Automotive

Building a car without compromise

Dallara

Revving up 6-times faster analytics workloads with Lenovo HPC solutions, powered by 3rd Gen Intel® Xeon® Scalable processors, to bring a car from drawing board to racing track in less than a year.

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Lenovo

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Who is Dallara?

Dallara designs, produces, and develops chassis for racecars and provides consultancy services for road car companies. Renowned for its racing pedigree, the company works with some of the biggest names in the automotive world, including Alfa Romeo, Audi, Bugatti, Ferrari, Lamborghini, and Maserati. It also produces the sportscars used by major racing championships worldwide. Headquartered in Varano de' Melegari in Northern Italy, Dallara employs around 750 people.

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The Challenge

Dallara has been developing some of the fastest and safest cars on Earth for more than 50 years. Today, most of that design and development work is done digitally, supported by computational fluid dynamics (CFD) and computer-aided design and engineering software. With such simulations, Dallara can discover how a car will perform when different components are changed and fine-tune its designs to make even better models.

These workloads are incredibly demanding, with CFD in particular producing highly complex, graphically intense 3D models. Dallara needs serious compute power to run these workloads efficiently. That's why, since 2019, the company has powered design and development with a Lenovo high-performance computing (HPC) infrastructure, rounded out by an extensive virtual desktop infrastructure (VDI).

But racing is all about pushing faster and further to reach new limits. And to keep pace with the relentless drive of innovation, Dallara needs ever-more-powerful computing resources. As it geared up to introduce an all-new model: the Dallara EXP, the racetrack version of its flagship Stradale road car, the company decided to expand its HPC infrastructure to a new peak of performance and efficiency, so it could bring this next-generation model to the track in less time.

“There is a huge amount that goes into developing cars at this level. We rely on heavy-duty simulation and analysis tools, and supporting this complexity of calculation requires very powerful hardware.”

Elisa Serioli
Senior Aerodynamic CFD Engineer, Dallara

Accelerating engineering

Working with Lenovo, Dallara implemented a new HPC cluster, consisting of 142 Lenovo ThinkSystem SR630 V2 nodes and eight Lenovo ThinkSystem SR650 V2 nodes. The Lenovo servers feature 3rd Gen Intel® Xeon® Scalable processors.

In parallel, Dallara introduced a storage subsystem based on the Lenovo Distributed Storage Solution for IBM Spectrum Scale (DSS-G), along with a high-performance Lenovo ThinkSystem DE6000H Hybrid Storage Array. The storage and compute systems are connected via a 1Gb Ethernet management network, a 25Gb Ethernet high-speed internal network, and a 100Gb InfiniBand high-speed low latency network, all based on NVIDIA-Mellanox switches.

Hardware

Lenovo ThinkSystem SR650 V2 powered by 3rd Gen Intel® Xeon® Scalable processors
Lenovo ThinkSystem SR630 V2 powered by 3rd Gen Intel® Xeon® Scalable processors
Lenovo ThinkSystem DE Series
Lenovo Distributed Storage Solution for IBM Spectrum Scale (DSS-G)

Software

IBM Spectrum Scale

The company used the Lenovo-Intel HPC infrastructure to drive the design, development, and testing for the new Dallara EXP. In a first for Dallara, the company performed all aerodynamics modeling on the new racing car design virtually, contributing to a faster, more cost-effective development cycle. Marking another milestone, Dallara was able to draw on the cluster's extreme performance to simulate an 800-million-cell model, corresponding to a complete car, for the first time ever.

After eight months of intense virtual development, and a one-month production process, the company unveiled its very first state-of-the-art Dallara EXP model. With a top speed of 180mph, the racecar has already been beating pole-position lap times of GT3 competition cars in early tests—and soon, it will be ready to hit top racing circuits around the world.

“We are always looking to make our cars faster and safer. Lenovo technology gives us the dependable, high-performing platform we need to deliver on this vision.”

Elisa Serioli
Senior Aerodynamic CFD Engineer, Dallara

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Results

Dallara credits much of the accelerated design, development, and testing process to its Lenovo HPC infrastructure. The new cluster has delivered a six-times improvement in performance for critical design and engineering workloads.[1] Likewise, the robust storage backend has delivered all-important scale and speed to help Dallara process and store ever-rising volumes of information in a highly effective way.

These performance and efficiency gains mean that Dallara can run ever-more-complex simulations and produce more iterations of highly detailed designs in less time. With efficient virtual resources doing the heavy lifting, the company is less reliant on more expensive and time-consuming physical testing. Ultimately, this drives down the cost and time required to develop world-class car designs without compromising on performance or safety—keeping Dallara at the leading edge of innovation.

- **6x improved compute performance**
- **Ran 800-million-cell CFD model in hours**
- **9 months to bring new racecar into production**

[1] Data provided by Dallara

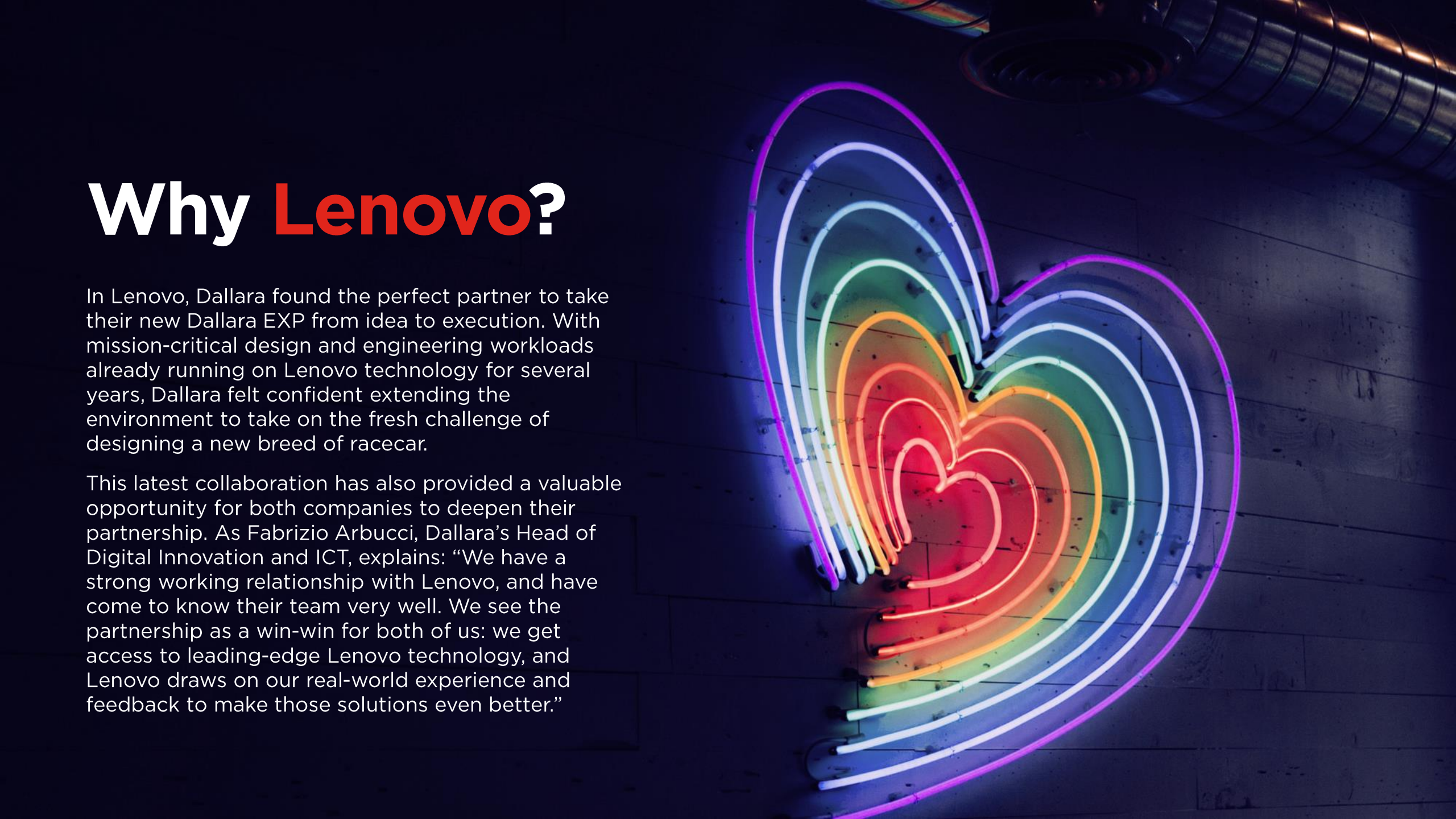
“Fulfilling our vision to create the EXP would be impossible without Lenovo and Intel technology. Today, we look forward to the future and dream even bigger with no limits, at the speed of technology.”

Andrea Pontremoli
CEO, Dallara

Why Lenovo?

In Lenovo, Dallara found the perfect partner to take their new Dallara EXP from idea to execution. With mission-critical design and engineering workloads already running on Lenovo technology for several years, Dallara felt confident extending the environment to take on the fresh challenge of designing a new breed of racecar.

This latest collaboration has also provided a valuable opportunity for both companies to deepen their partnership. As Fabrizio Arbucci, Dallara's Head of Digital Innovation and ICT, explains: "We have a strong working relationship with Lenovo, and have come to know their team very well. We see the partnership as a win-win for both of us: we get access to leading-edge Lenovo technology, and Lenovo draws on our real-world experience and feedback to make those solutions even better."



How do you bring a new racecar into production in just nine months?

Accelerating cutting-edge design and development work with Lenovo and Intel® technology.

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