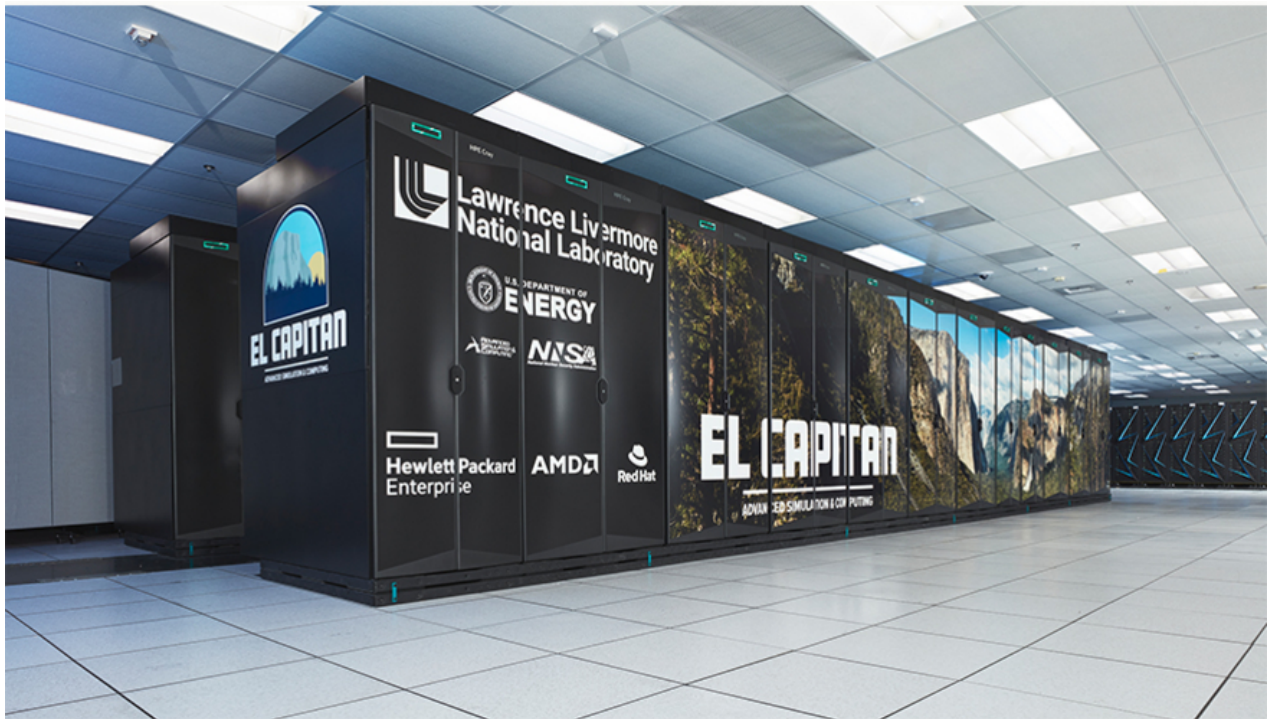


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## El Capitan reigns supreme across three major supercomputing benchmarks



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Lawrence Livermore National Laboratory's flagship exascale machine El Capitan maintained its status as the fastest supercomputer on the planet — claiming the No. 1 spot on not just one, but three of the most prestigious high-performance computing rankings. (Photo: Garry McLeod/LLNL)

**Lawrence Livermore National Laboratory's** (LLNL) flagship exascale machine El Capitan maintained its status as the fastest supercomputer on the planet — claiming the No. 1 spot on not just one, but three of the most prestigious high-performance computing (HPC) rankings.

In the 65th edition of the **TOP500 List**, released June 10 at the ISC High Performance conference in Hamburg, Germany, El Capitan reasserted its position as the world's most powerful supercomputer, repeating its 1.742 exaFLOP performance on the industry-standard High-Performance Linpack (HPL) benchmark.

The ranking reaffirmed the United States' and Department of Energy's dominance in HPC, which includes Oak Ridge National Laboratory's Frontier (No. 2) and Argonne National Laboratory's Aurora (No. 3). All three DOE systems remain the only supercomputers in the world to be verified at exascale — machines capable of reaching more than a quintillion calculations per second — on the benchmark.

For the first time, El Capitan also topped the High-Performance Conjugate Gradient (HPCG) benchmark, achieving 17.41 petaFLOPS — a complementary performance metric that reflects the complex, memory-intensive workloads typical in real-world science and engineering applications. Additionally, El Capitan debuted at No. 1 on the HPL-MxP (formerly HPL-AI) benchmark, with a stunning 16.7 exaFLOPS of performance using mixed-precision AI techniques.

Funded by the National Nuclear Security Administration's (NNSA) Advanced Simulation and Computing program, El Capitan supports the Stockpile Stewardship Program and NNSA's mission of ensuring the nation's nuclear deterrent is safe, secure and reliable. It performs critical calculations and modeling and simulation tasks for the NNSA Tri-Labs: LLNL, Los Alamos and Sandia National Laboratories.

“This isn't just a win for Livermore — it's a win for national security, the NNSA enterprise and the future of AI-assisted scientific discovery,” said Bronis R. de Supinski, chief technology officer for Livermore Computing. “El Capitan is delivering exactly as designed: fast, flexible and optimized for the world's most demanding workloads.”

Built by **Hewlett Packard Enterprise (HPE)** and powered by **AMD** Instinct MI300A APUs (Accelerated Processing Units), El Capitan **became** the third DOE supercomputer to break the exascale barrier in Nov. 2024 and remains the fastest system ever benchmarked.

Boasting more than 11 million cores and over 44,000 APUs, El Capitan also delivers 58.9 gigaFLOPS (GFs)/watt of energy efficiency — earning the 26<sup>th</sup> spot on the latest **GREEN500 List** of most energy-efficient systems worldwide and a TOP500 “honorable mention,” along with ORNL's Frontier, for demonstrating the ability to “achieve immense computational power while also prioritizing energy efficiency.” LLNL's rzAdams was the highest-ranked DOE supercomputer on the GREEN500 (15<sup>th</sup>) at 62.8 GFs/watt.

Tuolumne, an unclassified companion system to El Capitan, also maintained its status among the world's elite systems. Built by HPE and comprised of the same AMD Instinct MI300A APUs as El Capitan, Tuolumne is now ranked No. 12 on the TOP500 and is a

crucial platform for open science applications, including AI-assisted fusion research, materials science, earthquake modeling and drug discovery.

In addition to El Capitan and Tuolumne, a dozen other LLNL systems earned spots on the June 2025 TOP500 list, emphasizing the Lab's broad, powerful computing ecosystem and continuing legacy of excellence in HPC.

The list includes machines Sierra (No. 20), rzAdams (63) and Lassen (88), along with computing clusters Bengal (187), Dane (189), Ruby (310), Magma (348), Jade (454) and Quartz (455). Three El Capitan early-access systems are also listed under LLNL's banner: rzVernal (231), Tioga (257) and Tenaya (337).

Together, LLNL's 14 systems on the TOP500 — more than any other site — reflect LLNL's unmatched depth in HPC, from next-generation exascale platforms to workhorse machines critical for national security, AI research and scientific discovery.

June 16, 2025

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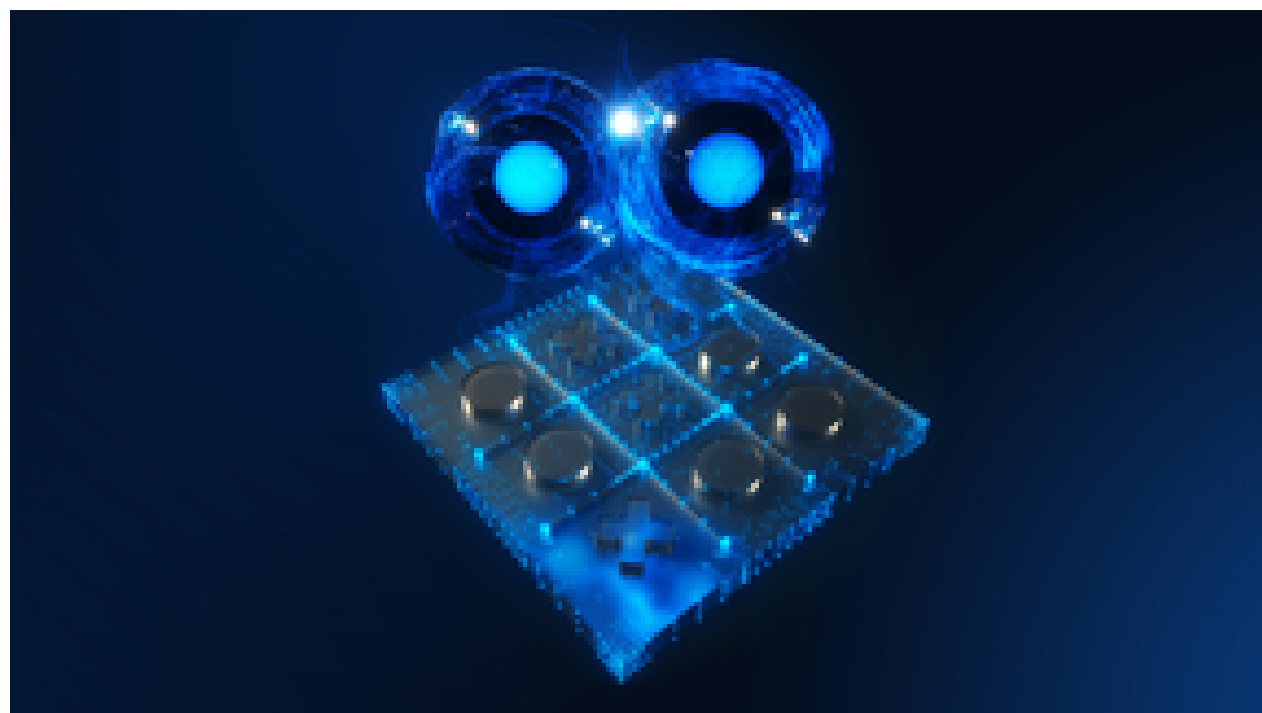
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