

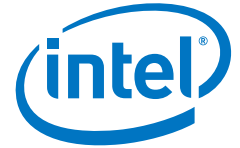
## SOLUTION BRIEF

### Intel® Xeon® Processor E5 and E7 Families

Cloud Computing Solutions

RISC Migration

Communication



# Enhancing service and capabilities

China Telecom builds an Intel® Xeon® processor-based business platform resources pool, improving its server's performance and computing density and enhancing reliability



"Our Intel® Xeon® processor E5-4600 product family-based four-socket server has effectively improved the computing density, reducing the enterprise's operating costs. The Intel Xeon processor E7-8800/4800 product families offer more advanced technologies, which provide high performance for more demanding workloads and guarantee data integrity, thereby improving the availability of mission-critical applications.

*Li Xianxu*

*Director, Guangzhou Research Institute  
China Telecom*

China Telecom Group Corporation (China Telecom) is one of China's largest state-owned communications enterprises, offering comprehensive information services such as landline and mobile services, satellite communication, and Internet access and applications for its customers, both private and enterprise users. In all of its business fields, China Telecom's information technology is immersed in every detail. China Telecom has been using Intel® Xeon® processor-based servers to build its resource pool and improve its business support platform, offering more convenient, enriched, personalized, and cost-effective comprehensive information services for its customers.

## CHALLENGES

- **Improve server performance.** Enhance server performance to deal with increasingly complicated services.
- **Improve computational density.** Support more customers and reduce operating costs.
- **Enhance reliability.** Improve businesses, especially the reliability of the key business's supporting platform, enhancing service quality and customer satisfaction.

## SOLUTIONS

- **Intel Xeon processor E5-4600 product family.** Deploy Intel Xeon processor E5-4600 product family based server to improve operational performance to optimize computing density and space utilization.
- **Intel Xeon processor E7-4800 and E7-8800 product families.** Deploy servers with Intel Xeon processors E7-4800 and E7-8800 product families to improve overall performance for mission-critical applications.

## IMPACT

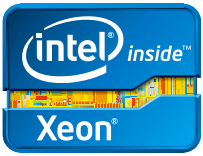
- **Support business expansion.** Intel Xeon processor based-servers helped China Telecom build its cloud computing resource pool to deal with the ever-growing user base and more complicated businesses, with a business support platform that boasts stronger performance.
- **Boosted competitive advantages.** Intel Xeon processor E5-4600 product family-based server offers a four-socket server architecture that improves computing density and reduces costs.
- **Improved service quality.** The Intel Xeon processor E7-4800 and 8800 product families, through constant circuit-level self-test and self-repair, ensure data integrity and reliability. This, combined with high performance, helps improve service quality.

## Changes in business model create new information technology demands

In the last two years, with the rapid development of the Internet, especially mobile Internet, China Telecom's its previous business mode, which merely provided information resources to users, placed the company behind its competitors. Li Xianxu, director for the Guangzhou Research Institute of China Telecom, explained: "The need for personalized business is growing. This comes with more business requirements and more complicated business logic. The operation and customer awareness in this customer-centric business model are greatly influenced by the performance of the business support platform."

Almost all of China Telecom's businesses rely on information technology. Its computing platform can be roughly divided into two business support platforms: general and mission-critical.

As early as 2009, China Telecom began using cloud computing technology in its general businesses for processes such as the telephone and broadband pre-installation applications, and self-service query of the customers' information. The cloud computing technology-based China Telecom resource pool was deployed in some provinces or municipalities. Practical results have shown that this model can significantly improve IT management efficiency and business agility for the enterprise.



# China Telecom uses Intel® Xeon® processor-based servers to build a cloud computing resource pool with stronger performance and higher density

## LESSONS LEARNED

- Matching different workloads with appropriate server architectures and processors optimizes performance and reduces total cost of ownership.
- The Intel Xeon processor E5-4600 product family, which optimizes both computing density and costs, is especially suitable for compute-intensive cloud computing data centers.
- The Intel Xeon processor E7-4800 and E7-8800 product families are an ideal choice for enterprise applications that need large-scale, longitudinally expanded servers. With enhanced reliability, availability, and serviceability (RAS) features, they provide an ideal platform for the enterprise's key businesses.

Meanwhile, the mission-critical businesses—for example, the database and transaction platforms—are extremely demanding for the platform's computing performance, stability, reliability, and data integrity. Historically, China Telecom ran its mission-critical applications on its original computing platform.

### Building cloud computing-based resources pool to deal with business challenges

With Intel's help, China Telecom tested the Intel Xeon processors for performance, power consumption, and reliability. The company chose servers with the Intel Xeon processor E5-4600 and E7 product families to build its resource pool, and according to different business support platforms, select the server's type.

By deploying Intel Xeon processor-based servers, China Telecom also expects to reduce the operating costs of cloud computing, delivering more cost-effective services to its customers. "Obviously, the larger the capability a single server can provide, the fewer physical servers are needed and the lower the operating costs. As far as the cloud computing-based resources pool model is concerned, since the IT infrastructure is provided in the form of virtual machines, we not only need servers with the best possible performance, but also expect one server can support more processors and cores, improving computing density while reducing costs," Li said.

### Improving cloud computing density

China Telecom deployed servers with the Intel Xeon processor E5-4600 product family to improve computing density. The Intel Xeon processor E5-4600 product family supports four processors on a single-width blade. China Telecom used its own test methods to compare the performance of the seven Intel Xeon processor E5-4607 product family based servers and the 14 Intel Xeon processor E5-2620 product family based servers. The performance comparison standards include the number of Java\* operations per second and overall average power consumption in different server loads. The test results showed that the Intel Xeon processor E5 4607 product family-based server has improved performance by more than 1.75 times while enhancing average performance and power consumption. Li added, "Actually, the most important point for us is that the server occupies less space. With

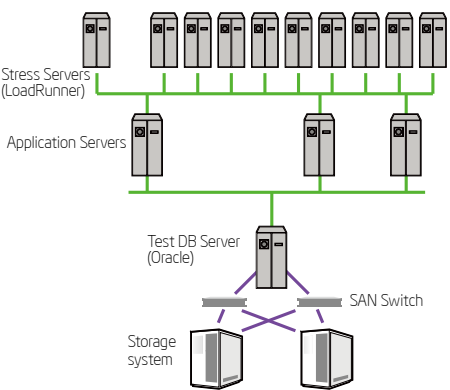
the Intel Xeon processor E5-4600 product family, we have improved the computing density of our cloud computing resource pool and reduced our operational costs."

### Enhancing mission-critical business reliability

Complex business challenges pose greater challenges for the reliability of China Telecom's key businesses such as the billing system. Li shared, "Supporting databases or transactions places more demands on a platform than general business. It needs not only stronger computing performance and greater memory support, but also 24/7 uninterrupted operations, plus the greatest possible data integrity."

Deploying Intel Xeon processor E7-4800 and E7-8800 product family based servers allows China Telecom to offer excellent computing performance with high reliability. China Telecom's mission-critical business support platform uses transactions per minute (TPM) as the benchmark, with the tests conducted according to China Telecom's IT Infrastructure Performance and Power Consumption Test Technology\* (CTB-C 2.1 \*). The test results showed that servers based on the Intel Xeon processor E7-4800 and E7-8800 product families met the requirements of this standard.

Li said, "The Intel Xeon processor E7-4800 product family-based servers can help China Telecom improve the vertical expansion capabilities for its key business support platform. This not only helps us quickly adapt to meet our short-term business needs, but also helps us meet the demands of our long-term business growth."



The performance test architecture

Another important requirement of China Telecom's key business support platform is to ensure data integrity. Intel Xeon processor E7-4800 and E7-8800 product family-based servers enhance server reliability and availability through a number of advanced technologies including Machine Check Architecture Recovery (MCA-R), and Double Device Data Correction (DDDC). These features help China Telecom further improve its service quality and enhance customer satisfaction.

"To date we believe that for our general businesses, the Intel Xeon processor E5 family-based servers would suffice, while for our mission-critical businesses, such as core database or transactional applications, the Intel Xeon processor E7 family-based servers are more appropriate." Li continues, "I look forward to further cooperation with Intel in such areas as cloud computing security and Gigabit NIC, so that we are able to offer better quality services for our customers."

The Intel Xeon processor E5 and E7 families provide a wide variety of processors to meet different computing demands. China Telecom can identify the appropriate Intel Xeon processor to meet specific demands for an enterprise application, constantly optimizing its data centers for better return on investment.

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All performance tests were performed and are being reported by China Telecom Group Corporation. Please contact China Telecom Group Corporation for more information on any performance test reported here.

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