

CAE Stepping Up from Workstations to an Intel Powered HPC Appliance for Better Motorcycles

Royal Enfield relies on simulations to build better motorcycles. Adoption of the Altair HyperWorks Unlimited Appliance left prior workstation-based solutions in the dust

At a Glance:

- Royal Enfield is “the oldest global motorcycle brand in continuous production.”
- Royal Enfield has relied on CAE on workstations for decades.
- The fully managed Altair HyperWorks Unlimited Appliance has proven an excellent choice for Royal Enfield. They have reported :
 - 15X faster runs for increased in productivity, and
 - Up to 25% reduction in the number of prototypes leading to more efficient product development.¹
- The solution features powerful Intel Xeon Scalable Processors, and Altair PBS Works software to serve novice and experts with a user experience seamlessly spanning local and cloud-resources.

Executive Summary

[Royal Enfield](#) has been making motorcycles continuously since 1901, longer than any other company. Recently, the Royal Enfield Interceptor 650 won India’s most prestigious two-wheeler award, the Indian Motorcycle of the Year (IMOTY) award.

High performance computing (HPC) with workstations, specifically computer-aided engineering (CAE), has been a critical part of motorcycle design work at Royal Enfield for the better part of two decades. Their engineers utilized workstations and are supported by a dedicated but small IT team.

Challenge

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

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 their 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.

“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

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 solution for HPC. It offers unlimited use of all Altair HyperWorks applications, plus Altair PBS Works HPC workload management software.





Intel technology powers the Altair HyperWorks Unlimited Appliance that enables Royal Enfield to dramatically increase their productivity.

“The Altair HyperWorks Unlimited Appliance was easy to adopt, and it removed the business-limiting bottleneck that a workstation-based approach had become.”

— Rod Giles

Result

Facing increased demand for compute cycles, Royal Enfield found the Altair HyperWorks Unlimited to be an outstanding solution. The web-based interfaces for users to submit and review jobs are the same they have used with workstations, so adoption was trivial. 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 their motorcycles.

“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.”

— Rod Giles

Royal Enfield CAE Transformed

Royal Enfield has found that this solution is allowing them to move to the “the next level in their simulation journey.”

Royal Enfield reported significant increases in productivity (run times 15X faster), and much more efficient product development (number of prototypes decreased by up to 25%).¹ Cost savings have been significant as well, from reductions in software licensing, and removing the need to buy and maintain high-end desktop (workstation) machines.

Royal Enfield is doing more simulations today, which is reducing development time, injecting innovation, and helping them develop better products for their customers.

HyperWorks Unlimited

Designed to Serve CAE engineers, not burden

Altair HyperWorks Unlimited is a fully-managed appliance that reduces the time and cost to enable HPC for high-end engineering — it makes it easier and more affordable for engineering organizations of all sizes to adopt HPC systems. It is fully backed and supported by Altair, a recognized leader in HPC solutions.

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

— Rod Giles

Powerful Workload Management

PBS Works combined with Altair PBS Professional delivers a modern, intuitive framework for resource provisioning, workload management and scheduling, and remote visualization, notification, and collaboration.

“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

Licensing Flexibility Built In

Altair’s licensing model gives your business unlimited access to HyperWorks software on a secure HPC infrastructure —



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which is especially important for compute-intensive solvers for structural, electromagnetics, and fluid dynamics analysis and optimization.

"Because we do not need to pick a limited number of license tokens with this solution, our jobs do not stall for license tokens — which significantly increases throughput of our jobs. Jobs that took 2, 3, or 4 days, now can run several times in a single day now. Our prototypes work better the first time — which can save months in development time!"

— Rod Giles

Grows with Your Needs, Instantly

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

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

"Our system is managed by Altair — there is very little day-to-day interaction for our IT department. They really think it is great! Based on our experiences, I definitely recommend others look at Altair solutions."

— Rod Giles

Brighter Future

Royal Enfield is rapidly finding new uses for this enormous expansion of compute capability, to improve future product and decrease time to product. This leap enabled by Altair's HyperWorks Unlimited has been a real game changer for Royal Enfield, and promises to even more for their future.

Where to Get More Information

For more information on solutions for HPC from Intel, visit intel.com/hpc

Solution Ingredients

Find more information on the [2nd Gen Intel® Xeon® Scalable Processor](#)

Learn about [Altair HyperWorks Unlimited](#)



¹ As reported by Royal Enfield. See "Unlimited Design Optimization and Innovation" at <https://tinyurl.com/EMEA202004HWUL>.

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Performance results are based on testing by Royal Enfield and Altair and may not reflect all publicly available security updates. No product or component can be absolutely secure.

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