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DUCATI MOTOR HOLDING

Revving up R&D capabilities to drive the next generation of motorbikes.

Becoming a champion superbike racer requires skill, fearlessness and an ultra-dynamic motorbike designed with supreme precision. To provide a fast, reliable, and safe riding experience on and off the racetrack, Ducati Motor Holding subjects its motorbike designs to rigorous stress tests as well as fluid dynamics and aerodynamics simulations: a process powered by a Lenovo high-performance computing cluster that helps drive rapid innovation.

Lenovo





Ducati CTO Konstantin Kostenarov

Famous for its stylish, sophisticated and powerful bikes, Ducati has won multiple superbike championships around the world. The company is continually looking for innovative ways to make its vehicles faster, safer and even more attractive.

To ensure that its bikes offer riders high speeds, versatile handling and reliable safety, Ducati engineers examine every aspect of their motorbike designs in intense detail. These testing and quality control processes generate vast amounts of data, which is why Ducati operates its own dedicated high-performance computing (HPC) cluster.

Konstantin Kostenarov, Chief Technology Officer at Ducati, explains: “Our HPC environment is the engine that drives the development and design of our road and racing bikes.

“We use advanced aerodynamic and fluid dynamic modeling tools to calculate how a particular design or bike feature will react in different riding conditions. We don’t just do this for the superbikes that we sponsor on the racecourse, but for our road models too, so all bikers that choose Ducati enjoy an exceptional riding experience.”

Recently, Ducati found that its HPC infrastructure no longer delivered the performance, reliability or flexibility that its engineers needed in order to test new designs within tight deadlines. What’s more, the company’s legacy cluster did not provide in-built data visualization capabilities—adding drag to the company’s testing workflows.

Stefano Rendina, IT Manager at Ducati, elaborates: “Previously, we had to transfer the results of our models and stress tests from the HPC environment and then use an entirely different workstation to transform this data into easy-to-understand visualizations. The process of transferring data in this way was both time-intensive and expensive—slowing down research and development.”

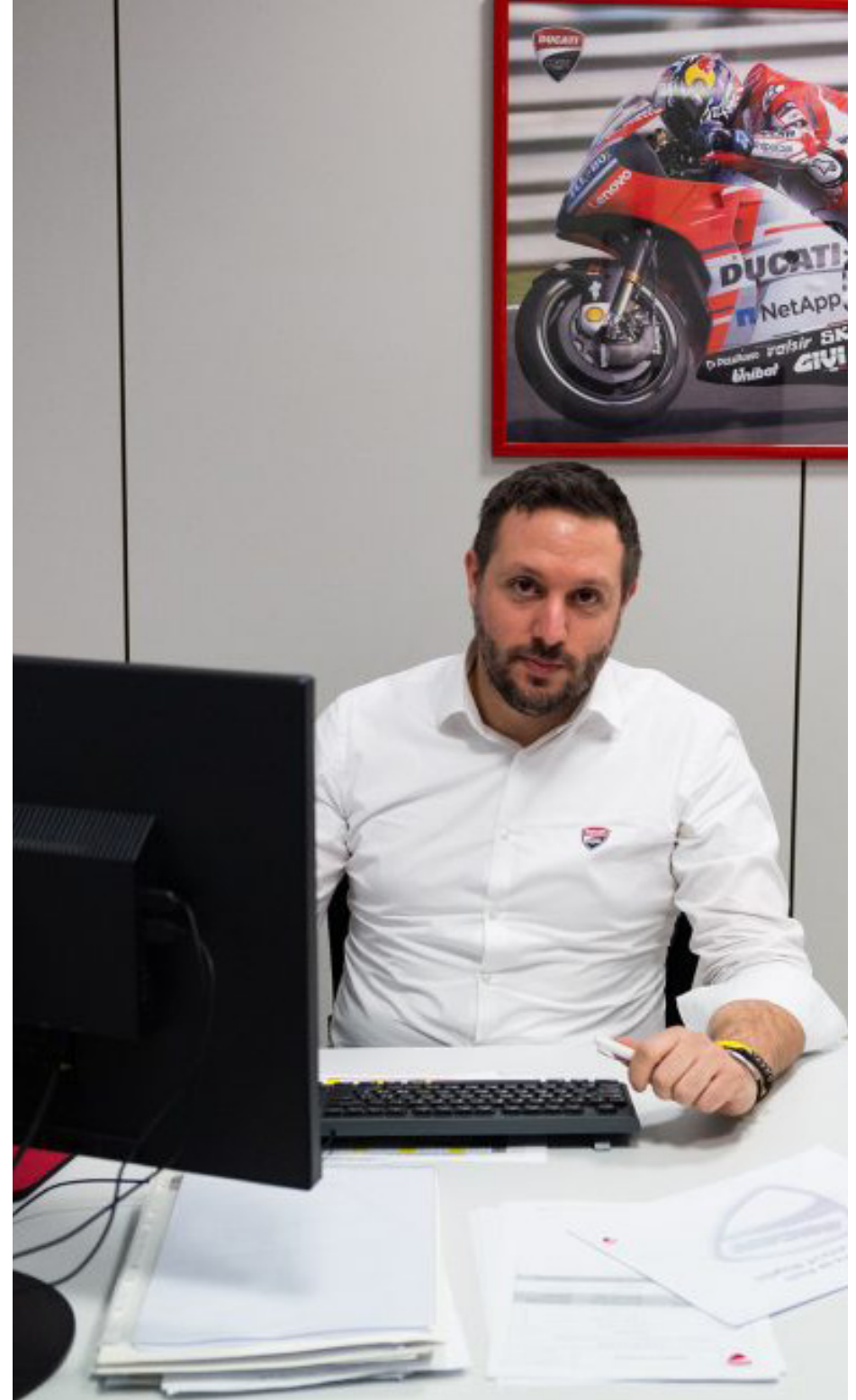
Ducati knew that generating aerodynamics, fluid dynamics and stress-testing visualizations from within its HPC environment would enable its engineers to innovate faster and more efficiently. As part of a broader technology refresh Ducati was undertaking to enhance its ability to restore their system in the event of a recovery scenario, the company decided to deploy a new HPC platform as well.

Stefano Rendina remarks: “We must be able to ensure business continuity, no matter what twists and turns lie in the road ahead.”

Ducati put several major vendors through their paces in the search for a powerful new HPC infrastructure.

“Our key requirement was being able to integrate data visualization capabilities within our HPC environment,” recalls Konstantin Kostenarov. “While many vendors offered strong standalone visualization technology, we felt that only Lenovo could deliver it as part of a robust, all-in-one HPC platform.

“What’s more, we were confident that Lenovo could deliver the high performance levels and security features that we needed. Crucially, it was clear that the Lenovo team wasn’t just trying to sell us a solution—they were keen to form a strategic partnership.”



Ducati Corse IT Manager Stefano Rendina

Ducati worked closely with Lenovo to design and implement a best-of-breed HPC cluster based on Lenovo ThinkSystem SD530, SR630 and SR650 servers, equipped with latest generation Intel® Xeon® Scalable processors and NVIDIA Tesla M10 and V100 GPUs, and connected with low-latency Lenovo ThinkSystem NE1032 RackSwitch switches.

Stefano Rendina comments: “Not only were we impressed with the fact that Lenovo’s server-node solution enables us to distribute part of our workloads across a CPU, but also because it is inherently flexible. This is key, because we plan to evolve our HPC capabilities with hybrid cloud computing, which will allow us to benefit from elastic, cost-effective scalability in the years ahead.”

At the same time as the HPC project, Ducati established two new data centers: one at Ducati’s headquarters in Borgo Panigale, Bologna and a second disaster recovery (DR) site in Ponte San Pietro, Bologna. Combined, the data centers contain 20 ThinkSystem SR630 servers and four ThinkSystem SR550 servers, configured as an active-active cluster for seamless failover in the event of an outage at one site.

“We apply the same focus to optimizing our IT environment as we do to perfecting our superbikes,” says Stefano Rendina. “Lenovo servers deliver excellent availability, reliability and performance. And with an active-active configuration, we can ensure that downtime and disruption is always kept to a minimum.”

With its new HPC environment online, Ducati can run aerodynamic and fluid dynamic modeling workloads at racing speed—empowering engineers to develop new superbikes faster while maintaining the highest quality and safety standards.



Konstantin Kostenarov explains: “Having the ability to create aerodynamics and fluid dynamics visualizations directly on our HPC platform means that we no longer have to spend long periods of time transferring modeling data from one environment to another. With the Lenovo ThinkSystem cluster, we can run modeling calculations 20 percent faster and we have also reduced the time it takes to collect results by 25 percent.”

Because Ducati no longer needs to maintain separate systems for HPC and data visualization workloads, it has also reduced total cost of ownership. “We have already been able to lower the cost of our HPC environment by moving to Lenovo,” says Stefano Rendina. “We expect that we will be able to reduce costs even further as we integrate our HPC environment with cloud technologies, which will open up opportunities for us to explore more flexible pricing models.”

By moving to Lenovo infrastructure, Ducati has also enhanced its back-office operations. “Thanks to our new Lenovo data center architecture, we have been able to achieve a recovery time objective of just four hours and a recovery point objective of 30 minutes,” says Stefano Rendina. “If the systems at one site were to go down for any reason, we know that data and workloads will switch over to the other data center rapidly, minimizing data loss and disruption to our core production systems.”

Konstantin Kostenarov concludes: “Lenovo technologies have turbocharged our ability to design, test and develop faster, safer, more efficient motorbikes, so professional racers can take pole position on the track and regular riders get the best possible driving experience on the road.”

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– Konstantin Kostenarov, Chief Technology Officer, Ducati



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