THE EDITOR'S VIEW

Workstation Market May Implode

Pentium Attracts Technical Users—SPARC, PA-RISC Could Suffer

The major RISC companies have spent the past year preening for top-tier PC vendors and making plans to enter this high-volume market. Apple represents the first big success for the RISC camp, but it won't be the last. As the RISC vendors chortle over their latest victory, however, they have left their flank open for Intel to attack their revenue supply line: workstations.

Traditional processor vendors such as Intel, Motorola, and AMD earn revenue from the sale of CPU chips. If a processor family is successful (such as the x86), it creates plenty of profit to develop future products. Less successful processors (such as the 88000) may not generate enough profit to create future generations, leading to a death spiral.

The major RISC architectures, by necessity, use a different business model. Development of PA-RISC, POWER, SPARC, and Alpha processors is funded by profit from the systems using these processors and not from the processors themselves. PowerPC and MIPS follow this model to a lesser extent. With the possible exception of PowerPC, none of these architectures has the volume to sustain itself on chip sales alone.

The RISC vendors get the bulk of their revenue from servers and workstations, products that hitherto have lived in a high-margin fantasy land while tough competition in the PC market drove margins into the dirt. The workstation market in particular has been protected by the vast floating-point gap between x86 and RISC: a 150-MHz Alpha chip, for example, has about 10 times the FP performance of a 486DX2. Because most workstation users require good FP performance, the 486 simply wasn't an option.

The introduction of Pentium, and in particular P54C, has changed this equation. Intel included a much better floating-point unit in its Pentium design, despite the fact that few customers will ever use it. During the past few weeks, several vendors have announced 90-MHz Pentium desktops, and by summer the market will be flooded with such systems. For about $4,500, these Pentium systems are loaded with 16M of memory, a 1G SCSI disk, accelerated graphics with 1M VRAM, a 15" color monitor, and Windows NT.

The following table shows that these systems could deliver floating-point performance similar to that of several popular workstations costing at least twice as much for fairly similar configurations. Note that the fast Pentium box outperforms every one of these systems on integer benchmarks. The RISC vendors do have less expensive systems, but these boxes are slower than even 60-MHz Pentium systems.

	SPECfp92	SPECint92	List Price
Digital 3000/300	91 fp	66 int	$9,995
HP 712/80i	79 fp	84 int	$8,800
SparcStation 20/50	78 fp	69 int	$12,195
90-MHz Pentium PC	72 fp	90 int	$4,500
SGI Indy (100-MHz)	67 fp	58 int	$10,995

Pentium systems are capable of running various flavors of UNIX, including Sun's own Solaris, and can be configured with large monitors, networking, and other features popular among workstation users. Although these features will slightly increase the system price, Pentium workstations will offer a significant price/performance advantage over low-end RISC systems, mainly due to the low margins of the PC industry.

Sun seems to be in the worst position. Its performance has traditionally lagged that of other RISC vendors, and its entire product line is nearly overlapped by lower-cost Pentium systems. Sun customers can switch to an x86 box while keeping the familiar Solaris interface. But other RISC vendors will also have a tough time justifying the high prices of their low-end systems.

For maximum FP performance, RISC vendors still offer more than Pentium. These companies point to the advantages of having a single architecture for low- and high-end systems. For those sites that don't require leading-edge floating point, however, the Pentium systems look good. And with the advent of multithreaded, multiprocessor operating systems, dual- and multi-Pentium systems will provide alternatives to faster uniprocessor RISC boxes.

The workstation market already has begun to sag, growing at a far slower rate than the PC market, as Nick Tredennick predicted years ago (see MPR 6/26/91, p. 12). With low-cost Pentium systems added to the mix, the workstation market could begin to implode. Workstation vendors will be forced to accept PC-like margins on their low-end systems or get out of that market entirely. In either case, the revenue available to invest in new processor development will decline. In the long run, the future of SPARC, PA-RISC, and POWER will depend on their vendors' ability to reposition these processors for new markets—before it's too late. ♦