DALLARA
Driving faster, smarter, more efficient sportscar design.

Racecar manufacturer Dallara accelerates the performance of its crucial computer-aided design and engineering tools with a powerful new supercomputer from Lenovo.

Lenovo

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Dallara designs, produces and develops chassis for racecars, and provides consultancy services for road car companies. Dallara has also launched its own road car. Renowned for its racing pedigree, the company works with some of the world's leading car companies, including Alfa Romeo, Audi, Bugatti, Ferrari, Lamborghini and Maserati. Dallara also produces the sportscars used by the Formula 3, IndyCar, Indy Lights, Formula 2, GP3, Super Formula, Formula E, WEC, ELMS and IMSA racing championships. Headquartered in Varano de' Melegari, Italy, Dallara employs around 650 people.

From conception to implementation, all Dallara components are designed and manufactured to the highest standards of quality and innovation.

Fabrizio Arbucci, ICT Manager at Dallara, explains: "Our motto is 'the pursuit of excellence', and it's something that we take very seriously. We are always looking to make our cars faster and safer."

Dallara's core competencies include: design and production with a specific focus on the use of carbon fiber composite materials; aerodynamics by means of wind tunnel and computational fluid dynamics (CFD); vehicle dynamics through simulations and testing; and the fast and flexible production of high quality prototypes.

Dallara's designers and engineers work closely together at every stage of the design process, harnessing the latest 3D modeling, structural analysis, CFD, finite element analysis (FEA) and vehicle dynamic driving simulations, as well as research center and wind tunnel resources to help create state-of-the-art sportscars.

"The use of simulation is very important in our company life," says Fabrizio Arbucci. "Simulations support the aerodynamic development of racing and road cars, from the earliest concept phase to wind tunnel testing. CFD allows us to simulate physical conditions that are difficult, if not impossible, to reproduce in a classic wind tunnel.

"One example is the study of the thermal analysis. Thermal analysis helps us study variables from the cooling of brakes, to the heat under the bonnet of road cars, to acoustic aerodynamics, to the comfort analysis of standard vehicles."

With demand for CFD and FEA increasing, Dallara decided to invest in a high-performance computing (HPC) infrastructure that it could use to run compute-intensive CFD and computer-aided design and engineering workloads. The company also wanted to implement a virtual desktop infrastructure (VDI) environment to power designers' workstations.

After evaluating offerings from several vendors, Dallara chose to partner with Lenovo. Fabrizio Arbucci recalls: "Lenovo came out on top when we considered the performance, availability, reliability, efficiency and cost of the solutions on offer. We were also very impressed with their Lab Services offering, as they designed an HPC solution that met all our unique needs."

Working with a team from Lenovo Professional Services and two local tech partners, Dallara implemented a NeXtScale cluster, powered by high-performance Intel® Xeon® processors, and a software-defined storage solution based on DataCore SANsymphony running on Lenovo servers. The company then implemented ten additional Lenovo servers as the foundation for its VDI environment.

Fabrizio Arbucci notes: "Lenovo delivered all the hardware really quickly, so we were able to get the HPC and VDI solutions up and running within a few months of signing the contract. The Lenovo Professional Services team helped us to install and configure the systems to meet our specific requirements."

With its new HPC environment in place, Dallara can run highly complex CFD and FEA simulations and 3D models much faster than was previously possible.

"We can now run CFD models with 300 million cells in just 2.5 hours," says Fabrizio Arbucci. "Before, it used to take five hours, so it's a huge improvement. We are now able to perform one particular wake simulation with 1.25 billion cells in 12 hours. We can also now run several simulations simultaneously, so different teams and departments don't need to wait to run their analyses."

Dallara's new VDI environment is also helping designers and engineers to work more efficiently. "There's no more waiting around for graphics-heavy applications and files to load," states Fabrizio Arbucci. "All the processing is done at the server level rather than at the client level, so users always get a reliable workstation experience – even if they log on from a laptop. This has unlocked a whole new level of mobility, enabling designers to work remotely.

"What's more, we can now spin up a virtual machine for a new employee in just five minutes, rather than having to spend a couple of days building and setting up a traditional desktop."

Looking to the future, Dallara is planning to run HPC workloads on its VDI environment at night. Fabrizio Arbucci elaborates: "When employees have gone home for the day and aren't using their workstations, we want to run CFD and FEA simulations on the VDI cluster to take full advantage of the considerable compute power we have at our disposal. It's one of the reasons we selected Lenovo technology."

He concludes: "Today, we can run more CFD and FEA simulations in a shorter space of time and have significantly improved workstation flexibility, security and performance. Lenovo technology powers the tools we need to continue our pursuit of excellence."

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– Fabrizio Arbucci, ICT Manager, Dallara

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