

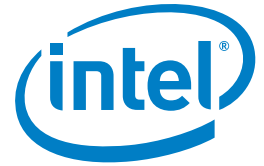
CASE STUDY

Intel® Xeon® processor 5600 series

Enterprise Server

Energy Efficiency, Environment, and Performance

Virtualization



Increasing the Odds of Success

GTECH delivers a lottery winner with Intel® Xeon® processor 5600 series

A typical lottery is a highly visible business. If its infrastructure goes down during a peak period, the lottery can face millions of unhappy customers and a spotlight of negative publicity. To help its customers avoid those risks, GTECH standardizes its typical Enterprise Series* (ES) lottery solutions on IBM xSeries* servers based on the Intel® Xeon® processor 5600 series. Ravi Paramasivam, GTECH director of technology, says the Intel® technology-based systems process more than 675,000 lottery transactions per minute (TPM)¹ with the reliability such high-profile operations require.



"We measure success by 100 percent error-free startup, and we are seeing it with deployments based on the Intel® Xeon® processor 5600 series."

— Peter W. Meusert
Senior Infrastructure Architect
GTECH

CHALLENGES

- **Win competitive bids.** Lottery organizations need outstanding transaction processing performance with reliability to last through a five- to 10-year deployment.
- **Optimize the data center.** GTECH wants to lower its operating costs by reducing power consumption and increasing VM density.

SOLUTIONS

- **Intel Xeon processors.** GTECH deploys a robust virtual environment based on IBM System* x3650 M3 servers powered by the six-core Intel® Xeon® processor X5650. Servers run Red Hat Enterprise Linux*, IBM DB2*, VMware ESX* 4.1, and JBoss* open source middleware.
- **Steady upgrades.** GTECH upgraded to the Intel Xeon processor X5650 shortly after Intel introduced it, and is looking toward the Intel® Xeon® processor E5 for future needs.

IMPACT

- **Business growth.** Intel® technologies help GTECH offer reliable, high-performance, energy-efficient solutions to grow its customer base.
- **Dense, high-performance virtualization.** Virtualizing on the Intel® Xeon® processor X5550 reduced GTECH's server footprint by more than 50 percent. The move to the Intel Xeon processor X5650 increases virtual machine capacity per ESX server by more than 20 percent.
- **Cost and carbon savings.** With more cores and higher performance per watt, the Intel Xeon processor 5600 series helps GTECH buy fewer servers, lessen its environmental impact, and reduce costs for power, cooling, licensing, and floor space.

Billion-Dollar Business

GTECH is a global leader that develops integrated, end-to-end lottery systems and sells or licenses them to regulated gaming jurisdictions in approximately 60 countries. Its customers make a major investment when they deploy a new lottery solution, and they choose technologies that last as long as 10 years or more.

Peter Meusert, GTECH's senior infrastructure architect, says the Intel Xeon processor 5600 series is a great solution for those customers—and for GTECH itself. GTECH also uses the Intel® Atom™ processor as the powerhouse for its retail terminals, which sell and print lottery tickets.



A single system processes over 675,000 lottery transactions per minute with 99.95% uptime

"A typical lottery is a billion-dollar business," Meusert says. "Our customers invest millions of dollars in their lottery infrastructure, and they don't want to bet their lottery solution for the next five to 10 years on unproven technology. They want to be absolutely sure that the technologies they're purchasing won't be obsolete in three to four years, and they're not going to have problems six to seven years down the road finding the skill set to support them. Customers want to feel comfortable that the technology they're buying is backed by a strong and healthy company. They have absolute confidence in Intel."

Performance and Reliability for a Range of Workloads

GTECH designs and builds lotteries based on cornerstones of high performance and reliability. "Because of the length of time that a lottery solution has to be in place, we always want to use the latest and greatest processors," says Meusert. "We demonstrate a TPM rate of over 600,000 and can easily accomplish much more than that on just a two-socket server with the Intel Xeon processor X5650."

GTECH's workload characteristics vary throughout the day. "The greatest demand on the systems is for processing speed, so CPU speed really matters to a lot of our applications," says Paramasivam. "Many of our applications are also highly I/O intensive, particularly when it comes to end-of-day tasks that need to be completed within a specific amount of time." The higher core counts, memory capacity, and bandwidth of the Intel Xeon processor 5600 series enable it to easily handle GTECH's compute-intensive and data-intensive workloads.

Lottery requests for proposal (RFPs) often require 99.5 percent uptime. Meusert says GTECH beats that, offering 99.95 percent uptime with its Intel Xeon processor X5650-based deployment. GTECH's data centers are fully redundant. A typical lottery implementation has a primary and backup data center, and a transaction is considered complete only when the system logs it onto transaction engine disks in both centers.

Greener and More Efficient

GTECH has a company-wide commitment to shrink its carbon footprint, and its technology choices support that commitment. GTECH has steadily reduced power consumption and costs as it has migrated from RISC architectures and moved through several generations of Intel Xeon processors.

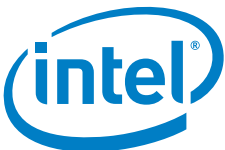
SPOTLIGHT ON GTECH

A world leader in gaming technology, GTECH supplies a full range of services, technology, and products to government-sponsored lotteries, including online, instant, and traditional lotteries. GTECH is a subsidiary of Lottomatica Group, S.p.A. The company has its headquarters in Providence, Rhode Island, and maintains technology centers in the U.S., Canada, India, and Poland.

"We constantly look at how we manage our power, AC, and space requirements," states Paramasivam. "With this deployment, because of virtualization and the advances Intel has made, we have been able to reduce our server footprint by more than 50 percent. A typical lottery deployment in our data centers has gone from 43 to 19 physical servers."

Intel® Virtualization Technology, which provides hardware-assisted support for virtualization, adds value for GTECH's virtualized environment. "When the processor can help boost the performance of the virtualization software by assisting it with integrated hardware mechanisms, it increases the price-to-performance ratio," says Meusert. "You can also save on licensing costs, which further increases the benefits."

Find a solution that is right for your organization. Contact your Intel representative or visit Intel's Business Success Stories for IT Managers at www.intel.com/itcasestudies



1. Figure is for online transactions (wagers, cancels, and validations) on an Enterprise Series Transaction Engine (ESTE) virtual machine deployed on an IBM x3500 M2* with two Intel® Xeon® processors X5550, and VMware ESX* Server Standard 4.1. The ESTE VM was configured with two virtual CPUs and 16GB of memory. Results provided by GTECH.

Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, and virtual machine monitor (VMM). Functionality, performance, or other benefits will vary depending on hardware and software configurations. Software applications may not be compatible with all operating systems. Consult your PC manufacturer. For more information, visit <http://www.intel.com/go/virtualization>.

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