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AMD 1067
Advanced Micro Devices v. Fermat Int'l
IPR2026-00360

"It has been basic United States policy that Government should foster the opening of new frontiers. It opened the seas to clipper ships and furnished land for pioneers. Although these frontiers have more or less disappeared, the frontier of science remains."

Vannevar Bush, "Science, The Endless Frontier" — 1945

EXASCALE IN AMERICA

Exascale is the next level of computing performance. By solving calculations five times faster than today's top supercomputers—exceeding a quintillion, or 10^{18}, calculations per second—Frontier will enable scientists to develop new technologies for energy, medicine, and materials.

WATCH VIDEO

SCIENTIFIC IMPACT

AMITAVA BHATTACHARJEE
Princeton Plasma Physics Laboratory

WDMApp Principal Investigator, Exascale Computing Project

"Fusion energy could one day be a transformative energy source, because it wil cheap, and nearly unlimited, with sea water supplying its basic fuel. A whole computer model can offer insights about the plasma processes that go on in tl device and predictions regarding the performance and optimization of nex experimental facilities. Using Frontier, we will be able to add new capabilitie whole-device model, including the effects of the plasma boundary, the effects products, the influence of sources of heating, and the superimposed engine structure that would make a fusion reactor operate as a unit."

Read Full Q&A

DANNY PEREZ
Los Alamos National Laboratory

EXAALT Principal Investigator, Exascale Computing Project

"Studying materials at exascale could have a significant impact on our world, l materials show up everywhere in the economy. Using a combination of adv methods and scalable codes on Frontier, we'll be able to perform simulatior potential millionfold increases in our time scales. We'll also be able to do one comparisons with experiments and make better predictions about the evolutio systems."

Read Full Q&A

JACQUELINE CHEN
Sandia National Laboratori

Combustion-Pele Principal Investigator, Exascale

"Combustion systems are projected to dominate the ener come. One engine concept—a low-temperature, reactiv ignition engine—has the potential to deliver groundbrea percent while reducing emissions. On Frontier, we ant simulations with machine learning and A.I. to model the promising engine."

PIONEERING OPEN SCIENCE

Delivered in 2021 and open for early operations in 2022, Frontier is accelerating innovation in science and technology and maintaining US leadership in high-performance computing and artificial intelligence. Frontier users will model the entire lifespan of a nuclear reactor, uncover disease genetics, and build on recent developments in science and technology to further integrate artificial intelligence with data analytics and modeling and simulation.

The system is based on HPE Cray's new EX architecture and slingshot interconnect with optimized 3rd Gen AMD EPYC CPUs for HPC and AI, and AMD Instinct 250X accelerators.

SYSTEM SPECS	TITAN	SUMMIT	FRONTIER
Peak Performance	27 PF	200 PF	1.6 EF
Cabinets	200	256	74
Node	1 AMD Opteron CPU 1 NVIDIA K20X Kepler GPU	2 IBM POWER9™ CPUs 6 NVIDIA Volta GPUs	1 HPC and AI Optimized 3rd Gen AMD EPYC CPU 4 Purpose Built AMD Instinct 250X GPUs
CPU-GPU Interconnect	PCI Gen2	NVLINK Coherent memory across the node	AMD Infinity Fabric
System Interconnect	Gemini	2x Mellanox EDR 100G InfiniBand Non-Blocking Fat-Tree	Multiple Slingshot NICs providing 100 GB/s network bandwidth. Slingshot network which provides adaptive routing, congestion management and quality of service.
Storage	32 PB, 1 TB/s, Lustre Filesystem	250 PB, 2.5 TB/s, GPFS™	2-4x performance and capacity of Summit's I/O subsystem. Frontier will have near node storage like Summit.

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