CASE STUDY
Intel® Xeon® processor 5600 series
Enterprise Server
Virtualization
Energy: Efficiency, Environment, and Performance

Cutting Costs and Carbon at 3M

Virtualizing with Intel® Xeon® processors helps 3M save USD 91,000 on yearly energy costs and avoid 661 tons of annual emissions

Diversified technology giant 3M has what its executives call a "culture of conservation," and IT is no exception. The company has eliminated 661 tons of carbon dioxide (CO2) emissions annually and reduced yearly energy costs by USD 91,000 by virtualizing the company's data centers on energy-efficient Intel® Xeon® processors 5600 and 5500 series. The measures helped 3M earn a USD 34,000 energy incentive credit from the Xcel Energy Data Center Efficiency* program while providing more flexible, reliable infrastructure to business and development teams.

"The Intel® Xeon® processor 5600 series gives us better performance and more bang for the dollar, particularly in the VMware* environment. We can put twice as many virtual machines (VM) on a server compared to when we started virtualizing four years ago with the Intel® Xeon® processor 5400 series."

– Curt Letch, IT Infrastructure Manager, 3M

CHALLENGE

- **Efficient infrastructure for innovation**. Improve data center efficiency and meet growing demand for computing resources while maintaining a reliable, manageable, and cost-effective environment.
- **Sustainability**. Reduce energy consumption and shrink the company's carbon footprint.

SOLUTIONS

- **Virtualize and refresh with Intel® Xeon® processors**. 3M deploys HP ProLiant* BL460 G7 and BL490 G7 blade servers based on Intel Xeon processors 5600 and 5500 series. The servers run VMware vSphere* 4.0 ESX, with hardware-assisted support from Intel® Virtualization Technology (Intel® VT).
- **Stay current**. By quickly adopting Intel's latest technologies, 3M takes advantage of advances in performance, memory capacity, energy efficiency, and virtualization support.

IMPACT

- **Capacity improvements**. 3M puts 50 to 60 virtual machines (VM) on each Intel Xeon processor 5640-based server, reducing its total server count by more than 25 percent.
- **Cost savings**. In addition to energy savings, 3M lowers its costs for software licensing, cabling, and other infrastructure. IT has avoided adding system administrators while supporting more applications.
- **Greener world**. Calculations performed by 3M and the consulting firm N'compass show 3M's data center emits 661 fewer tons of CO2 annually.
- **Increased agility**. IT deploys new applications faster and provides a more responsive end-user experience, helping employees continue 3M's tradition of technology and marketing excellence.

Sustainable Infrastructure

From Post-It* Notes to Scotch* Tape, 3M uses its technology infrastructure to help develop and market practical breakthroughs for home, office, and industry. In both its products and its operations, 3M puts a premium on sustainability. The company has received an ENERGY STAR* Sustained Excellence award for the last six years and earned Gold-Class honors on the 2010 Dow Jones Sustainability Indexes.

Server virtualization with the Intel Xeon processor 5600 and 5500 series is an important element of 3M's sustainability strategy—and it has helped the company eliminate 481 physical servers, primarily single- and dual-core systems, in the last

3M users enjoy higher application performance and faster deployment of new capabilities

two years. 3M has also retired 220 RISC platforms and migrated their workloads to 40 Intel Xeon processor-based servers running Windows* and Linux*. All told, 3M's IT leaders say they're managing at least 25 percent fewer physical servers than they were two years ago.

Dollar Savings and a Smaller Carbon Footprint

To assess the energy impact for 3M's St. Paul, Minnesota, data centers, the company teamed up with N'compass, a Minneapolis-based strategic IT firm. Working with Xcel Energy, 3M's local gas and electric utility, the team identified energy-saving opportunities for its data centers. Xcel Energy established its Data Center Efficiency program in 2009 to help customers make energy efficiency improvements to new or existing data centers. The program offers rebates designed to help offset the cost of an initial holistic data center efficiency study. Customers are eligible for additional incentives if they implement efficiency measures the study recommends.

The analysis showed dramatic benefits from replacing the older servers with new HP ProLiant blades and energy-efficient Intel Xeon processors. In addition to producing long-term energy savings, the upgrade qualified for a USD 34,000 rebate through Xcel Energy's Data Center Efficiency program.

"We estimate that five racks of traditional servers leave the floor for every rack of blades coming onto the floor, and our field measurements show we have a net savings of 7 kilowatts (KW) per rack," explains Dale H. Barth, IT enterprise facilities manager for 3M.

Those improvements are reducing 3M's electricity consumption by approximately 84 KW annually, Barth notes. They also lower the cooling load by approximately 23 tons, saving on both chilled water to cool the air and fan energy to circulate the cooler air. Ten computer room air conditioning (CRAC) units have been retired or put into backup mode.

The changes produce energy-related savings of USD 91,000 per year. In addition, they shrink the annual carbon footprint of 3M's data centers, lowering CO_2 emissions by 478 tons on electricity and 183 tons on chilled water production.

Benefits across the Data Center—and the Enterprise

The refresh also delivers benefits that were not factored into the energy analysis, including lower administrative support and licensing costs, and less need to purchase cabling, switches, and other infrastructure to support additional servers. A wide range of 3M's applications, including mission-critical workloads, benefit from the new Intel Xeon processors' increased performance and memory capacity according to Curt Letch, IT infrastructure manager for 3M. "Just about any application you can think of—ERP, manufacturing, email—you name it, and we're running it on the Intel servers," he says.

SPOTLIGHT ON 3M COMPANY

Based in St. Paul, Minnesota, 3M is a diversified technology company and a recognized leader in research and development. With USD 27 billion in annual sales, 3M has a global presence in six key market segments: consumer and office; display and graphics; electro and communications; healthcare; industrial and transportation; and safety, security, and protection. The company has approximately 80,000 employees worldwide and operations in more than 65 countries. In 2010, 3M placed third on Booz & Company's Most Innovative Companies list from its Global Innovation 1000 survey.

Letch notes that Intel VT adds further value. "The performance and reliability of the virtualization technology is much better than it was before the introduction of Intel VT, whether you're using VMware or some other standard," says Letch. "We use VMotion* all the time, and I know it uses Intel VT. We're moving applications all the time within the data center, and we can do it without affecting application availability. We're more effective in deploying new servers and more responsive to our internal customers and their application needs."

Energy: Efficiency, environment, and performance. Lower energy and cooling costs—while keeping mobile users going—through more environmentally friendly computing.

Find a solution that is right for your organization. Contact your Intel representative or visit the Reference Room at **www.intel.com/references.**

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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