



Comment Article

360°IT – Dawn of a cool new age?

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Received wisdom has it water and datacentres don't mix. Water-cooling was a necessary evil in the age of the mainframe, but these days our dear little servers are perfectly capable of being cooled by the merest draft - probably along with a whiff of air freshener at the same time - right?

Unfortunately, the boffins at Intel and AMD have been struggling a bit. I remember an Intel event where one very senior person said something along the lines of: "We do have one small problem... If we continue the way we are going, by 2015 the core temperature of a CPU will be greater than the surface of the sun."

Okay, so this was a while ago and the silicon engineers have been beaver away to try and ensure that fateful day is postponed for a few more years yet. Even so, it's true equipment densities have been increasing, and hot spots getting hotter, faster than we have been able to deal with them. Mass air cooling is becoming not only less effective, but a major energy cost - and if we end up with a high-cost, low-effective system, surely something's wrong?

So water is back in the running, so to speak. Rear-door heat exchangers (where the heat from air cooling is withdrawn through a water-cooled heat exchanger placed across the back of an equipment rack) can be pretty effective in many cases, but are probably just a stop-gap solution. IBM, though, has been working on something with the Swiss Federal Institute of Technology (ETH Zurich) that looks rather more promising.

Called Aquasar, the co-project has been launched in a blade-based supercomputer at ETH Zurich and the results seem impressive. The computer is a biggie (6 teraflops) and churns out a lot of heat. Some is still removed via air cooling, but Aquasar uses micro-channel copper heat exchangers that fit over the CPUs. These little blocks plug into a self-sealing water back distribution bus. Not only does this prevent any leakage, but it also makes it possible to swap out

blades as necessary without any tricky plumbing work.

It's a contained system - high purity water is used to ensure there are no deposits within the micro-channels and no reaction between impurities in the water and the copper. The inlet water temperature can be as high as 60°C - which then results in an outlet temperature of over 80°C. This outlet water can be used to help meet ETH Zurich's water heating needs.

The system avoids one of the problems with moving heat around from high-volume air cooling systems - the fact that, without further treatment (which can invalidate any savings) the outlet temperature is only suitable for space heating. That's of little use in warm climates, where spaces need to be cooled not heated. Every organisation, however, tends to need hot water.

So will you see water cooling in a computer near you soon? Several high-performance, overclocked desktop systems are already using contained water cooling systems, and rear-door cooling has had some success in the market. So far, Aquasar has only been used in the one supercomputer - but it could easily be brought into the mainstream IBM BladeCenter product line.

And for IT service providers and others operating at the highest density levels, water cooling not only does the job required but may also enable the sale of excess high-quality heat to the surrounding community. So adopters can both recover a portion of their costs and reduce the organisation's carbon footprint. Sounds like a runner to me.

About Quocirca

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Through researching perceptions, Quocirca uncovers the real hurdles to technology adoption – the personal and political aspects of an organisation’s environment and the pressures of the need for demonstrable business value in any implementation. This capability to uncover and report back on the end-user perceptions in the market enables Quocirca to advise on the realities of technology adoption, not the promises.

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