



NVIDIA GPU-Accelerated Supercomputer Sets World Record for Energy Efficiency

Italy's Top Supercomputing Center Leapfrogs Current Green500 No. 1 System Using Kepler Accelerators, Liquid Cooling

SANTA CLARA, CA -- Italy's "Eurora" supercomputer -- which uses [NVIDIA® Tesla® GPU accelerators](#) based on [NVIDIA Kepler™](#), the world's fastest and most efficient high performance computing (HPC) architecture -- has set a new record for data center energy efficiency, NVIDIA today announced.

The Eurora supercomputer, built by [Eurotech](#) and deployed Wednesday at the [Cineca](#) facility in Bologna, Italy, the country's most powerful supercomputing center, reached 3,150 megaflops per watt of sustained performance⁽¹⁾ -- a mark 26 percent higher than the top system on the most recent [Green500](#) list of the world's most efficient supercomputers.⁽²⁾

Eurora broke the record by combining 128 high-performance, energy-efficient NVIDIA Tesla K20 accelerators with the Eurotech Aurora Tigon supercomputer, featuring innovative Aurora Hot Water Cooling technology, which uses direct hot water cooling on all electronic and electrical components of the HPC system.

Available to members of the [Partnership for Advanced Computing in Europe \(PRACE\)](#) and major Italian research entities, Eurora will enable scientists to advance research and discovery across a range of scientific disciplines, including material science, astrophysics, life sciences and Earth sciences.

"Advanced computer simulations that enable scientists to discover new phenomena and test hypotheses require massive amounts of performance, which can consume a lot of power," said Sanzio Bassini, director of HPC department at Cineca. "Equipped with the ultra-efficient Aurora system and NVIDIA GPU accelerators, Eurora will give European researchers the computing muscle to study all types of physical and biological systems, while allowing us to keep data center power consumption and costs in check."

Pairing [NVIDIA Tesla K20 GPUs](#) with Eurotech's Aurora Hot Water Cooling technology, the Eurora system is more efficient and compact than conventional air-cooled solutions. HPC systems based on the Eurora hardware architecture, including the Eurotech Aurora Tigon, enable data centers to potentially reduce energy bills by up to 50 percent and reduce total cost of ownership by 30-50 percent.⁽³⁾

In addition, the use of Aurora Hot Water Cooling technology reduces or eliminates the need for air conditioning in typically warm climates like Italy. The thermal energy the system produces can be used to heat buildings, drive adsorption chillers for air conditioning or generate tri-generation, the combined production of electricity, heating and cooling.

"GPU accelerators are inherently more energy efficient than CPUs, and Tesla K20 accelerators widen this gap considerably," said Sumit Gupta, general manager of the Tesla accelerated computing business at NVIDIA. "Energy efficiency has become the defining element of computing performance. And GPUs enable data center computer systems of all sizes -- from small clusters to future exascale-class systems -- to achieve performance goals within an economically feasible energy budget."

Eurora is a prototype system developed for Cineca under the PRACE 2IP initiative to provide a sustainable, high-quality infrastructure to meet the most demanding needs of the European HPC user community. A commercial version of the Eurotech Aurora Tigon supercomputer is also available today from Eurotech. More information is available on the [Eurotech website](#).

About NVIDIA Tesla GPUs

NVIDIA Tesla GPUs are massively parallel accelerators based on the [NVIDIA CUDA® parallel computing platform](#) and programming model. Tesla GPUs are designed from the ground up for power-efficient, high performance computing, computational science and supercomputing, delivering dramatically higher application acceleration for a range of scientific and commercial applications than a CPU-only approach.

To learn more about CUDA or download the latest version, visit the [CUDA website](#). Additional product information is available on the [NVIDIA Tesla website](#). Follow us on Twitter at [@NVIDIATesla](#).

About NVIDIA

[NVIDIA](#) (NASDAQ: NVDA) awakened the world to computer graphics when it invented the [GPU](#) in 1999. Today, its [processors](#) power a broad range of products from [smartphones](#) to [supercomputers](#). NVIDIA's [mobile processors](#) are used in [cell phones](#), [tablets](#) and [auto infotainment systems](#). [PC gamers](#) rely on GPUs to enjoy spectacularly immersive worlds. Professionals use them to create [3D graphics](#) and visual effects in movies and to design everything from golf clubs to jumbo

jets. And researchers utilize GPUs to advance the frontiers of science with [high performance computing](#). The company has more than 5,000 patents issued, allowed or filed, including ones covering ideas essential to modern computing. For more information, see www.nvidia.com.

- (1) System configuration: 64 Aurora Tigon nodes system; 2 x Intel Xeon E5-2687W and 2 x NVIDIA K20 GPU accelerators per node; Energy measurements followed the same procedure as specified by Green500 guidelines, and were taken on a calibrated power meter with the system running a customized version of LINPACK.
- (2) Compared to the Beacon system National Institute for Computational Sciences/University of Tennessee at 2,499 megaflops/watt. Source: <http://green500.org/lists/green201211>
- (3) Based on a comparison between air cooled and liquid cooled medium-sized data centers with 1,800 server nodes, each with double Intel Xeon E5-2670 2.6 GHz processors.

Certain statements in this press release including, but not limited to, statements as to: the impact and benefits of NVIDIA Tesla GPU accelerators; and the effects of the company's patents on modern computing are forward-looking statements that are subject to risks and uncertainties that could cause results to be materially different than expectations. Important factors that could cause actual results to differ materially include: global economic conditions; our reliance on third parties to manufacture, assemble, package and test our products; the impact of technological development and competition; development of new products and technologies or enhancements to our existing product and technologies; market acceptance of our products or our partners products; design, manufacturing or software defects; changes in consumer preferences or demands; changes in industry standards and interfaces; unexpected loss of performance of our products or technologies when integrated into systems; as well as other factors detailed from time to time in the reports NVIDIA files with the Securities and Exchange Commission, or SEC, including its Form 10-Q for the fiscal period ended October 28, 2012. Copies of reports filed with the SEC are posted on the company's website and are available from NVIDIA without charge. These forward-looking statements are not guarantees of future performance and speak only as of the date hereof, and, except as required by law, NVIDIA disclaims any obligation to update these forward-looking statements to reflect future events or circumstances.

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