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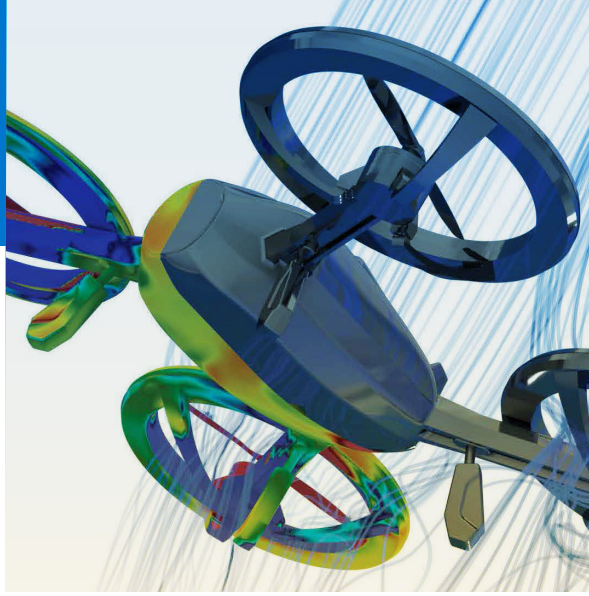

Pitzer Cluster

Ohio Supercomputer Center rolls out its most efficient supercomputer system.

Ohio Supercomputer Center
An OH·TECH Consortium Member

Research | United States

Business needs

The Ohio Supercomputer Center needed a next-generation high-performance computing cluster to enable academic and industrial research.

Solutions at a glance

- Dell EMC PowerEdge™ servers
- Intel® Xeon® Scalable 6148, 20C, 3.6 GHz Processors
- Mellanox EDR InfiniBand networking

Business results

- Accelerating computer-intensive research workloads
- Reducing energy consumption and costs compared to earlier systems

The theoretical peak performance of the Pitzer Cluster is about

1.3
petaflops

The Pitzer Cluster will arm the Ohio research community with the power of

10,560
cores

A service-driven mission

The Ohio Supercomputer Center (OSC) provides supercomputing services, cyberinfrastructure, research and educational resources to a diverse community of state and national users, including universities and industries in Ohio. The center strives to empower its clients with powerful research tools, to partner strategically to develop new research and business opportunities, and to lead Ohio's knowledge economy.

To carry out this service-driven mission, OSC operates leading-edge high-performance computing (HPC) systems that help researchers accelerate discovery and innovation. That's the case with the center's newest and most efficient Dell EMC supercomputer system, the liquid-cooled Pitzer Cluster.

The Pitzer Cluster

Named for Russell M. Pitzer, a co-founder of OSC and emeritus professor of chemistry at The Ohio State University, the Pitzer Cluster is designed to power a wide range of research, from understanding the human genome to mapping the global spread of viruses. This type of research requires an enormous amount of computational power — like that of the Pitzer Cluster.

The theoretical peak performance of the cluster is about 1.3 petaflops, meaning it is capable of performing 1.3 quadrillion calculations per second. In other words, to match the potential of what the Pitzer Cluster could do in just one second, a single person would have to perform one calculation every second for 41 million years (or 41,195,394.5 years, to be exact). The cluster also can achieve seven petaflops of theoretical peak performance for mixed-precision artificial intelligence (AI) workloads.

The Pitzer Cluster features 260 nodes, including Dell EMC PowerEdge™ C6420 servers with CoolIT Systems' Direct Contact Liquid Cooling (DCLC) coupled with Dell EMC PowerEdge R740 servers. The cluster includes 528 Intel® Xeon® Gold 6148 processors and 64 GPUs, all connected with EDR InfiniBand networking. In all, the system has 10,560 compute cores.

The use of CoolIT's modular, rack-based DCLC solution allows for increased rack densities, higher component performance potential and better energy efficiency.

As a result, the Pitzer Cluster offers nearly as much performance as the center's most powerful cluster but requires less power and takes up less than half the space, according to David Hudak, executive director of OSC.

"The Pitzer Cluster follows the long-running HPC trend of higher performance in a smaller footprint," Hudak says. "This valuable new addition to our data center allows OSC to continue addressing the growing computational, storage and analysis needs of our client communities in academia, science and industry."

Capitalizing on Pitzer

Scientists, engineers, clinicians and students from throughout Ohio and points beyond can now put the Pitzer Cluster to work to accelerate academic and industrial research. The supercomputer is built for the challenges of modeling, simulation, machine learning, deep learning and more in natural sciences, engineering and technology, and social sciences.

Across the board, the Pitzer Cluster is ready for the extremely diverse types of research that OSC facilitates — from studies of disease resistance in crops and aircraft crash-worthiness to genetic mutations and precision medicine.

Much of this research focuses on very real and tangible problems. For example, teams of researchers use OSC resources to study harmful algal blooms in Lake Erie.

"These teams collect data in the field and ship it back to OSC for analysis via a statewide high-speed network called OARnet," Hudak says. "The results of these studies are combined with other information to help local officials cope with water-quality decisions when the algal blooms peak, assist statewide leaders develop policy initiatives addressing the long-term impact of the blooms, and provide insights to researchers developing future lines of investigation."

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David Hudak
Executive Director of OSC

In another a particularly impactful research initiative, a researcher at Ohio State University used mapping software on an HPC cluster to process data from an earthquake in Nepal and provide the results to earthquake relief teams in the form of high-quality maps. These maps gave relief teams information about where to find people and deliver aid.

Industrial users also make heavy use of OSC's resources. For example, some companies come to OSC when they want to extend their modeling and simulation needs beyond the capabilities on their desktop systems.

"OSC has an industrial engagement program called AweSim," Hudak says. "For AweSim simulations, companies such as NASCAR come to us and we help them scale their problems and their codes to run on our clusters. And then they can run larger-scale, finer-grained, longer-term analyses than they could do with desktops."

Working with Dell EMC

The Pitzer Cluster builds on an established relationship between OSC and Dell EMC. In 2016 and 2017, OSC worked with Dell EMC on the design and deployment of the center's Owens Cluster, a 23,392-core system based on Dell EMC PowerEdge servers with Intel Xeon processors.

"OSC went with Dell EMC for its last two major clusters because of the variety of technology partners that they can bring to the table, the integrated solutions they can deliver, the price of the system and the support they provide," Hudak says. "They provide excellent value and terrific support."

The bottom line? "OSC is very grateful for what Dell EMC has been able to provide in our last two major acquisitions," Hudak says. "And we look forward to seeing what they come up with next."

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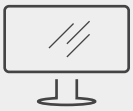

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