

Generation Xeon

INTEL'S PENTIUM PRO REPLACEMENT IS HERE. BUT WILL IT SOUP-UP YOUR SERVER? TO HELP YOU DECIDE, AJITH RAM REVIEWS FOUR SYSTEMS WHICH USE THE XEON PROCESSOR.



Pentium II Xeon suggests, the Xeon core is the same Deschutes core that is present in other Intel processors like the Pentium II and

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Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

INTEL MAY BE FACING increased competition from AMD and Cyrix in the mainstream consumer market, but it rules the mid-range server market with its Pentium Pro processor. The company's new Xeon processor is aimed at both the server and workstation markets and represents the company's attempt to consolidate its hold over these lucrative market segments, while replacing the now quite aged, but still popular, Pentium Pro.

At the same time, Intel hopes that the Xeon will gain market share from Digital's Alpha and Sun Microsystems' Sparc processors which dominate the high-end server and workstation markets. The Xeon also represents a stopgap measure to hold market share before the arrival of Intel's much anticipated Merced processor.

The Xeon is not a radical departure from the standard x86 design. As its full name of

Celeron. It is mainly the L2 cache on the processor that differentiates the Xeon from other Intel products. While the first Celeron had no cache at all, and the Pentium II has its cache running at half its clock speed, the Xeon has either a 512Kb or a 1Mb cache running at the same clock speed as the processor. A version with a 2Mb L2 cache is soon to be released. This larger cache size makes a huge difference while running memory-intensive applications, particularly on busy networks.

The Xeon has also overcome the 512Mb limit on RAM which prevented the Pentium II from being widely accepted in the lucrative server market. The Xeon can be used in multiple-processor configurations like the older Pentium Pro, either in four-way or eight-way arrangements. Used in an eight-way configuration, it can address and cache up to 64Gb of RAM.

Dell PowerEdge 6300

The PowerEdge was physically the smallest system we tested. Fitted with four 400MHz Xeon processors, each with 1Mb of L2 cache, the Dell system has a 64-bit PCI bus but no RAID card. For an extra £1,000, Dell will include it with the system. The PowerEdge comes with 2Gb of RAM but this cannot be easily upgraded as all the DIMM slots are full. The only way to get around this problem is to remove some of the lower-capacity DIMMs and replace them with higher-capacity versions. Adding extra storage will be difficult, too, because all six drive bays are full. However, since each of them contains 9Gb hard drives, it will be some time before upgrading will be necessary. The three power modules that power this server can be easily pulled out and replaced.

The Dell server is well constructed. A side door provides easy access to the expansion slots and is large enough to put in full-length cards. A removable side panel provides easy access to the cooling fans and processors. The inside of the

panel has a diagram of important information on component removal and jumper settings. The documentation is comprehensive and is replicated in the Dell Server Assistant CD which also allows you to create necessary driver diskettes. A second CD provides the OpenView NNM server manager for the remote administration of PowerEdge servers.

Performance was only average, with a throughput of 16.3 transactions per second.

PCW DETAILS



Price £27,893 (£23,739 ex VAT)

Contact Dell 0870 1524625

www.dell.co.uk

System Specifications Four Xeon processors, 2Gb RAM, 54Gb SCSI HD.

Good Points Easily accessible components. Useful documentation.

Bad Points No RAID card.

Conclusion A costly server with average performance and not easily upgradeable.

What Xeon offers in the face of strong competition

Although the Xeon does not represent a radical departure from the venerable x86 design, it includes three significant improvements over the Pentium II (PII) which make it eminently suitable for server and workstation use.

➔ **Firstly**, there is the addition of either 512Kb or 1Mb of L2 cache, with a 2Mb version likely to follow shortly. The L2 cache runs at 400MHz, the same speed as the processor core, and is a great improvement over the 200MHz speed of L2 cache on the PII 400.

➔ **Secondly**, there is its ability to address and cache up to 64Gb of RAM in an 8-way configuration; that is, 8Gb per processor.

This is quite a jump from the limit of just 512Mb on the PII.

➔ **Thirdly**, it can be installed in 4-way or 8-way configurations, whereas the PII can only be run in 2-way configurations. These changes may seem minor, but they do represent considerable technical advancement over previous Intel processors.

Although Intel is pitching the new processor as the ideal solution for all servers and workstations, it should not be mistaken as the fastest processor for just any PC. In many systems, the Xeon will represent overkill. Even though its high-speed cache may make it appealing, its integer and floating-point units are

identical to PII processors. So, unless you are running applications that take advantage of the larger, faster cache, you are unlikely to see a massive performance increase. And, unless you need more than 512Mb of RAM, you might be just as happy with a PII in your server or workstation.

However, systems such as web servers, which require large amounts of memory, are ideal candidates for the Xeon processor. These systems, which place heavy demands on their I/O bridges, are likely to benefit from its power. At the time of going to press, Intel had identified numerous bugs in the new processor and was working on fixing them

by making changes to the micro code. The most serious of these bugs occurs while running the Xeon in eight-processor combinations. Intel claims that Xeon systems with less than eight processors are stable enough to be used immediately.

● Despite its strengths, Xeon faces **heavy competition** from the **Alpha** and **Sparc** processors, both running at higher clock speeds. Digital's Alpha also has the distinction of being a true 64-bit processor. But many buyers may prefer to wait for Intel's own **Merced** processor to arrive later next year. This is Intel's first 64-bit processor. Using a new architecture (IA-64) and manufactured

using a 0.18 micron process, Merced is expected to provide unprecedented levels of performance.

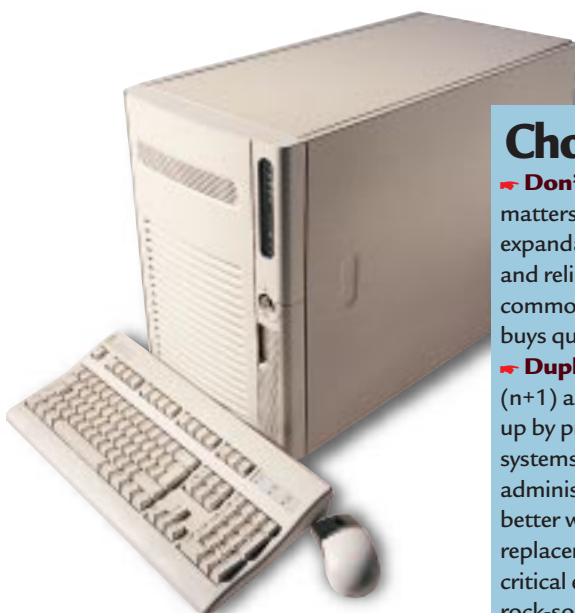
At around the same time as Merced's release, **Digital** is expected to roll out a **new version of the Alpha processor** with a clock speed of around 1GHz.

Cyrix is also expected to enter the fray with a new line of CPUs codenamed **Jalapeno**. These are rumoured to have four times better floating-point performance than current PIIs and might be a better option for systems running graphics-intensive applications. These developments are likely to make the dominance of the Xeon short-lived.

Evesham XenQua

The Evesham server had the lowest specification we tested. With just two processors, each with 1Mb of L2 cache, it can be the ideal choice for the small to medium-sized business. You get 256Mb of RAM, three hard drives, with a storage controller on each. The XenQua has a RAID controller but no 64-bit PCI bus. There are 12 DIMM slots and two hard-drive bays available for expansion. This server is extremely well built, but slightly difficult to get into. The drive bays and DIMM slots are easy to access, the two processors are well cooled by fans, aided by a mass of adjacent panels that channel the air flow. One of the side panels carries a diagram showing the proper way to remove the hard drives and change power supply units, and there are manuals dealing with setting up the server.

The XenQua posted test results of over 13.4 transactions per second — impressive for its specification and price point. A good choice for the price-conscious buyer.



PCW DETAILS



Price £12,337 (£10,500 ex VAT)

Contact Evesham Micros 0800 4960800

www.evesham.com

System Specifications Two Xeon processors, 256Mb RAM, 27Gb SCSI HD.

Good Points Easily accessible components. Useful documentation. Excellent construction.

Bad Points No 64-bit PCI bus.

Conclusion A good choice for small to medium-sized businesses.



Olivetti Lexikon Netstrada 7400

As an enterprise-level server, the Olivetti system is almost £8,000 cheaper than Dell's but has no 64-bit PCI bus. It makes do with a 4Mb RAID card. Housing four Xeon processors, the Netstrada provides ample scope for increasing the RAM with its eight free DIMM slots. But its hard-drive expandability is limited as it has only two 5.25in bays free. The hard-drive bays house six 4Gb SCSI drives. This 24Gb storage capacity might become a little constraining for a server aimed at the high end of the market: it would have been better to have had

larger-capacity hard drives occupying fewer slots. The absence of the 64-bit PCI bus may affect its performance and upgradeability. Although adequately built, the Olivetti system is not as well constructed as the Siemens or Evesham servers. The fans cooling the four processors, although serving their purpose, are not as easy to remove as those in the other systems reviewed here. The hard drives are hot-replaceable. One side panel bears instructions on removing and replacing components, while the other side provides access to the CPUs and expansion slots.

The Netstrada's test performance was above that of the Dell and Evesham servers, with a throughput of 18.5 transactions per second.

Choosing a server

➤ **Don't cut corners.** Every component matters, as the overall package must be expandable, upgradeable, manageable and reliable. Intel-based servers may be commodity items, but money always buys quality of construction.

➤ **Duplication of critical components** (n+1) aids reliability only when backed up by proper procedures. Automatic systems which page the network administrator are good, but they're even better when they call the server vendor if replacement parts are needed. A server critical enough to require n+1 needs a rock-solid warranty with rapid on-site response.

➤ **Workgroup file servers** can manage with a single processor but dual processors meet the expandability requirement. For Windows NT, two processors are better than one for all but the smallest application server. Four-way and eight-way PII systems are mostly still on the drawing board and will be expensive, so don't discount the Pentium Pro. There are many Pentium Pro systems which will take the PII OverDrive.

➤ **Servers must support** parity memory and preferably ECC (Error Checking and Correcting) memory: the former flags up memory errors; the latter has a stab at correcting them. Desktop motherboards dumped parity checking to cut costs, but it's a false economy in a server.

➤ **Forget EIDE hard disks** on all but minor servers: SCSI is *de rigueur* for expansion and performance. An embedded SCSI interface on the motherboard is handy for attaching that essential tape backup drive, and it saves a slot for a RAID disk array controller.

TERENCE GREEN

PCW DETAILS



Price £19,407 (£16,517 ex VAT)

Contact Olivetti 0800 447799

www.olivetti.com

System Specifications Four Xeon processors, 1Gb RAM, 24Gb SCSI HD, 4Mb SCSI RAID controller.

Good Points Low cost. Solid construction.

Bad Points No 64-bit PCI bus. Not easily upgradeable.

Conclusion A well-built system that may attract the price-conscious buyer.



Siemens Nixdorf Primergy 870

Aimed primarily at the high-end server market and built around four Xeon processors with 1Mb of L2 cache, the Primergy 870 has a 64-bit PCI bus, providing better performance than the more common 32-bit bus. Aiming to fulfil its purpose as an enterprise-level server, the Siemens system comes with no less than 90Gb of hard-drive storage, made up of ten 9Gb hard drives controlled by a RAID card. This ensures fast transfer of data.

The Primergy comes with 1Gb of RAM and has tremendous scope for expansion with its 28 free DIMM slots. This gives it a capacity to hold up to 32Gb of RAM which is the maximum supported by the Xeon processors in a four-way configuration. The system can accommodate up to eight processors and support up to 216Gb of storage directly if larger 18Gb hard drives are used in all 12 hard-drive bays.

The Siemens system is extremely well built. The front of the case is quite stylish and has a door which provides access to the storage bays. One side panel provides access to the expansion slots, while the other allows access to the CPUs. The processors are housed inside easily removable cassettes which slide from their housings. Manuals are supplied which deal with the RAID controller, and further documentation is likely to be available with the shipping versions.

The Primergy 870 was the fastest server in our test, managing over 40 transactions per second.

PCW DETAILS



Price £36,985 (£31,477 ex VAT)

Contact Siemens Nixdorf 01252 555312
www.sni-epc.co.uk

System Specifications Four Xeon processors, 1Gb RAM, 90Gb SCSI HD, 16Mb SCSI RAID controller.

Good Points Excellent construction. Easily upgradeable. High performance.

Bad Points Expensive.

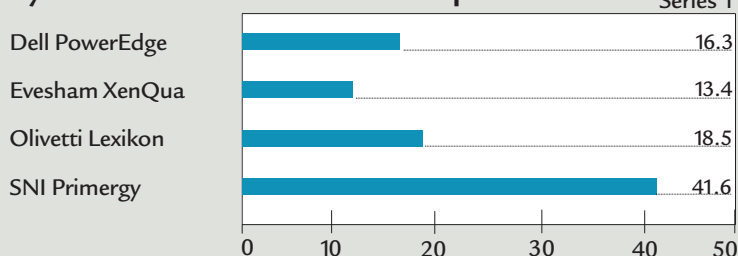
Conclusion An ideal server for the most demanding operations.



Editor's Choice

The Xeon is a good choice for high-end systems. But the processor is just one of the crucial components within a good server, and this is shown to good effect in the test results achieved by the Dell and Olivetti servers. While the Dell cost about £8,000 more than the Olivetti, it posted a result only slightly higher. It had a 64-bit PCI bus but no RAID card. The Olivetti had a RAID card but only a 4Mb model, and less hard-disk capacity. It is not easy to say which components made the crucial difference, but probably with a better RAID controller, the Olivetti could post better results. As the Xeon is aimed at the mid- to high-end server market, we looked for a model which best catered for this sector. The **Siemens Nixdorf Primergy 870** is our **Editor's Choice** due to its outstanding performance, superior components and excellent build quality. It also offers scope for upgrading with an ability to take eight processors and 64Gb of RAM. Although the Siemens server is the most expensive, its superior performance outweighs price considerations.

Sysmark DB scores: transactions per second



How we did the tests



All four servers were tested using Windows NT SQL Server (with all three service packs loaded). On top of the operating system we installed Sysmark DB (database), our benchmarking software, and the server is then connected to numerous client machines. Sysmark then builds a database. The software queries the server to find the maximum number of client systems it can handle without crashing. The database that is built

simulates the real-world environment of a travel agency and its clients. The benchmarking software simulates real-time transactions as well as those between the employees of the company. At the end of the simulated working day, the software publishes the average number of transactions per second that the server is able to handle. This result takes into account the cumulative speed of the hard drives and the processors, the efficiency of the RAID connection and the stability of the software