

HARDWARE

IBM Reaches Sweet 16

Well-built and a talented performer, xSeries 445 scales out to 16 processors

BY ALAN ZEICHICK

SOMETIMES, size does matter. Take servers. Some applications don't require a huge amount of horsepower or the utmost in high-availability hardware because it's easy to build clusters. But when it comes to more robust challenges — high-end transaction processing, messaging, database serving, data warehousing — you want big, bigger, biggest, such as IBM's eServer xSeries 445, which replaces the x440.

In the realm of x86-based servers, I haven't yet found an Intel-based machine that's as powerful, resilient, and scalable as the eight-processor 2.8GHz Xeon MP (multiprocessing)-based x445. Or rather, as resilient as two of those 4U (7-inch) rack-mount boxes, which is what IBM sent *InfoWorld* for review: Plug them both together with a special cable and change a BIOS setting, and suddenly you have a single 16-way server. Now, that's scalability, although it doesn't come cheaply at about \$70,000 for each fully laden eight-way server.

There's a lot to admire about the x445 server, beyond the instant-16-way trick. IBM gives you a choice of using the slower but most robust Xeon MP processor, which has huge 2MB L3 cache ideal for massive database access, or the faster but wimpy Xeon DP (dual-processing) processor, which lacks the L3 cache but has faster clock and bus speeds suitable for CPU-based tasks, such as graphics visualization or serving Web pages. (For more about Xeon DP vs. Xeon MP, see infoworld.com/130.)

To boost performance, IBM also installs 64MB of memory cache for every two installed processors, using what it calls the XcelL4 Server Accelerator.

It's unique in the market, as far as I can tell. IBM claims to have figured out how to make the x445 work as a four-way server with the far less expensive Xeon DP processor, which is normally limited to two-way configurations. The benefit there is that if all you need is a four-way server, you

can get all the robustness of the x445 chassis with the Xeon DP's faster clock. However, the systems I tested used Xeon MP processors.

In many ways, the x445 is comparable to Hewlett-Packard's ProLiant DL740 server, which is also a 4U-high box with eight Xeon processors and many high-availability features (infoworld.com/36). The HP ProLiant DL740 system comparable to the one we reviewed — but with 2.0GHz Xeon processors — costs \$74,556. The price of the hardware needed to build the 16-way server tested for this review, including the special dual-server connection kit, is \$143,919.

In terms of specs, the boxes are similar. Both servers have dual Gigabit Ethernet ports. The IBM x445 has six hot-swap PCI-X slots; the HP DL740 has six. Both have onboard Ultra320 SCSI RAID controllers, but the IBM server has two hot-swap drive bays, and the HP server has four. Score one for HP. IBM sells a separate enclosure that provides 12 additional PCI-X slots.

IBM differentiates itself with robustness and reliability. The server contains IBM's memory-recovery technology, called Chipkill, which can recover from double-bit memory errors and has optional memory mirroring and hot-add memory capability with Windows Server 2003. Considering that memory is a weak spot in any server, Chipkill is a great idea and an improvement over ordinary ECC (error-correcting code) RAM.

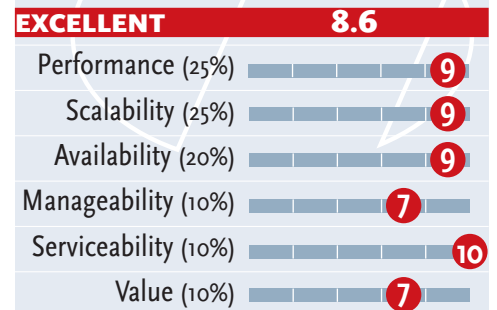
HP's RAID memory approach is different: RAM is striped across five memory modules, so one can fail without crashing the machine, plus they can be hot-swapped without powering down. Although HP requires you to buy and install 1.25GB of chips to get an effective 1GB RAM, it does offer more resiliency in case of a catastrophic memory failure.

Also tops is IBM's maintainability. The company has updated its Lightpath diagnostic system with a small pull-out console that provides full hardware diagnostics without having to unrack



eServer xSeries 445

IBM ibm.com



COST: \$40,797 for base system with four 2.8GHz Xeon processors; as tested, \$69,460 for eight processors, 2GB RAM, and two 36GB hard drives; \$4,999 for kit to connect two systems

BOTTOM LINE: IBM's new x86-based flagship server is well-designed and well-built for performance, high availability, and scalability to as many as 16 processors. The only shortcoming: limited drive bays.

the server, plus LEDs on key hardware components that identify bad parts.

There are other little pieces too numerous to mention here. But if I had to bring a dead server back to life or perform routine hardware maintenance, I'd rather repair the x445 than anything else in this class.

As Big Blue's high-end IBM x86 server, the xSeries 445 is a machine worthy of deployment anywhere you need an eight-way box — with room to grow.