

**3M, SGI and Intel Showcase Advanced Cooling Technology for
the “Data Center of the Future”**

*3M demonstrates two-phase immersion cooling technology to reduce water consumption
and energy use, while increasing supercomputer efficiency*

St. Paul, Minn. – April 8, 2014 – As the growth of the Internet of Things spikes so does the growth of data traffic in the cloud, which requires data centers to deliver more performance and storage with less energy consumption. Today, 3M is announcing the implementation of a fully functional supercomputer developed in collaboration with Intel and SGI that uses a revolutionary two-phase immersion cooling technology pioneered by 3M.

In this proof-of-concept, SGI[®] ICE[™] X, the fifth generation of the world’s fastest distributed memory supercomputer and the Intel[®] Xeon[®] processor E5-2600 hardware are placed directly into 3M[™] Novec[™] Engineered Fluid. The 3M Novec fluid is an efficient dielectric that keeps the hardware cooled with minimum additional energy, maximum performance and better reliability. 3M’s two-phase immersion cooling technology can reduce cooling energy costs by 95 percent and reduces water consumption by eliminating municipal water usage for evaporative cooling. Heat can also be harvested from the system and reused for heating and other process technologies such as desalination of sea water.

This technique has been shown to require 10 times less space than conventional air cooling and eliminates costly air cooling infrastructure and equipment associated with conventional liquid cooling, making it cost effective for large-scale data center hubs. It enables much tighter component packaging – allowing for greater computing power in less space – and easy access to hardware with no residue. In fact, the system can enable up to 100 kilowatts of computing power per square meter.

This innovative technology leads to a smaller environmental footprint with optimal computing power – important factors as the world approaches Earth Day 2014.

SGI’s industry standard high performance computing technology, coupled with Intel’s energy efficient processors, complement 3M’s ground-breaking immersion cooling technology that significantly reduces energy and water use and sets the stage for the future of data centers.

“We are thrilled with the work that our collaboration with SGI and Intel has produced,” said Joe Koch, business director for 3M Electronics Markets Materials Division. “We applaud them for their leadership in helping us find better ways to address energy efficiency, space constraints and increased computing power in data centers. These advancements are a significant stepping stone in accelerating industry wide collaboration to optimize computer hardware design.”

In the “data center of the future” the SGI ICE X system can scale seamlessly from tens of teraflops to tens of petaflops, and across technology generations, while maintaining uninterrupted production workflow. The system enables tighter component packaging and scalability, helping reduce the system footprint. It minimizes system overhead and communication bottlenecks that can inhibit efficiency and scalability for a wide range of applications and customer needs.

“Through this collaboration with Intel and 3M, we are able to demonstrate a proof-of-concept showcasing an extremely innovative capability to reduce energy use in data centers, while optimizing performance,” said Jorge Titinger, president and CEO of SGI. “Built entirely on industry-standard hardware and software components, the SGI ICE X solution enables significant decreases in energy requirements for customers, lowering total cost of ownership and impact on the environment. We are delighted to work with Intel and 3M on this demonstration to illustrate the potential to further reduce energy in data centers, something imperative as we move to a more data intensive world.”

“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. “Intel is continually innovating and improving microprocessor technologies to meet today’s datacenter demands and is working with companies like 3M and SGI to explore advanced cooling technologies that improve energy efficiency in datacenters while also containing operating costs.”

By investing in advanced cooling technologies, companies such as Intel and SGI can explore hardware designs without the heat transfer constraints of traditional cooling, while being more affordable and less complex to build and operate. This installation is designed to prove the viability of the two-phase immersion technology using Novec fluids, and to validate open and future proof platform designs.

In-depth data acquisition and evaluation of the installation will kick off in April. Additionally, the companies are working with the Naval Research Laboratory, Lawrence Berkeley National Labs and APC by Schneider Electric to deploy and evaluate an identical system with the intention to demonstrate the viability of the technology at any scale.

About 3M

3M captures the spark of new ideas and transforms them into thousands of ingenious products. Our culture of creative collaboration inspires a never-ending stream of powerful technologies that make life better. 3M is the innovation company that never stops inventing. With \$31 billion in sales, 3M employs 89,000 people worldwide and has operations in more than 70 countries. For more information, visit www.3M.com or follow @3MNews on Twitter.

About SGI

SGI, the trusted leader in high performance computing, is focused on helping customers solve their most demanding business and technology challenges by delivering technical computing, Big Data analytics, cloud computing, and petascale storage solutions that accelerate time to discovery, innovation, and profitability. Visit sgi.com (sgi.com/) for more information.

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About Intel

Intel (NASDAQ: INTC) is a world leader in computing innovation. The company designs and builds the essential technologies that serve as the foundation for the world's computing devices. Additional information about Intel is available at newsroom.intel.com and blogs.intel.com.

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Contacts:

Colleen Harris
3M
651-733-1566

Stephani Simon
Inprela Communications
612-677-2021

From:

3M Public Relations and Corporate Communications
3M Center, Building 225-1S-15
St. Paul, MN 55144-1000