

A CAHNER'S PUBLICATION

DATAMATION[®]

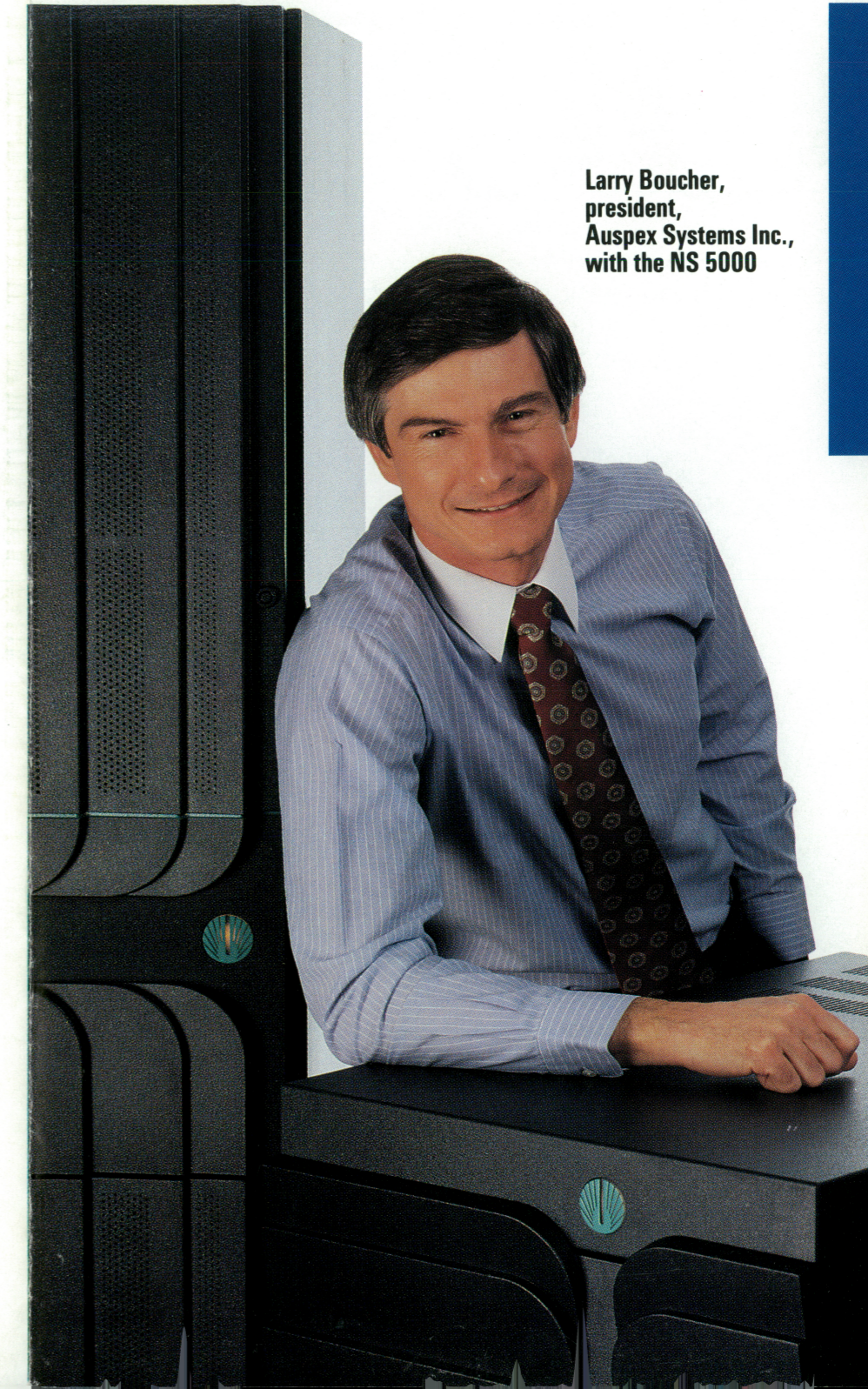
FOR MANAGERS OF INFORMATION TECHNOLOGY WORLDWIDE

MARCH 1, 1991

UNIX Server CLOUT!

page 22

Larry Boucher,
president,
Auspex Systems Inc.,
with the NS 5000



Rewritable Optical
Still Not In Overdrive
page 35

Curing The LAN
Support Blues page 41

Stop Net Faults
Before They Stop You
page 44

Plug Your Customers In
page 49

UNIX Goes On Line
page 53

A PC Gateway
For AS/400s
page 57

page 61

Market Review
PC Accounting
Software

Auspex A Startup, But No Baby

As a company, Auspex Systems Inc. is a recent arrival on the computer scene. It was founded in 1987 and shipped its first server in February 1990. But the firm's management team represents a wealth of industry experience—experience that is decidedly weighted toward a talent for developing data-storage technology.

Chairman Jim Patterson was formerly with IBM and Memorex Telex Corp. President Larry Boucher spent 11 years with IBM, where he developed the original IBM tape-streaming device, and is the author of the Small Systems Computer Interface (SCSI) specification. Together, they have more than 50 years of industry experience. In addition, each has previously started a company: Patterson founded disk-drive maker Quantum Corp. of Milpitas, Calif., now a primary supplier to Apple Computer Inc. Boucher founded and is still chairman of Adaptec Inc., a high-performance disk-controller maker, also in Milpitas. Bob Lux, a 25-year industry veteran, left his job as vice president and general manager of Sun Microsystems Inc.'s Customer Service division to join Auspex.

All this experience has given the company the credibility it needed to attract substantial financial backing. It has garnered more than \$20 million in three separate rounds of venture capital financing. Investors include Fuji Xerox, Mayfield Fund, New Enterprise Associates, Nissho Electronics, Sequoia Capital and Technology Venture Investors. And although there's no telling whether a start-up will still be around when the new century dawns, Auspex's investors have previously made some pretty good picks: Technology Venture backed Adaptec, Microsoft Corp., Seagate Technology and Sun; New Enterprise invested in Silicon Graphics Computer Systems Inc. (SGI) and 3Com Corp.; Sequoia financed LSI Logic Corp. and Pyramid Technology Corp.; and Mayfield funded Quantum, SGI and Mips Computer Systems Inc.

cache memory board called PrestoServe from Legato speeds disk I/O by allowing the server to write to electronic cache instead of mechanical disk. Sun has licensed Legato's technology and is selling PrestoServe; the company is negotiating a similar deal with Interphase.

Despite Sun's reported promises to users that it will beef up server performance, Sun is unwilling to acknowledge publicly any widespread server inadequacy. "There may be users out there who need more NFS throughput," says Stolle. "But it is only the high-performance fringe, I think, who can't get the throughput they need with a Sun server fitted with specialized add-on hardware."

Auspex's Nelson disputes Stolle's assertion. Nelson claims that hardware add-ons only bring the 490 into "the low end of the medium range. We think there are more than just a few users who need 20 or more workstations, four Ethernets and 10GB of storage," he says. Network Systems's Lewandowski concurs: "We aren't a real burner of Sun systems. We only had 20 workstations, and yet performance still stunk."

"Among our customers, everyone seems to have the same problem," he adds. "You add clients, and you have to add servers. As you add servers and associated peripherals, you have to add people to administer the network. It gets to be expensive."

In Sun's Shadow?

Sun isn't disclosing details as to just how it may enhance server performance. Current speculation centers on storage fixes. Some customers say Sun will offer IPI drives with cache buffers. Sun is also believed to be looking at redundant arrays of inexpensive disk (RAID) technology. (See "Relief for Slow Storage Systems, September 1, 1990, p. 22). Sun has even hinted that it will embrace multiprocessing architecture for its family of workstations and servers, but Sun users speculate that when Sun execs talk about multiple processors in a single box, they are talking about symmetric multiprocessing—that is, two or more identical processors performing the same functions concurrently—not Auspex's asymmetric approach of dedicating processors to different I/O functions.

Sun flat out rejects the idea of building a dedicated file server. "The vast majority of our users are using servers for more than just file service," says Stolle, citing database access, compute serving and communications as functions users want to perform on general purpose servers. "Customers want to get the most out of their investment," he says.

Again, Lewandowski differs. "If communications and compute serving and database are what you want, it's fairly easy and cheap to cross-mount a SPARCstation [to run it as a server] to handle those things. What most customers need is more I/O."

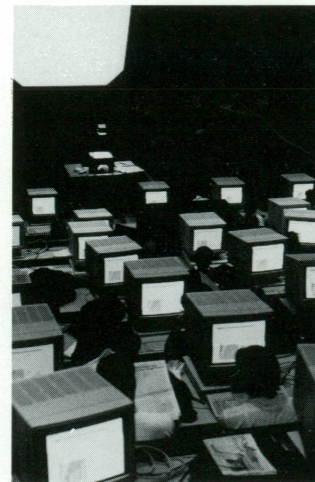
Some analysts believe that specialized servers such as Auspex's are networking's future. "Over the next two years, I expect to see networks increasingly populated by both multifunction servers and by all sorts of application-specific servers," predicts Nili Young, a systems strategist with Meta Group Inc., a

market research firm in Westport, Conn. And Auspex says it plans to be in the thick of this trend toward special purpose servers. For now, its focus is the narrow niche of UNIX file service. But, next year, Auspex plans to announce a server based on Sun's SPARC processor, a move that will enable it to offer compute, database and other services.

Still, although Auspex may be riding the wave of the future, there is no assurance that the company will still be around when the market for superservers reaches its peak. In the computer industry, companies that attack a specific problem with a specialized product are often absorbed by larger players. Already some analysts are fingering Auspex as a likely acquisition candidate.

And who would be a logical acquirer? Why, none other than Sun itself, speculates Peter Galvin, a Sun user who recently acquired two SPARCserver 490s, but who says he'll take a hard look at Auspex for any future network expansion. "Sun and Auspex are carrying on like rivals, but they are actually allies," says Galvin, who manages the computer science network at Brown University in Providence R.I. "Sun might not admit it, but Auspex is greatly helping Sun by lowering the cost per seat of workstations. It's cheaper to go with one Auspex box than multiple 490s," Galvin points out. "It only makes sense for Sun and Auspex to form a strategic alliance. After all, Sun's real competition isn't Auspex; it's IBM and DEC and all the other workstation vendors."

TO CONNECT ITS WORKSTATIONS, Brown University is taking a hard look at Auspex superservers.



David Stamps is a DATAMATION contributing editor.



AUSPEX

The Network Server Company.

Auspex Systems, Inc., 2952 Bunker Hill Lane, Santa Clara, California 95054 USA
Phone: 800/735-3177 • 408/492-0900 • Fax: 408/492-0909 EMail: Info@Auspex.com or uunet!auspex!info

Document #AR001 V1.0 910403

UNIX SERVER CLOUT!

Auspex Systems is smack in the middle of the growing market for superservers that operate as foundations for workstation networks. Some Sun users, faced with I/O bottlenecks and sluggish network performance, are turning to Auspex for relief.

BY DAVID STAMPS

The desktop, these days, is a breeding ground: put a workstation on one user's desk, and a colleague wants another. Workstations are multiplying in the corporate environment like rabbits in the woods. But as workstations proliferate, network performance suffers. And the so-called client/server revolution, a subject of much cheerful speculation in the commercial computing world, but already a reality in the faster moving scientific and engineering arena, only adds to the problem.

In the lab, networks of 100 or more UNIX workstations are commonplace. But users of compute-intensive applications, such as electronics and software design, are finding that scores of powerful workstations can push a network rapidly to the point of diminishing returns.

At Loral/Rolm Mil-Spec Computers in San Jose, file servers were already just barely keeping up with the proliferation of workstations last year when the company began adding fast SPARCstations from Sun Microsystems Inc. of Mountain View, Calif. Then, says engineering IS manager Donald Johnson, "it was no contest." The two Sun file servers—a 4/260 and a 3/260—couldn't keep up with the potent SPARCstations. Network use sank to a dismal 30%.

Nor is the rising tide of ever-faster workstations the only thing gumming up client/server throughput. About 20% of all workstations are sold without disk drives,

says International Data Corp. analyst Crawford DelPrete, and these diskless workstations cry out for large amounts of network-based storage and network bandwidth.

Dave Lewandowski oversees a software development group at Minneapolis-based Network Systems Corp. that installed 20 diskless Suns earlier this year. The advantage of disklessness is obvious to Lewandowski: "They are cheaper, and data backup and administration is vastly simplified when you can handle it automatically on a single file server."

A problem arises, however, when you consider that as much as half of the traffic over a network of diskless clients consists of swapping and routing. (A diskless workstation writes all of its files to remote storage via the server; variations on the diskless model are the "swapful" and "dataless" workstations, which have small built-in disks for some booting and temporary storage of volatile files.) That much swapping and routing reduces by half the number of clients you can add without causing a bottleneck on the network, figures Lewandowski, who calculates that he has to buy a new server for every 20 workstations he adds to the network. "Not an ideal solution," he says.

An Alternative To Sun

With more than 300,000 installed workstations, Sun rules the UNIX roost. But although Sun has done a superb job of bringing low-cost computing power to the desktop, it has not done so well at feeding data to those machines, say critics. For managers who run networks of 50, 60 or more workstations, or who need to split the network into multiple Ethernets, the high-end SPARCserver 490 simply can't handle the needed input/output, contend Lewandowski and Loral/Rolm's Johnson. And they are not alone in their criticism.

Poor server performance is a charge that Sun is not ready to concede. "We have 490s in our own lab running 70 workstations," boasts Carl Stolle, Sun's SPARCserver product line manager. But, say critics, even if you accept that number from Sun, it's probably an upward limit. "If your network is growing rapidly, Sun doesn't show you much in the way of expandability," says Johnson.

So now some Sun customers are turning to a special high-performance file server from a start-up called Auspex Systems Inc. of Santa Clara. Auspex has carefully designed its Network Server (NS) 5000 to deliver throughput of up to 1,100 Network File System (NFS) I/O operations per second—a full five times the performance of Sun's SPARCserver, Auspex claims. And, the company asserts, one of its brawny superservers can support a network of 100 diskless or 200 dataless workstations.

The Auspex server is so well suited to performing file service for such large numbers of users for two reasons, say Auspex execs. First, to keep performance high and contention low, the NS 5000 uses multiple Small Computer Systems Interface (SCSI) channels—10 of them on the base system, each of which optimally supports two disks, says Bruce Nelson, Auspex's director of technology. "What we've done

IN FOCUS

Network Server 5000

Auspex Systems Inc.
Santa Clara
Price: \$115,000 and up

Product Features

■ Separate processors for network, file- and storage-processing

■ Two to eight Ethernet ports

■ 1 to 60GB of formatted disk storage

■ 8mm, 1/4-inch and 1/2-inch tape options

■ 16 to 96MB primary I/O cache memory

■ UNIX compatibility (Ethernet, ONC/NFS, SNMP, Sun OS, TCP/IP and VME)

Source: Company reports/DATAMATION

is provide high-performance disks attached to 10 to 30 channels on a single machine . . . so we can get a good balance between the number of disks and the [number of] channels."

In contrast, Nelson points out, the SPARCserver 490 doesn't use SCSI at all—rather, it employs up to four Intelligent Peripheral Interface (IPI) controller boards per system, each of which handles the I/O of numerous disks.

The advantage of providing so many SCSI channels, Nelson claims, is that, although IPI is great for sequential access, needed for compute-intensive operations, SCSI outperforms IPI when married with random-access protocols such as NFS. "We designed [the NS 5000] to be a file server and not a general purpose or compute server," he says.

Second, in a significant departure from Sun's single-processor architecture, Auspex has adopted an approach it calls Functional Multiprocessing, in which it divides separate server tasks among four to 10 different Motorola 68020-based boards. One processor handles Ethernet protocols using NFS. UNIX file processing is assigned to another processor. Yet another handles disk storage, including disk buffering and control. Finally, a separate processor runs the UNIX operating system and utilities.

This approach is neither new nor unique. One can find similarities in machines going back as far as Seymour Cray's early Control Data Corp. supercomputers in the mid-1960s, Nelson points out. Moreover, mainframe storage vendors have employed multiple channels for years. Not coincidentally, Auspex's founders have storage backgrounds: chairman Jim Patterson was formerly with IBM and Memorex Telex Corp.; president Larry Boucher, also a former IBMer, is author of the SCSI definition.

"It's not that we've done anything that is so radical," says Auspex's Nelson. "It's just that we come from a background that recognizes the importance of I/O. Workstation vendors have been obsessed with MIPS and have neglected I/O."

Nelson and his colleagues at Auspex are not the only ones to recognize the need for file service on the client/server network—nor the significant



THE NS 5000 SUPERSERVER is designed to be a file server star, able to comfortably support 100 workstations.

Key Benefits For IS

■ Five to 10 times the performance of high-performance network file servers

■ Easier data administration and backup than multiple servers

■ Reduces cost per workstation (one NS 5000 replaces several existing file servers)

■ Network expandability

money to be made in this growing business. Cambridge, Mass.-based Forrester Research Inc. predicts that the market for general purpose file servers will grow from \$3.2 billion in 1989 to \$11.7 billion in 1994. And the growth won't only be among scientific and engineering users: many analysts predict that the client/server computing model will supplant the traditional mainframe hierarchy throughout the corporate information structure. As that happens, there will be a corresponding demand for high-performance file, database and compute servers.

Serving The Market

"Already, economics favors the client/server model in many situations," says Dick Bush, Auspex's vice president of marketing. "If you're running 100 workstations, it takes a mainframe costing a \$1 million or more to support those 100 users. That same work group running a dedicated file server and new high-performance workstations can probably get by for half the cost and still have more I/O and more processing power," he claims.

Bush admits that, for now, the mainframe still has an advantage in data administration and management, due to the maturity of mainframe operating systems. But, he says, that advantage will diminish over the next several years as network software grows more robust, allowing file servers to take on more of the data administration role. "Most traditional IS people haven't yet realized that the client/server model is the answer to their development bottlenecks," says Auspex evangelist Nelson. "But that realization will come with time."

Along with Auspex, a handful of companies that believe in the rise of client/server computing are poised to harvest the riches they think are waiting for savvy server marketers. Houston-based Compaq

Computer Corp.; NetFrame Systems Inc. of Milpitas, Calif.; and Tricord Systems Inc. of Minneapolis also sell high-performance servers specially built for the needs of file service in PC LAN environments. Where Auspex is unique is in singling out the rapidly growing UNIX/Ethernet server market—a niche that could represent \$4.3 billion in sales by 1994, or more than a third of the market, according to Forrester Research.

Auspex began shipping its NS 5000 in February 1990. By the end of last year, it had sold about 60 of the \$115,000 servers; customers were evaluating another 10. It also announced the smaller \$90,000 NS 3000 last October.

Although its track record is short, field reports on the NS 5000 are positive. Where network utilization was sputtering at a feeble 30% at Loral/Rolm, it's now up to 90%. And Network Systems's Lewandowski figures an NS 5000 installed in September paid for itself by December. When the company suddenly started a new development project, it had to add another 35 workstations. Rather than buy a Sun 470 server—at about \$80,000—to handle the extra load, the company added 3 gigabytes of disk storage and another Ethernet processor to its existing NS 5000, at a total cost of just under \$35,000. And, Lewandowski maintains, his choice simplified installation and maintenance, and saved space—"all the things that nobody usually thinks about."

Not only does Auspex's box ease users' immediate throughput pain, it marks a clear path for future network growth. A basic NS 5000 supports two Ethernets and 1GB of disk storage but can be upgraded to support eight Ethernets and up to 60GB of disk storage.

This scalability is earning Auspex both attention and sales. Recent Auspex converts include Adobe Systems Inc. in Mountain View, Calif., and LSI Logic Corp. in Milpitas, Calif. And, in an ironic move, AT&T, a 20% shareholder in Sun, installed an NS 5000 at its Bell Labs facility in Whippany, N.J., late last year.

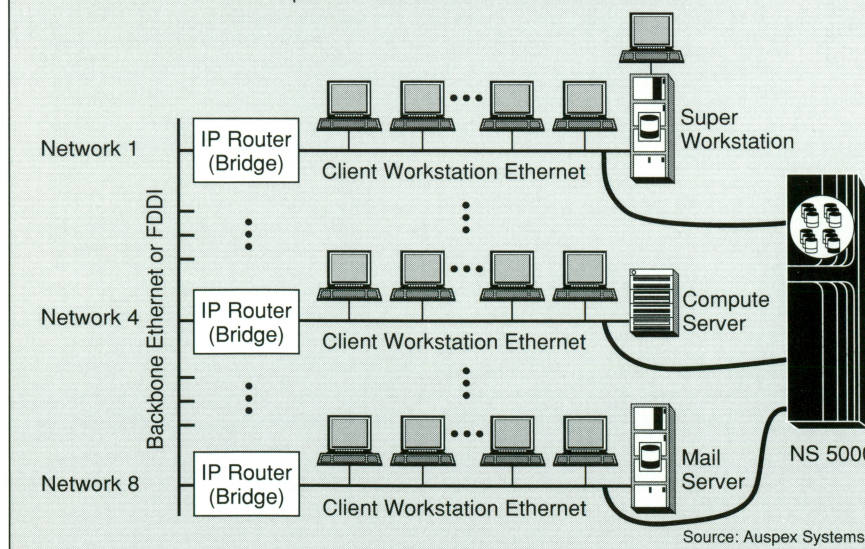
Auspex's success is turning up the heat at Sun. At a user meeting last November, a Sun executive reportedly promised that 1991 will be "the year of the server." Fine and dandy, say Sun users, but if Sun is going to shine on this promise, it must do more than it has so far to solve network bottlenecks.

Performance Stinks

To date, Sun's solution has been to promote third-party add-on products: when Auspex started wooing customers away from the Sun 490 server, Sun sales reps began augmenting the SPARCserver with products from Legato Systems Inc. of Palo Alto and from Omni Solutions of Mountain View, Calif. (purchased by Interphase Inc. of Dallas in September). Omni, now called Interphase, sells a \$7,950 coprocessor to which Ethernet processing can be off-loaded. A \$5,995

How To Serve Multiple Ethernets

Here's one example of how some users are implementing an Auspex NS 5000-based workstation network.



Source: Auspex Systems