

SERVER VIRTUALIZATION UTILIZING
AMD OPTERON™ PROCESSORS IS HELPING
DELOITTE CONSULTING BOOST SERVICE LEVELS
WITH SPEED, AGILITY AND FEW PHYSICAL SERVERS.

VIRTUALIZATION NOW!

Francis Cardell, senior
manager on Deloitte
Consulting's SNET technical
management team

BY TOM FARRE

The following conversation recently took place between a data center manager and a blade server manufacturer. The manufacturer's name has been omitted to protect the embarrassed.

Manufacturer: We have more blade server options than anyone else.

Manager: Good. So you have a 4P/16-core AMD Opteron™ blade on your roadmap.

Manufacturer: No. Why would you want that on a blade?

Manager: For virtualization.

Manufacturer: Why would you want that on a blade?

Manager: You're selling blades for server consolidation. Why should I put only 14 servers in your chassis, when, with virtualization using AMD Opteron processors, I can put several times that? To consolidate from a whole rack to a blade center is one thing, but to take 10 racks and consolidate them onto one, now that's extraordinary.

Welcome to the brave new world of server virtualization, brought to you, in large part, by AMD Opteron processors. According to the leaders of Deloitte Consulting LLP's Solutions Network (SNET)—an environment with hundreds of servers that supports the delivery of hosted application test and development services provided around the world—this technology's time has come.

In the year since SNET introduced its x86-based servers to AMD Opteron processor technology, it has experienced an increase in its processing power and the number of server instances available while reducing physical server count and data center sprawl. These improvements have helped SNET increase the efficiency of its operations. Additionally, thanks to server virtualization with AMD Opteron processors, SNET can provide hosted test environments quickly and with agility.

"Server virtualization with AMD has been very effective for Deloitte Consulting," says Francis Cardell, senior manager on Deloitte Consulting's SNET

technical management team. "It has allowed us to become more responsive and productive while decreasing the amount of hardware we require, not just in the lab but in the production environment of an enterprise data center."

Virtualization and You

The evolving effectiveness of SNET, Deloitte Consulting—a subsidiary of Deloitte & Touche LLP USA, which has access to broad global capabilities in nearly 150 countries—has addressed an issue long on IT managers' minds: how to increase service levels and processing power without blowing the budget for server acquisition and management, power delivery and cooling, and data cen-

source project and Microsoft®, enterprises hope for high server utilization, efficient operations and easy management.

In development, test and quality assurance environments, virtualization allows multiple operating systems and stages of the development process to run simultaneously on a single physical server, which would be addressed concurrently by multiple teams. This can facilitate fast time-to-market and help improve application quality.

"Data center managers understand they have to consolidate, and they understand they can consolidate to a high level of efficiency through virtualization," says Michael O'Brien, director of worldwide commercial system channels at AMD. "Now the question is: What platform should they do that on? Where will they receive outstanding return—a high level of investment protection?"

The answer for Deloitte Consulting came only after exhaustive testing and

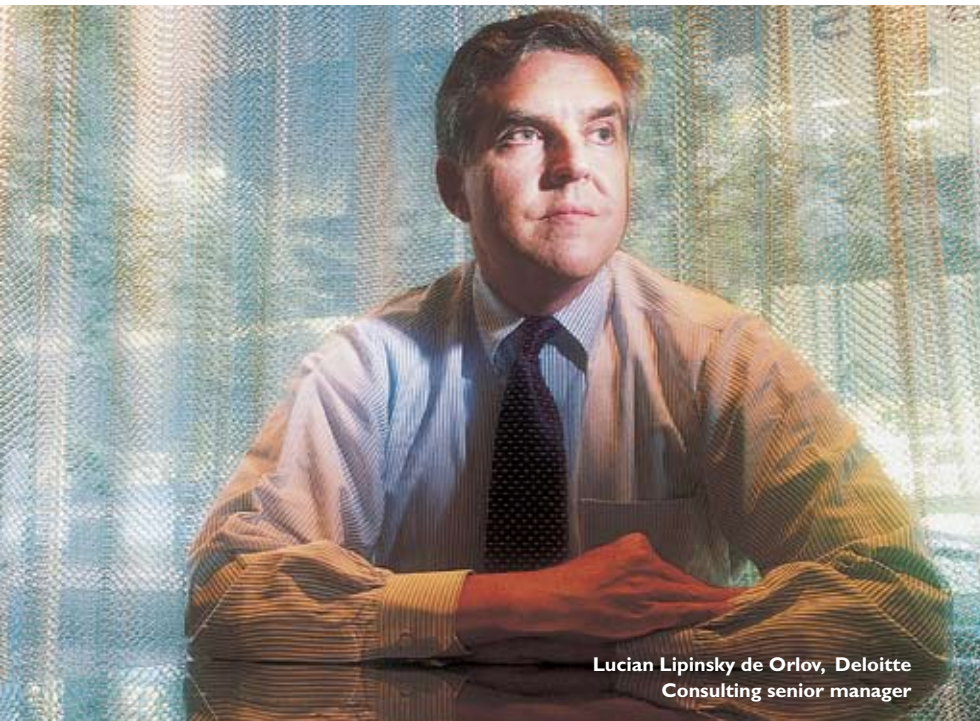
"We found we could put more virtualization slices on the AMD Opteron™ processor-based servers than we could on other servers," says Francis Cardell, senior manager on Deloitte Consulting's Solutions Network (SNET) technical management team.

ter real estate. For some years, consolidation through virtualization has been seen as the answer by many.

Virtualization is an abstraction layer that decouples the physical hardware from operating environments to deliver increased IT resource utilization and flexibility. Using virtualization technology, a server is divided into several virtual machines, which can each run their own separate operating system and applications. These virtualized server environments facilitate workload isolation and granular resource control for a server's computing and I/O resources. By consolidating physical systems onto virtualized infrastructure, under software such as that offered by VMware, the Xen open

analysis. But, first, a little background. Established in 1999 at a single location with eight servers, SNET now has many locations worldwide, 60 terabytes of storage and hundreds of servers from every major manufacturer, processing platform and operating system. This enables SNET to replicate application environments to support the services being provided by engagement teams on application migration and improvement projects.

"The purpose of SNET is to provide a network of locations and technical resources that engagement teams can turn to for hosted environments," says Jonathan Schnell, senior manager on SNET's packaged application team. "Let's say the team is providing Oracle- or SAP-related services



Lucian Lipinsky de Orlov, Deloitte Consulting senior manager

and they want to help the client jumpstart the project. They turn to SNET to quickly provide a fully configured, fully available development environment that matches customer specifications.”

This allows the project team to start work immediately, and, using SNET’s infrastructure, helps the client save money in that they don’t have to acquire development systems on their own. Deloitte Consulting’s professionals also use SNET to create application-demonstration environments and for “sandboxing” applications for staff training.

Speed and agility are essential as are rapid deployments and quick direction changes when shifting to new projects. Resource use and flexibility are also critical; new servers can’t be purchased for every new project. To contain costs, it’s key to take advantage of processing power, and existing servers must accommodate an increased workload.

Such business requirements prompted SNET leaders to make a move to server virtualization. In early 2005, 2P/4-

core and 4P/8-core servers powered by Dual-Core AMD Opteron™ processors were introduced. Their pricing got the attention of SNET, but it was their performance that made the difference.

SNET began testing virtualization performance on a variety of leading-edge platforms using processors from four vendors, including AMD, Cardell says. “We found we could put more virtualization slices on the AMD Opteron processor-based servers than we could on other servers.”

The Dual-Core AMD Opteron processor-powered servers also consumed low power and generated low heat. When the SNET leaders considered all the features and benefits, AMD was chosen (see sidebar, AMD’s Virtualization Edge).

“Deloitte Consulting is an integrator that provides services to its clients to help them in their efforts to design and implement balanced systems,” AMD’s O’Brien says. “I would like to think AMD’s win in the virtualization test confirms our balanced approach to

GRID ENABLING THE LIFECADDY

If the engineers have their way, Deloitte Consulting’s LifeCaddy will get a power assist from grid computing.

An analytical application Deloitte Consulting provides as a component of its services to the financial services industry, LifeCaddy is used to support the evaluation of future scenarios and actuarial tables to help identify alternative financial portfolios expected to support individuals in retirement. But here’s the challenge: LifeCaddy analyzes so many different financial alternatives, that it often takes an hour or more to run for a single individual—hardly a model for fast service and too slow for real-time delivery.

To help increase LifeCaddy’s speed, Deloitte Consulting turned to grid computing, which can treat hundreds and thousands of processors as a single virtualized unit. First, however, it had to be determined which processor would run LifeCaddy most efficiently. Deloitte Consulting performed a test of similarly configured 1P/2-core servers powered by two different processors—one ran at 2.8 GHz, while the AMD Opteron™ processor operated at 2.4 GHz. “[It] was no contest,” says Lucian Lipinsky de Orlov, a Deloitte Consulting senior manager. “The AMD Opteron processor ran LifeCaddy 37 percent faster.”

Encouraged by these initial results, Deloitte Consulting began a 600-node grid experiment at AMD’s Developer Center in Sunnyvale, CA, using Hewlett-Packard servers powered by Dual-Core AMD Opteron processors, and grid-management software from Platform Computing. As this article goes to press, the project is still in progress, but Lipinsky de Orlov says he is convinced the grid will run a 750,000-scenario simulation in one minute or less. “The grid could open up many commercial opportunities for LifeCaddy,” he says, “such as delivering the service in real time in front of clients with input from a PDA or smart phone.”

LifeCaddy would then become one of the first commercial applications of grid computing.

processor architecture. The AMD Opteron processor delivers high throughput, which our customers translate as the ability to run applications, such as virtualization, fast.”

Once AMD’s processors had been chosen, SNET began to be populated with AMD Opteron processor-powered servers from the major manufacturers, with virtualization predominantly under VMware. Today, SNET runs approximately 480 servers on fewer than 200 pieces of hardware.

SNET’s dynamic environment has provided an effective test bed for the benefits of virtualization under AMD Opteron processor-powered servers. SNET’s leaders confirmed the following advantages:

- **Flexibility.** The AMD64 computing platform runs 32- and 64-bit software seamlessly. Through virtualization, one server can run many instances of any supported OS.

- **Rapid, repeatable deployment.** Server virtualization has significantly improved client service in SNET. “A consultant will come to me and say, ‘I need an Oracle serv-

er tomorrow,’” Schnell says. “If I had to go out and buy the hardware, that’s a three-to-four-week turnaround. Using our virtualization template for Oracle on an AMD technology-based server, the request can be met in two to four hours.”

- **High processor workload.** Utilization of SNET’s server processors was 20 percent or less before virtualization. Today, SNET reports its utilization is up approximately 80 percent or higher with AMD Opteron processors.

- **Consolidation under blades.** Virtualization really shines when integrated into a blade server solution. “We are reducing floor space within the data center by deploying virtualization on blades powered by AMD Opteron processors,” Cardell says. “If you can put 16 servers on four physical blades, that’s real consolidation.”

- **High availability.** With virtualization technology, if a blade fails or appears likely to fail, the server instances can be moved to another blade in the blade center virtually without interruption, and then back after repair.

SNET reports it has experienced a 62 percent increase in server instances provisioned year to year, accomplished with a 42 percent decrease in physical hardware. “Virtualization on AMD Opteron processor-powered servers helped us decrease our hardware significantly while increasing our productivity in providing hosted application environments,” Schnell says. “It’s our answer to virtualization across the board.”

Cardell and his team concur. “We have found virtualization to be production ready,” he says. “The AMD Opteron processor running virtualization software has helped us to rapidly deploy an enterprise data center over and over again with repeatable solutions.”

No wonder the manufacturer mentioned in the opening anecdote has decided to add AMD Opteron processor-powered blades to its roadmap. His organization will find itself in good company, as Deloitte Consulting’s SNET continues to consolidate its server array through AMD Virtualization™ technology. ■

THE AMD VIRTUALIZATION™ EDGE

Dual-Core AMD Opteron™ processors feature the improved Direct Connect Architecture and industry support to help deliver the business and technical benefits of x86 virtualization, such as:

- AMD64 technology with significant performance improvement in 32-bit environments, and the gains accelerate in 64-bit environments, where it becomes possible to break through the 4 gigabyte memory barrier. Able to run both 32- and 64-bit virtual machines on the same physical server, AMD64 helps maximize IT investments.
- Direct Connect Architecture in all AMD64 processors directly connects the CPU to the memory controller, I/O

and other processors. This provides high-speed, low-latency access to memory, which helps host and guest operating systems function more efficiently. It also provides for low power consumption and heat generation.

- HyperTransport™ technology provides improved scalability and I/O capabilities, which translate directly into support for more guest operating system sessions and more user applications.
- AMD Virtualization™ in the Next-Generation AMD Opteron processors with DDR2 provides a hardware assist for virtualization and helping guest operating systems run unmodified at near-native speed.

- AMD’s multi-core processor roadmap is right for virtualization. Servers powered by Next-Generation AMD Opteron processors with DDR2 featuring seamless upgradability to quad-core in the same socket and thermal envelope will be available in the next year or so.

In addition, AMD has forged strong relationships with numerous hardware and software firms involved in x86 virtualization technology, including EMC (VMware), Hewlett-Packard, IBM, Microsoft, Red Hat, Sun Microsystems, Symantec (Veritas) and XenSource. The result: exceptional performance and industry support for those who want to run a virtualized environment on servers powered by AMD Opteron processors.