise server upgrading. In particular, it delivers up to 20x performance per server over 4 socket single-core servers and supports up to 20:1 server consolidation ratio, resulting in 90% reduction in operation cost.

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