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Europe taps Nvidia for ARM-based supercomputer

By Jack Clark, 14 November 2011 17:00

NEWS A pan-European research initative has picked Nvidia's ARM-based processors as the foundation for an experimental low-power supercomputer architecture.

The Mont-Blanc Project, which is developing an energy-efficient exascale computing architecture via a consortium of European technology companies, has chosen Nvidia's Tegra 3 CPUs[http://www.zdnet.co.uk/news/financials/2011/05/13/nvidia-earnings-lift-off-with-tegra-growth-40092768/] and Cuda-capable Tesla GPUs for a pilot research system, Nvidia said on Monday. Nvidia believes that this is the first ARM-based system[http://www.zdnet.co.uk/news/processors/2011/10/28/arm-preps-server-push-with-64-bit-architecture-40094308/] of its kind to be announced.

"In most current systems, CPUs alone consume the lion's share of the energy, often 40 percent or more," Alex Ramirez, leader of the Mont-Blanc project, said in an Nvidia statement. "By comparison, the Mont-Blanc architecture will rely on energy-efficient compute accelerators and ARM processors used in embedded and mobile devices to achieve a four-to-ten-times increase in energy efficiency by 2014."

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Cuda is an Nvidia-developed architecture[http://www.zdnet.co.uk/news/application-development/2010/10/26/nvidia-looks-to-the-future-of-gpu-computing-40090520/] that gives developers more tools to play with when chaining multiple GPUs together to work in parallel on large-scale computations, such as the simulation of dynamic systems. Nvidia's Tegra 3 Kal-el[http://www.zdnet.co.uk/news/processors/2011/09/21/nvidia-powers-down-kal-el-with-fifth-core-40093990/] processors are based on ARM's Cortex-A9 chip designs.

The Nvidia chips will go into a pilot system that aims to be capable of 50 petaflops of processing capacity, at levels three-to-five times as efficient as any publicly disclosed supercomputer operating in 2011.

The Mont-Blanc project[http://www.montblanc-project.eu/] is being led by the Barcelona Supercomputing Centre [http://www.bsc.es/]. The scheme has three main objectives: to design an exascale computer that uses 15-to-30 times relatively less energy than an exascale computer built with today's technologies; to base some of this computer on embedded rather than dedicated processors; and to develop applications that can get the most out of massively parallel exascale computers.

Intel has its own exascale endeavour with roughly equal goals[http://www.zdnet.co.uk/news/emerging-tech/2011/09/16/intel-targets-exascale-computing-with-new-technologies-40093957/] — a computer capable of an exaflop by the end of the decade that consumes around 20MW of power. However Intel's scheme is wholly based around its own x86 chips.

Eurocentric technology

The scheme places emphasis on European companies. Its key technical partners are ARM for the processors; Bull SAS for systems integration, design and assembly; and Gnodal for the interconnects. Researchers from four of the Partnership for Advanced Computing in Europe's (PRACE)[http://www.zdnet.co.uk/news/emerging-tech/2010/06/10/europes-prace-hpc-grid-aims-for-exaflop-power-by-2019-40089201/] key supercomputing centres will work on the scheme as well.

The Mont-Blanc scheme has a total project cost of €14.5m (£12.4m), started on 1 October and is expected to run till 30 September, 2014. €8.11m of the scheme's funding came from the €780m warchest of the EU's Seventh Framework Programme [http://www.zdnet.co.uk/news/business-of-it/2010/09/29/commission-seeks-bids-for-780m-of-it-funding-40090336/].