



## Technology Evaluation Case Study

Intel® Xeon® Processor

Energy Industry

Production Control Systems



# Delving Into the Core of Virtualization

## China Huadian Corporation Test Drives Quad-core Intel® Xeon® Processor Technology to Great Success

<b>Company</b>	The biggest power plant group in mainland China, the China Huadian Corporation (CHD) is a wholly state-owned enterprise approved by China's State Council and established as a collective sum of enterprises and institutions formerly owned by the State Power Corporation of China.
<b>Product evaluated</b>	Quad-core Intel® Xeon® processor technology.
<b>Challenge</b>	CHD's original single and even dual-core processing systems were unable to fully utilize server resources – CHD needs to bring down its total cost of ownership (TCO) by maximizing server resources on a minimum number of machines.
<b>Results</b>	64-bit quad-core Intel Xeon <sup>1</sup> processor technology provides significant performance boost and better performance-to-watt ratio, delivering maximum headroom for more robust virtualization solutions.
<b>Impact</b>	By test evaluating virtualization technology on quad-core Intel Xeon servers, CHD is able to customize a flexible deployment solution where two or more virtualized applications can run on the same server, potentially lowering server TCO through best server consolidation practices and lower energy consumption.
<b>Next steps</b>	150 servers running on quad-core Intel Xeon processor technology to be deployed for CHD's power plant real-time production control systems.

“Quad-core Intel® Xeon® processor technology deliver significant performance gains in our heavily virtualization-intensive computing environment, effectively lowering our server TCO.”

Wang Gangjun  
Deputy Director  
China Huadian Corporation

### Challenge: To lower TCO by maximizing server resources

As China's biggest power plant group, China Huadian Corporation (CHD) is responsible for the development of power-related primary energy such as coal production and the supply of electricity and heat to more than 20 provinces and regions throughout China.

First established in 2002 with a registered capital of RMB 12 billion\*\*, CHD has been so profitable that by the end of 2005, the company had boasted total assets of RMB 149.2 billion\*\* and controlling shares in affiliate companies from Huadian Power International Co., Ltd to Wujiang Hydropower Development Co., Ltd. In fact, the company is growing rapidly that its installed capacity is projected to reach 80000MW in 2010 and 100000MW in 2020\*\*.

However, rapid growth demands a thorough management plan to control escalating production costs. And with reforms towards market orientation as the motivating trend in China, CHD is looking at maximizing the use of its current resources in order to avoid passing unwarranted costs to customers.

To do this, the Chinese powerhouse looked inward at its production processes to cut costs and discovered that its production control processes were not cost-efficient.

The bottleneck was found to be performance, as single to dual-core processors are not capable of fully maximizing available server resources, inevitably creating costly server acquisition issues for CHD on a regular basis.

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## Technology Evaluation: Quad-core Intel® Xeon® processor technology

In searching for a solution, CHD turn to Intel for answers and wasted no time in deploying a product evaluation of Intel's latest architecture – quad-core Intel Xeon processor technology.

Featuring the world's first quad-core standard high-volume server processor, Intel Xeon processor technology delivers breakthrough performance and energy-efficiency for the ultimate in powerful, dense and reliable server platforms.

Quad-core Intel Xeon processors also deliver up to 50 percent greater performance than competing dual-core processors in the same power envelope<sup>2</sup>, with up to 150 percent greater performance<sup>3</sup>.

This translates into greater computing capabilities with fewer cooling challenges and lower power consumption, offering CHD the headroom to run more applications on lesser servers and potentially resolving its virtualization and server consolidation issues with less capital outlay.

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## Results: Significant performance and better performance-to-watt ratio

With the product evaluation underway, CHD could not help but be impressed by the results.

64-bit, quad-core Intel Xeon processor technology not only enabled the integrated deployment of new virtualized solutions for CHD's J2EE application servers, which run CHD's production control processes, it is also robust enough for CHD to carry out specialized functions such as disk array-based data migration and two-node cluster deployment.

This in turn translates to the capability to accommodate two or more applications in maximizing server resources fully, maximizing availability and reliability of CHD's virtualized solutions.

In addition, CHD's J2EE quad-core Intel Xeon processor technology-enabled application servers running virtualized solutions displayed excellent performance-to-power consumption ratio, surpassing the performance-per-watt capabilities of single-core processors\*\*.

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## Impact: Best server consolidation practices and lower energy consumption

By deploying quad-core Intel Xeon processor technology, CHD is able to run two or more virtualized applications that can fully utilize system resources on the same server, potentially lowering server TCO through server consolidation practices and saving additional costs from further acquisitions.

In addition, the lower energy consumption of quad-core Intel Xeon processor technology means that CHD enjoys greater efficiencies in server heat dissipation, which goes a long way in extending server productivity and prolonging server life.

All these mean greater performance for lesser cost for CHD, who stand to realize its initial goal of reducing the overall TCO of its servers.

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## Future: Purchase 150 servers running on Intel Xeon processor technology

CHD is so impressed by the performance boosts that it has decided to make purchase servers based on quad-core Intel Xeon processor technology.

To be installed in CHD's real-time production control systems in its power plants, the quad-core Intel Xeon processor technology-enabled servers will serve to regulate CHD's critical production processes.

Additionally, the cost savings that CHD will incur from server consolidation and lower energy consumption will potentially go a long way towards the powerhouse's bottom line for many financial years to come.



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<sup>1</sup>64-bit Intel® Xeon® processors with Intel® EM64T requires a computer system with a processor, chipset, BIOS, OS, device drivers and applications enabled for Intel EM64T. Processor will not operate (including 32-bit operation) without an Intel EM64T-enabled BIOS. Performance will vary depending on your hardware and software configurations. Intel EM64T-enabled OS, BIOS, device drivers and applications may not be available. Check with your vendor for more information. Performance will vary depending on the specific hardware and software you use. See most up to date benchmarks at <http://www.intel.com/products/benchmarks/server/index.htm> for detailed information.

<sup>2</sup>Performance measured using SPECjbb2005\*, SPECjbb2005\*/SysWatt, comparing a Quad-Core Intel® Xeon® processor E5345-based platform to a Dual-Core Intel® Xeon® processor 5160-based platform.

<sup>3</sup>Performance measured using SPECint\*\_rate\_base2000 comparing a Quad-Core Intel® Xeon® processor X5355-based platform to a Dual-Core AMD Opteron® processor Model 2220SE- based platform.

\*\*Source: China Huadian Corporation.

\*Other names and brands may be the property of their respective owners.

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