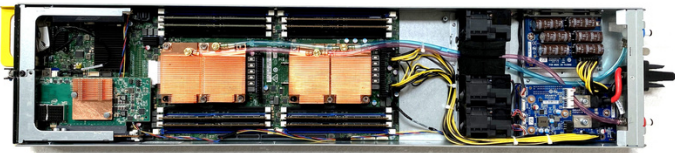


## MANZANO SUPERCOMPUTER



The supercomputer at Sandia National Laboratories with the under-floor automatic failover valves that enable the system's N+1 smart redundancy to maximize uptime.



Fans in each node provide primary cooling for low-power components and redundant cooling for CPUs.

Sandia National Labs deployed Manzano supercomputer at their Albuquerque HPC data center with Chillydyne's negative pressure liquid cooling system. Chillydyne's cooling solution reduces the computer system's energy use without risk of leaks.

The new supercomputer maximizes speed, reliability and sustainability - serving vital research needs while establishing new standards for sustainable data center design.

- Initially ranked #69 on Top500 list
- 1488 Skylake nodes
- 82% heat capture at the server.
- Cooling water: 72°F (22°C)
- Return: 102°F (39°C)
- PUE: 1.016 with thermosyphon facility cooling

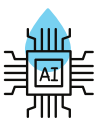
### TECHNICAL SPECIFICATIONS

- **Site:** Sandia National Laboratories/NNSA CTS-1 MANZANO
- **Manufacturer:** Penguin Computing
- **Cores:** 71,424
- **Processor:** Xeon Platinum 8268 24C 2.9GHz
- **Interconnect:** Intel Omni-Path
- **Power:** 960 kW
- **Power Measurement Level:** 2
- **Linpack Performance (Rmax):** 4.28 PFlop/s
- **Theoretical Peak (Rpeak):** 6.63 PFlop/s
- **Nmax:** 5,491,968
- **Nhalf:** 5,184,000
- **HPCG [TFlop/s]:** 40.2875



#### LEAK-PROOF LIQUID COOLING

Negative pressure system



#### DIRECT-TO-CHIP

CPU Temperatures below 60°C



#### FAIL-SAFE & REDUNDANT DESIGN

N+1 CDUs with backup air cooling



#### SUSTAINABLE SOLUTION

450 tons of CO2 reduction annually

Chillydyne's innovative negative pressure technology creates a vacuum to circulate water by pulling it through the cooling system. This approach removes the need for costly, heavy-duty plumbing to the racks, ensures easy setup and upkeep, and eliminates leaks in a system with no single point of failure.