

# Keeping things cool

By Scott Ferguson

**T**HE RAPIDLY ESCALATING cost of cooling servers has given rise in recent years to the return of water and liquid cooling solutions.

Over the past two years, a number of systems makers, including IBM, Hewlett-Packard and Sun Microsystems, have rolled out offerings that use water as a way of offsetting the jump in data center temperatures caused by the increasing density within the facilities and the powerful processors being used in the servers.

IBM officials continued that trend April 8, when they unveiled the latest Power 575 supercomputer, which uses water instead of air to cool the system. The Power 575, rolled out at an event in San Francisco, is based on the company's Power6 processor, which has a clock speed of 4.7GHz. This meant the company had to find a different way to cool the high-performance computer, which contains 448 processing cores within a single rack.

Instead of using air to cool the system, IBM engineers decided to bring water to each of the individual processors within the system. The machine is set up with a grid overlay, with

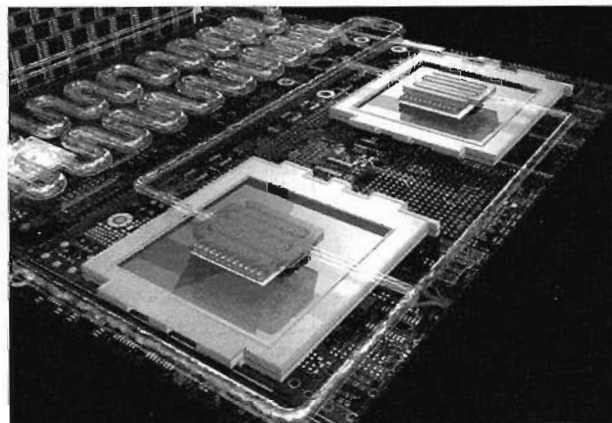
## IBM turns to water for its latest high-powered supercomputer

water-chilled copper plates placed above each processor. This cooling system absorbs the heat and then removes the water and heat from the rack.

When compared with older air-cooled Power systems, IBM claims the new

than just air blowing on it to keep it cool, and that's where this water solution comes in," Clabby said.

Within data centers, he said, many IT professionals and server vendors are exploring ways to use water and other liquids



Scientists at IBM's Zurich Research Lab are working on the future of water cooling, bringing cold water to the hottest part, directly on the chip itself, and then capturing the water at its hottest and piping it off the chip for reuse.

water-cooled Power 575 can help reduce energy consumption within a data center by 40 percent.

Joe Clabby, an analyst with Clabby Analytics, said that when it comes to cooling one system or an entire data center, water is three times more effective than air in removing heat.

"When you have a processor running at that clock rate, and it's running really fast, you need more

instead of air to cut down on heat and reduce the power bill.

IBM officials said the Power 575 supercomputer cooling systems will eventually give way to a new method where a water-cooling system is embedded on the chip itself. Once the heat is captured, the water can be pumped out of the system and reused.

In addition to the cooling system, IBM made sev-

eral improvements to the Power 575 system, which is a significant part of the company's overall high-performance computing division.

The company currently ranks No. 1 on the Top 500 supercomputer list with the Blue Gene/L system at the Department of Energy's Lawrence Livermore National Laboratory.

The current version of that Blue Gene/L system runs at 478.2 teraflops, or 478.2 trillion floating point calculations per second.

The Power 575 system comprises a series of racks that each contain 14, 2U (3.75-inch) nodes that hold 32 Power6 processing cores. Each of the cores runs at 4.7GHz, and each node offers 600 gigaflops (600 billion floating point calculations per second). Each rack also provides 3.5TB of memory.

IBM will sell the Power 575 with either its own AIX operating system—the company's version of a Unix operating system—or with Linux. The system will be available in May. ■

### Phantom

IBM is undertaking a new project aimed at enhancing security in virtualized environments, Brian Prince writes. [it.eweek.com](http://it.eweek.com)