Adastra' new AMD MI300A based partition ranked #3 on Green500 is already serving AI and HPC workloads

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GENCI's supercomputer Adastra, built by by Hewlett Packard Enterprise (HPE) and operated by CINES in Montpellier, France, has been successfully upgraded this summer with a new partition based on the AMD MI300A APU. The first delivered nodes of this extension have been ranked #3 on the latest edition of the Green500, with a performance of 69.1 GF/W, as announced on November 18th during the SC24 conference in Atlanta.

This first extension, named Adastra2, consists of an HPE Cray Supercomputing EX4000 system. Each node is equipped with 4 APUs, which combine CPUs, GPUs, and high-bandwidth memory (512 GB HBM3 @ 5.3 TB/s) in a single package, along with 4 HPE Slingshot interconnect 200 Gb/s links. Adastra2 currently houses a total of 112 APUs, delivering a peak performance of 6,8PFlops (FP64). To optimize overall energy consumption, the solution features 100% fanless direct liquid cooling provided by HPE, which cools 97% of the generated heat via warm water.

Adastra2 is fully integrated with Adastra, an HPE Cray Supercomputing EX4000 system installed two years ago, which includes over 104,000 AMD Zen4 CPUs and 1,424 AMD Instinct MI250x GPUs. These components are federated by HPE Slingshot interconnect and a tiered storage infrastructure.

Like Adastra, this new partition is freely available for open research to academia and industry, addressing major challenges in climate research, new energies, material development, biology and personalized medicine. All these fields will benefit from the compute performance of Adastra2, to achieve better performance at a reduced energy cost for numerical simulation and artificial intelligence.

Focus on AI: only two weeks after its installation, Adastra2 was used during a so-called « Grand Challenge » to set up and train a 3-billion parameter efficient multilingual large language model (LLM) with a new and optimized encoder-only architecture. This project, led by Pierre Colombo (Centrale Supelec) and his team, received an allocation of 200,000 APU hours.

Focus on HPC: A CFD project, led by CORIA, aimed to finalize the porting of YALES2, a popular platform for two-phase combustion from primary atomization to pollutant prediction on massive complex meshes, to GPUs. This porting, which began on MI250x GPUs, is now facilitated by the design of the MI300A APU. Unified memory, free data transfer, impressive HPC performance and excellent energy efficiency are the keys to succeed in this project.

“In the long lasting journey to high level performance simulations at the service of science and research, Adastra plays now a very important role in HPC and AI converged national strategies, just offering very promising future scientific achievements in the societal challenges like health, new energies, LLMs for sciences or climate modeling. This top ranking in the Green500 confirms that the development of this APU partition with direct liquid cooling meets our expectations, combining computational performance and energy efficiency in HPC and AI. It motivates us to continue on our path toward a more responsible and sustainable digital future” said jointly Michel Robert Director of Cines and Philippe Lavocat Chair and CEO of GENCI.

“We are proud to continue our collaboration with GENCI, which is focused on advancing France’s sovereign AI initiatives to accelerate scientific discovery and innovation with cutting-edge high performance computing solutions,” said Damien Declat, Go To Market, Supercomputing HPC & AI, EMEA & LATAM at HPE. “The expansion to Adastra delivers significant performance and scale for AI while achieving leadership energy efficiency, using the HPE Cray Supercomputing EX system which is based on 100% fanless direct liquid cooling architecture. We look forward to the ongoing contributions that GENCI and its users will make with Adastra in powering breakthrough science and tackling critical societal challenges like climate modeling, personalized medicine, and renewable energy development.”

"AMD and GENCI have developed a strong strategic partnership including collaboration with our Instinct™ GPU accelerators,” says Travis Karr, corporate vice president, Data Center GPU Business, AMD. “We are pleased to see the ADASTRA2 system delivers outstanding performance, serving as a powerful resource for both academic and industry

users in AI and HPC. AMD is dedicated to providing best-in-class technology to support our partners' success and drive innovation."

About

GENCI

Created by the French public authorities in 2007, GENCI (Grand Équipement National de Calcul Intensif) is a major research infrastructure. This public operator aims to democratise the use of digital simulation through high performance computing associated with the use of artificial intelligence, and quantum computing to support French scientific and industrial competitiveness.
GENCI is in charge of three missions:

- To implement the national strategy for the provision of high-performance computing resources, storage, massive data processing associated with Artificial Intelligence technologies and quantum computing, for the benefit of French scientific research, in conjunction with the 3 national computing centres (CEA/TGCC, CNRS/IDRIS, France Universités/CINES).
- Supporting the creation of an integrated ecosystem on a national and European level
- Promoting digital simulation and supercomputing to academic research and industry

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Regarding the national quantum strategy GENCI is partner together with CEA and Inria of HQI, the French HPC hybrid Quantum Initiative.
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