

Intel, SGI test 3M fluids for cooling effects

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(Phys.org) —One area where engineering expertise is always appreciated is in operating the modern-day data center; finding improved cooling techniques for today's powerful servers is one such challenge inviting good ideas. Intel and SGI have been testing the waters, or more accurately, fluids, to explore what could be a more efficient cooling system for computers. The companies, in collaboration with 3M, have been testing a supercomputer cooled by submerging the electronics in special fluids from 3M.

With data center operations in mind, success could result in a dramatic

reduction in energy bills. In a proof of concept announced this week, the SGI ICE[®] X distributed memory supercomputer and Intel Xeon processor E5-2600 hardware were placed in 3M's specially designed liquid called[®] Novec Engineered Fluid. 3M calls its technology approach two-phase immersion [cooling](#) where racks are submerged in the fluids, described by 3M as nonflammable, of non-ozone-depleting materials. According to 3M's promotional video, the Novec technique can reduce cooling energy costs by 95 percent compared to conventional air cooling. The benefits point to several data-center advantages: less floor space required, as the technique was shown to require ten times less space, and reduced dependence on municipal water for cooling, to name a few.

According to a *PCWorld* report by Agam Shah Tuesday on the SGI and Intel project, Michael Patterson, senior power and thermal architect at Intel, said the technology does have the potential to slash data-center [energy bills](#) by more than 90 percent, but he was also aware of challenges posed, including a redesign of motherboards and servers.

"Servers have historically been designed to maximize the flow of air over components, and immersion [cooling](#) is a very different concept," wrote Shah. "On today's motherboards, circuits are laid out just the right distance apart to maximize heat dissipation. With Novec, circuits could be packed together much more tightly, but redesigning servers is a big undertaking."

The Tuesday press release, meanwhile, said the companies will continue on this exploratory path, working with the Naval Research Laboratory, Lawrence Berkeley National Labs and APC by Schneider Electric to evaluate an identical system. The intention is to demonstrate the technology's viability "at any scale."

This would not be the first time Intel explored immersion technologies. In 2012 Intel tested Green Revolution Cooling's mineral-oil

server-[immersion](#) technology. Running data centers optimally and containing power consumption are concerns not likely to fade away any time soon. "As the backbone of the data economy, modern data centers must increase the raw performance they deliver, but also do so efficiently by containing power consumption and operating costs," said Charles Wuishpard, vice president, [data center](#) group and general manager, Workstation and High Performance Computing at Intel.

More information: www.sgi.com/company_info/newsroom/immersioncooling.html

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