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## TWO PIONEER FIRMS OF SUPERCOMPUTING NOW PLAYING CATCH-UP

By Therese Poletti

Supercomputing has shifted over the past decade from an era of big-iron machines to cheaper clusters of smaller, networked machines used to handle the world's biggest computing jobs.

But two industry pioneers, Silicon Graphics of Mountain View and Cray in Seattle, fell behind in the shift, and are now struggling financially.

Silicon Graphics, also known as SGI, was delisted from the New York Stock Exchange on Nov. 7 because its shares languished below \$ 1 for a month. Now relegated to the over-the-counter stock market, SGI in July hired a turnaround company, Altix Partners, to look at options, after six straight years of shrinking sales and red ink. The company even cited the possibility of bankruptcy in a regulatory filing several weeks ago -- although it has since received a \$ 100 million loan and credit line.

Cray of Seattle is losing money amid heavy investment in technology development. Earlier this year, the company laid off 90 employees and imposed temporary pay cuts. Its stock also is trading around \$ 1 and was almost de-listed by Nasdaq for failing to include an auditor's opinion on internal financial controls.

Both companies have rich, colorful and sometimes turbulent histories.

In the mid-1990s, SGI was the darling of Silicon Valley, developing expensive high-performance workstations for Hollywood studios, which used them to create the digital dinosaurs of "Jurassic Park" and the special effects in "Terminator."

Cray traces its roots to the origins of supercomputing. A predecessor company known as Cray Research was founded in 1972 by Seymour Cray, known as the father of supercomputing. SGI bought the business in 1996 to further bolster its presence in high-performance systems. The current company was formed in 2000, after SGI sold Cray Research.

Today, SGI and Cray are playing catch-up. They still develop and market their older proprietary systems, which are made from expensive, custom designs. The market for these big-iron machines is shrinking, while sales of smaller, networked machines made from off-the-shelf parts has taken off.

For example, in SGI's most recent quarter, sales of its older IRIX systems fell 40 percent, while sales of its newer, lower-cost systems grew 33 percent.

"You have really seen a wholesale move away from these custom architectures," said Addison Snell, an analyst with IDC.

Supercomputers are used to do everything from modeling new drugs and finding places to drill for oil to designing better diapers and conducting virtual autopsies. Applications like these are being discussed this week at the industry's annual conference, Supercomputing 2005, in Seattle.

In recent years, national laboratories in the United States began to create their own lower-cost systems, using clusters of computers made from off-the-shelf parts, and running the Linux operating system. The clustering trend was inspired by the success in 1994 of the Beowulf Project, a system developed by two scientists at NASA, using commodity parts.

**Computer makers like IBM, Hewlett-Packard, Sun and Dell jumped on board, developing their own clusters and ultra-thin blade servers to sell to the scientific community. Start-ups have also embraced the trend, such as Penguin Computing in San Francisco, a cluster server developer; Scali,**

**a clustering software maker in Marlborough, Mass; and Panasas in Fremont, a developer of clustered storage systems.**

Corporations also have turned away from proprietary supercomputers to Linux-based servers running widely available chips from Intel or Advanced Micro Devices.

Both SGI and Cray have embraced the trend to lower-cost systems, albeit belatedly. SGI started selling its Altix systems, designed around Intel's Itanium chip, almost three years ago. SGI hopes its expertise in three-dimensional imaging -- for things like crime scene re-enactment or forecasting a hurricane -- can offer a unique advantage over the standard, off-the-shelf servers.

"Our strategy is to try and take advantage of the commoditization where it makes sense, but don't go so far in that direction that you can't compete with Dell and every other putty-colored server," said Greg Estes, SGI's vice president of marketing.

SGI says it is fighting to stay alive.

"The reality is we are here and we are fighting hard," said Estes.

For its part, Cray in 2002 began using AMD's Opteron chips in a system it developed for Sandia National Labs, called Red Storm -- Cray's first foray into using off-the-shelf parts. That system alternates as a boon and a drag for Cray, depending on delivery schedules and government spending cycles.

"One thing we do see with this industry, and one of the challenges, is that it is hooked to government procurement cycles. We will always have things that go up and down," said Virginia Balcom, director of product marketing at Cray. "In a world that looks at quarterly results, we are in a world that needs to look a little longer term than that."

Both SGI and Cray are moving to use chips known as "field programmable gate arrays" (FPGAs), which can be reprogrammed to handle different tasks. Analysts said this is another way to distinguish their offerings from the slew of competitors.

But some wonder if it's too late for the former industry pioneers to catch up in the face of bigger competitors that offer high-performance computers today.

Analysts said that SGI and Cray don't have the wherewithal of companies like IBM and Hewlett-Packard to offset losses on big systems with other more profitable products.

"It's just a problem of size," said Chad Bennett, an analyst with Miller Johnson Steichen Kinnard in Minneapolis. "It's a problem of being exclusively focused on hardware or large hardware systems. The other major players have software segments, or storage or big service operations that somewhat mask the hardware segment."