

## <<< Off-Site Managed HPC Cluster for AutoCRC

VPAC is providing superior High Performance Computing (HPC) services and advanced visualisation tools to the AutoCRC to explore the application of Advanced Computing to automotive engineering and design. VPAC's focus is on the provision of a high level of service and HPC support to AutoCRC participants, to enable them to be as productive and innovative as possible.

Access to HPC and advanced visualisation tools allows researchers to conduct leading-edge computer simulations and design optimisations, including durability analysis, stress analysis, automated design optimisation and noise and vibration analysis. As a result, the Australian auto industry will see benefits such as an increase in product and process innovation, reduced concept to product cycle time and increased safety, comfort and performance of vehicles. Furthermore, the use of advanced computing tools will increase the sustainability of the Australian automotive industry by reducing the environmental impact associated with conventional vehicle design and manufacturing processes.

The AutoCRC HPC cluster, named Karros, is a centralised HPC facility fully managed by VPAC and housed at the Holden Innovation centre in Port Melbourne. VPAC gathered requirements, designed the system specifications and ran the purchase and installation process for the AutoCRC. The centralised HPC facility allows researchers from Universities, OEMs and their suppliers to access the cluster at high speed via various academic and automotive networks such as AARNET and AANX respectively. In this way, research is conducted on a large scale with increased fidelity when compared to the internal compute resources available at most participant facilities. Reduced turnaround times for the analysis being conducted opens up the option to explore further optimizations which can improve designs and reduce prototype and production costs. Coupled with visualisation technologies, the HPC cluster allows for more informed decisions to be made from a greater number of analysis runs and data generated leading to design for excellence.

### High Performance Computing

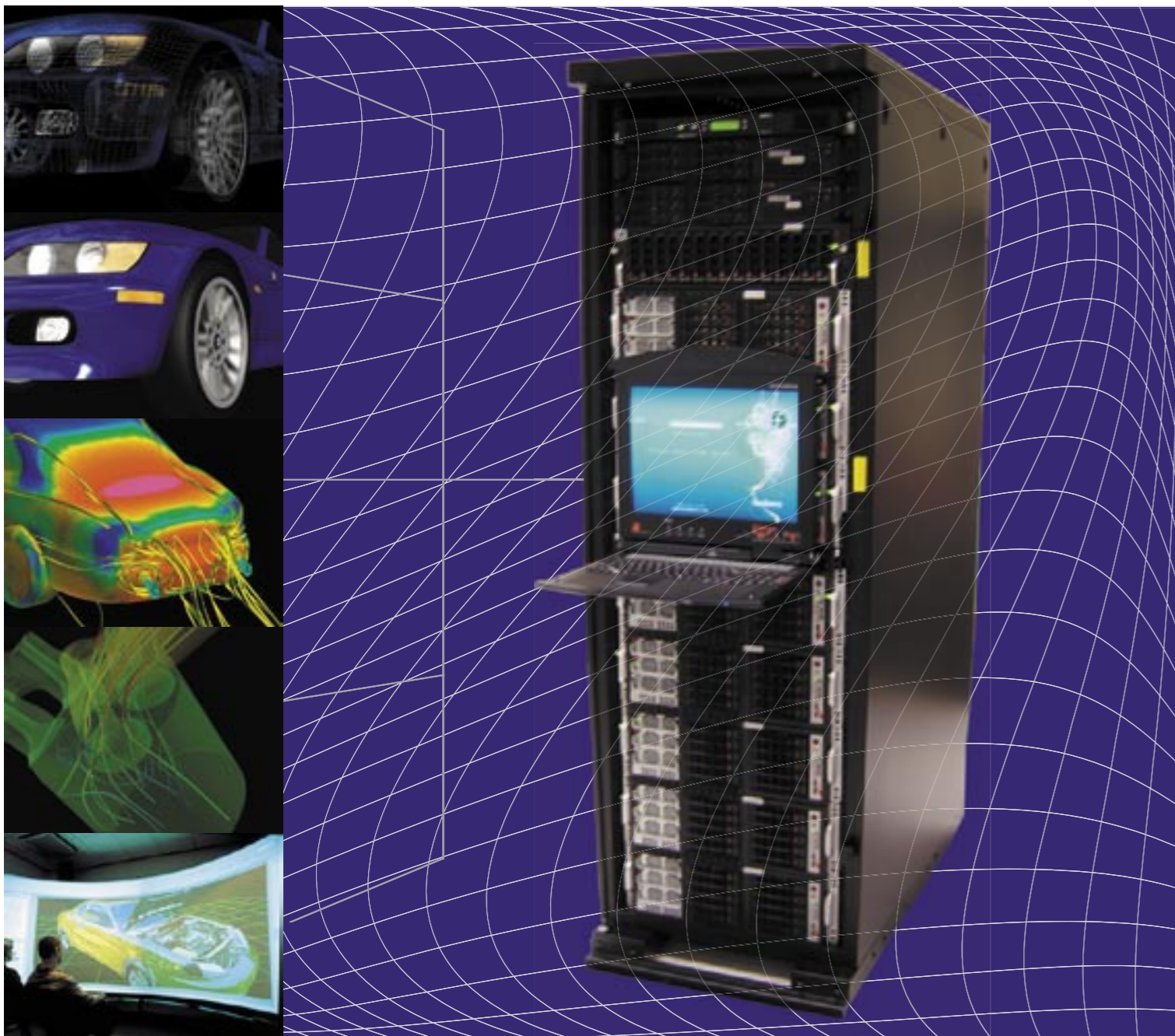
The 64 CPU AMD Opteron system with 4 GB RAM per CPU and 10 Terabytes of disk is heavily tuned to suite the different compute characteristics of most Computer Aided Engineering (CAE) applications such as Nastran and Optistruct for noise & vibration (NVH) analysis; Abaqus, LS-Dyna for non-linear and crash testing and Fluent, OpenFOAM, StarCD, CFX for computational fluid dynamics. This capability includes:

- NVH (Powertrain): 4 million elements, 20 million Degrees of Freedom (D.O.F)
- Crash (Full car crash analysis) : 5 million elements
- CFD (aircraft external aerodynamics, fuel injection spray) : 25 Million elements

### Advanced Visualisation

AutoCRC participants have access to VPAC's Engineering Visualisation (EV) Lab which provides participants with all the necessary equipment as well as in-house expertise needed to use computer visualisation to enhance the engineering and design processes. The EV Lab comprises an Immersive Stereo capable display system and a Six Degree of Freedom Tracking System which allows for advanced engineering review and collaboration application use. VPAC's EV Lab provides AutoCRC participants with immersive and cluster-based visualisation tools for collaborative decision making and virtual engineering and product development.

For further information regarding VPAC's HPC services, contact Suda Ramachandran on +61 3 9647 5433 or at [suda@vpac.org](mailto:suda@vpac.org) or visit [www.vpac.org](http://www.vpac.org).



## Off-Site Managed HPC Cluster for the AutoCRC

The Cooperative Research Centre for Advanced Automotive Technology (AutoCRC) is a research collaboration aimed at delivering smarter, safer and cleaner manufacturing and vehicle technologies to Australia's auto industry. The collaboration is part of a national strategy to secure Australia's position in the global automotive industry and involves participation from eight of Australia's leading vehicle and component manufacturers, two state governments and ten research institutions, including VPAC, with a total investment of \$100m over seven years.