

SUMMIT: Scaling New Heights

The Oak Ridge Leadership Computing Facility (OLCF), a US Department of Energy Office of Science User Facility at Oak Ridge National Laboratory, provides access to the nation's fastest supercomputer to address some of the grand challenges of our time and enable scientific breakthroughs in many areas of science and engineering.

In 2018, the OLCF launched Summit, the latest leap in leadership-class computing systems for open science. The IBM AC922 system offers scientists 200 petaflops of performance—200 million billion calculations per second. That's about eight times the performance of Summit's predecessor, the Titan supercomputer, and a substantial step toward the nation's first exascale machine, a system capable of a billion billion calculations per second.

Leading the Way

Summit allows researchers to add much more complexity to their codes than past systems, enabling simulations of greater resolution and higher fidelity to advance human knowledge in science domains as diverse as biology, nuclear science, and cosmology. Some exciting Summit research projects include:

- Studying exploding stars at unprecedented scales
- Simulating particle turbulence in sustainable fusion reactions
- Researching materials for high-temperature superconductors
- Carrying out fluid dynamics simulations to accelerate combustion science

An AI Supercomputer

In addition to modeling and simulation, Summit offers researchers unparalleled opportunities for the integration of artificial intelligence (AI) and scientific discovery. Applying AI techniques like machine learning and deep learning to automate, accelerate, and drive understanding at supercomputer scales will help scientists achieve breakthroughs in human health, energy, and engineering and answer fundamental questions about the universe.

"The computational speed of Summit is helping us simulate the evolution of the structures in the universe we observe with very large telescopes."

Katrin Heitmann, Summit User and Physicist
Argonne National Laboratory



200

Number of petaflops supplied by Summit

4,608

Number of Summit nodes

185

Miles of fiber-optic cable installed in Summit

250

Petabytes of data storage provided by Summit's file system

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