Volvo Cars Leverages Ansys and NVIDIA GPUs to Accelerate CFD Simulations by 2.5x for the EX90 Electric Vehicle

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Ansys solutions on NVIDIA hardware enable more optimization studies, critical to increasing EV range

/ Key Highlights

- Ansys Fluent® fluid simulation software delivers high-fidelity computational fluid dynamics (CFD) models that are critical for designing next-generation, energy-efficient vehicles
- Leveraging just eight NVIDIA Blackwell GPUs, Ansys accelerated solver speed by 2.5X when compared to the same simulation run on 2,016 CPU cores and cost-equivalent hardware
- Using Ansys simulation to reduce aerodynamic drag, customers can design battery electric vehicles (BEVs) that are more performant and travel farther on a single charge

PITTSBURGH, March 18, 2025 /PRNewswire/ -- Ansys (NASDAQ: ANSS) today announced a significant breakthrough in aerodynamics simulations in collaboration with Volvo Cars and NVIDIA. Using the combination of eight NVIDIA Blackwell GPUs for the solver and CPU cores for meshing, the companies reduced total simulation run time from 24 hours to 6.5 — enabling multiple design iterations per day, facilitating more optimization studies for BEVs, and accelerating time-to-market. This collaboration sets a benchmark for the automotive industry and those beyond that require precise fluid flow simulation, including aerospace, motorsports, and consumer electronics.

Volvo Cars relies on advanced computing and CFD to drive innovation and improve electric battery performance. Robust simulations are critical for reducing aerodynamic drag — a significant factor on EV range. However, high-fidelity CFD simulations can be time consuming, compute-intensive, costly, and allow little opportunity for optimization.

To improve the energy efficiency and drive range of the fully electric EX90, Volvo Cars and Ansys scaled Fluent to eight NVIDIA Blackwell GPUs, enabling an optimized end-to-end workflow wherein meshing only took one hour and the solver took 5.5 hours. Compared to solving the same simulation on cost-equivalent hardware using 2,016 CPU cores, this equates to a 2.5X speed increase in solve time. The technology combination can allow Volvo Cars to run multiple CFD simulations per day, evaluating a range of design variants to quickly enable a step change in design optimization.

"Using Ansys simulation has the potential to help our teams obtain favorable designs and carry out virtual testing in much less time than traditional approaches allow," said Torbjörn Virdung, technical leader CFD, at Volvo Cars. "To make our products more efficient, we must first take stock of the tools and solutions we're using to get there. In this case, the capability of Ansys Fluent can allow us not only to perform extremely high-fidelity analyses, but the added NVIDIA infrastructure supercharges the computation, so we can consider a greater number of design possibilities and reach an optimal car design faster."

This accelerated process has the potential to further help Volvo Cars meet critical emissions, range, and efficiency standards, such as Worldwide Harmonized Light Vehicles Test Procedure (WLTP) requirements.

"This breakthrough underscores how GPU-accelerated simulation can drive innovation and get products to market faster," said Shane Emswiler, senior vice president of products at Ansys. "The combination of high-fidelity modeling and extreme solver speed empowers customers to run more simulations and maximize the results to develop more performant products."

"The efforts of Ansys and Volvo Cars showcase the exceptional performance and scalability of our latest Blackwell infrastructure offerings and its applicability to engineering simulation," said Tim Costa, senior director of CAE, EDA and quantum at NVIDIA. "Together with software partners like Ansys, we are paving the way for the future of computer-aided engineering and scaling to unprecedented heights, empowering our customers to solve their most complex challenges."

Visit Ansys at NVIDIA GTC in San Jose, CA March 18-21, Booth #224 to learn more about its advanced physics solvers and see exciting demonstrations.

/ About Ansys

Our Mission: Powering Innovation that Drives Human Advancement™

When visionary companies need to know how their world-changing ideas will perform, they close the gap between design and reality with Ansys simulation. For more than 50 years, Ansys software has enabled innovators across industries to push boundaries by using the predictive power of simulation. From sustainable transportation to advanced semiconductors, from satellite systems to life-saving medical devices, the next great leaps in human advancement will be powered by Ansys.

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