

Revving up product engineering

Motorcycle manufacturer takes computer-aided engineering to a new level with an appliance from Altair.



Automotive | India

Business needs

Royal Enfield needs high performance computer-aided engineering systems to accelerate its product engineering cycles.

Solutions at a glance

- Dell EMC PowerEdge servers
- 2nd-Generation Intel® Xeon® Scalable processors
- Altair HyperWorks Unlimited
- PowerSwitch networking

Business results

- Accelerating product engineering processes
- Reducing the need for physical prototypes
- Realizing significant cost savings
- Simplifying IT with a fully managed appliance

Royal Enfield reported significant increases in productivity, including run times that are

15x faster



The company reported that the number of prototypes decreased by

Up to **25%**



Accelerating product-engineering cycles

Royal Enfield has been making motorcycles continuously since 1901, longer than any other company. For the better part of two decades, the company has kept its products at the head of the pack with the power of high performance computing (HPC) systems and computer-aided engineering (CAE) software.

This remains the case today as Royal Enfield accelerates its product engineering cycles with a leading-edge HPC and CAE solution incorporating products from Altair, Dell Technologies and Intel.

The challenge

Finite-element (FE) models for motorcycle designs require extensive processing for doing structural analysis. To meet this need, Royal Enfield uses Altair OptiStruct™ for non-linear implicit FE analysis and Altair Radioss™ for explicit FE analysis.

Earlier on, Royal Enfield's engineers ran their FE analysis workloads on engineering workstations. As these workloads grew, they found that analysis time on workstations, especially for complex dynamic events, had become extremely long. This was severely hampering the ability for Royal Enfield to improve and influence the design of its motorcycles. The negative business implications of not delivering more compute to CAE efforts were substantial.

Contemplating a move to HPC meant facing a myriad of software and hardware purchases, and management of the same. The effort had long been estimated to be far too much for a workstation-based CAE team to consider, given the setup and administrative burden of typical HPC systems and appliances.

To overcome these challenges, Royal Enfield turned to a groundbreaking solution, Altair HyperWorks Unlimited.

The solution

Altair HyperWorks Unlimited is a fully managed appliance that reduces the time and cost to enable full-scale HPC for engineering. Designed specifically for CAE engineers, this pre-configured hardware/software solution is a true plug-and-play appliance for HPC. It offers unlimited use of all Altair HyperWorks applications, plus Altair PBS Works HPC workload management software.

HyperWorks Unlimited is designed to serve — and not burden — CAE engineers. As a fully-managed appliance, HyperWorks Unlimited reduces the time and cost to enable HPC for high-end engineering. This makes it easier and more affordable for engineering organizations of all sizes to adopt HPC systems. And for complete peace of mind, the solution is fully backed and supported by Altair, a recognized leader in HPC solutions.

“The Altair HyperWorks Unlimited appliance was easy to adopt, and it removed the business-limiting bottleneck that a workstation-based approach had become,” notes Rod Giles, Head of CAE & CAD for Royal Enfield. “In a two-day period, our Altair HyperWorks Unlimited appliance was in production and the team fully trained. We have been delighted with how reliable it has been at making us more productive, without being a burden to manage.”

The appliance's web-based interfaces for users to submit and review jobs are the same as those that Royal Enfield used with workstations, simplifying adoption. The day-to-day work for the IT department is minimal, as the system is well managed by Altair. The resulting leap in capabilities for Royal Enfield enables significantly more competitive engineering for the company's motorcycles.

“Our users are submitting and reviewing jobs exactly like they did on their own workstations — so it was not a leap at all,” Giles says.

“Analysis time on workstations had become extremely long, and that was severely hampering our ability to improve and influence our designs.”

— Rod Giles, Head of CAE & CAD, Royal Enfield



“Access to high-performance computing power has become a necessity to remain competitive in the computer aided design and engineering fields. We have seen, and expect to continue to see, rapid growth in adoption of the HyperWorks Unlimited Appliance because it provides turnkey, scalable access to those resources without the complexity.”

– Sam Mahalingam, CTO, Altair

In another benefit, HyperWorks Unlimited includes unlimited HyperWorks units within the appliance, paving the way for massive virtual exploration. Scaling between a physical on-premises appliance and a virtual appliance in the cloud is seamless, and available as needed.

The turnkey nature of HyperWorks Unlimited gives performance at scale with powerful and cost-efficient solutions for on-premise or virtual compute cluster. All of Altair’s state-of-the-art physical appliances are powered by Intel® Xeon® Scalable processors, while employing GPU acceleration as needed for applications that can utilize that as well.

Transforming CAE at Royal Enfield

Royal Enfield has found that this solution is allowing the company’s engineers to move to the next level in their simulation journey. Royal Enfield reported significant increases in productivity — including run times that are 15X faster. The company also reported much more efficient product development, with the number of prototypes decreasing by up to 25 percent.

In addition, Royal Enfield has realized significant cost savings, stemming from reductions in software licensing and the removal of the need to buy and maintain high-end desktop workstation machines.

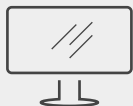
Today, Royal Enfield is doing more simulations, which is reducing development time, injecting innovation into the product engineering process, and helping the company develop better products for its customers.

Looking ahead, Royal Enfield sees a bright future for its CAE processes. The company is rapidly finding new uses for this enormous expansion of compute capability, to improve future products and decrease time to market.

Ultimately, this leap forward enabled by Altair HyperWorks Unlimited has been a real game-changer for Royal Enfield — and promises to be even more so in the future.

Ready Architecture for Altair HyperWorks

The Dell Technologies portfolio of Ready Solutions for HPC Digital Manufacturing now includes a scalable architecture created specifically for Altair HyperWorks. This architecture is configured specifically for Altair HyperWorks digital manufacturing workloads, to enhance performance for CAE applications. This solution for Altair HyperWorks uses a flexible building block approach to HPC system design, where individual building blocks can be combined to build HPC systems that are optimized specifically for Altair HyperWorks workloads and use cases. [Read the solution brief.](#)



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