Iceotope Unveils First Modular Liquid-Immersion Cooled Server

Innovative new system able to cut data centre cooling costs by 93%

Supercomputing 2009, Portland Oregon; 17th November 2009: Iceotope (www.iceotope.com) today launched its new liquid-cooled server technology. The system is believed to be the first to use modular "liquid immersion" of the server components and is able to reduce data centre cooling costs by 93%, saving hundreds of thousands of dollars over its lifetime. The technology is being demonstrated for the very first time at the Supercomputing 2009 event in Portland, Oregon (November 17th-19th 2009). The demonstration can be found on Booth 2355.

Operators of traditional air cooled data centres have to spend around 30% or more of their electricity costs on cooling. Running the Computer Room Air Conditioning (CRAC) units and the associated refrigeration plant (chillers) is a huge energy burden, increasing costs and carbon output, yet is necessary to chill the large quantities of cold air that must be blown around the data centre to keep the sensitive components inside the servers cool.

To cool a typical air cooled data centre, running around 1,000 servers, costs in the region of $788,400 over three years. With the Iceotope system, data centre operators can reduce or eliminate the requirement to run the CRAC units and chillers by directly connecting the liquid cooled servers to a recirculating "warm" (rather than chilled) water supply that transfers heat from the servers to the air outside the data centre. Iceotope calls this approach "end to end liquid" cooling. In a data centre in which all servers are cooled this way, the cooling costs can be reduced by as much as 93%, bringing the cost down to only $52,560.

On top of that, by enabling servers to be packed more tightly without compromising the cooling efficiency, the same approach can reduce the space required for the servers by 84% - further reducing costs and making the data centre even more efficient.

"It is increasingly clear that as demand for high-efficiency/high-density data centres increases, a substitute for air cooling is required," said Liam Newcombe, Director Research & Policy at Romonet Limited. "Water is much more efficient in terms of its thermal transfer properties; the main question is how best to couple the water to the servers. Of the different approaches that we have seen, the Iceotope direct liquid immersion seems to have clear benefits in terms of thermal performance and operational management."

The Iceotope "end to end liquid" approach entirely eliminates air in the heat transfer path between server components and the air outside the data centre and replaces it with a series of liquids, including water. Water is already used for heat transport in many data centre facilities, although usually outside of the main server room, as it is around 3500x better than air in this role. With the increase in server power consumption and the increasing demand for server capacity, various attempts have been made to bring water closer to the servers

including “in-rack” water cooling that further chills the air locally to the servers and “component-level” cooling that brings water to the processor via locally-connected “water blocks”.

The Iceotope approach takes liquid – in the form of an inert synthetic coolant, rather than water – directly down to the component level. It does this by immersing the entire contents of each server in a “bath” of coolant within a sealed compartment, creating a cooling module. These cooling modules fit into a chassis, several of which can be mounted in an industry standard 19” data centre rack. The chassis provides each module with electrical power and a connection to a local water circuit which pumps water through channels in the connected modules to remove heat from the closely-coupled (but sealed) motherboard compartment. In effect, each module is a tightly integrated coolant-to-water heat exchanger.

The chassis has a further water-to-water heat exchanger that transfers heat to a “building-level” water circuit, which could be pre-existing or newly installed. The improved thermal efficiency of the earlier stages, due to the replacement of air with liquids, means that this water can be provided at higher temperatures (requiring little or no chilling) and/or in lower volumes than the air in an equivalent air cooled system.

“We have spent 18 months developing this technology in stealth mode, with input from a number of interested customers,” said Dan Chester, CEO of Iceotope. “We are delighted with the results we are able to achieve and are looking forward to demonstrating the system at the Supercomputing event. We believe that we will see a huge growth in the use of liquid-cooled servers as people see the ease with which these systems can be deployed.”

A key advantage of liquid immersion compared to other forms of “component-level” liquid cooling (such as the use of “water blocks”) is that in addition to capturing the heat from the processors the heat from power supplies, sold-state disks, RAM and other chips can be transferred efficiently; this is important as less than 50% of the heat produced by a server may come from the processors themselves.

Iceotope will be demonstrating its solution on Booth 2355 at the Supercomputing event in Portland Oregon from 17th-19th November.

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About Iceotope Limited
Iceotope was founded in 2005 to develop the concepts of liquid immersion cooling for server computing. Following Venture Capital investment in early 2008 the company has developed solutions for the modern, high density, free-cooled data centre.

Iceotope manufactures servers using its modular liquid immersion and end to end liquid cooling technologies, which it sells in certain markets. Iceotope also licenses its technology to other server and data centre equipment manufacturers.

For more information about Iceotope please visit www.iceotope.com