Tecnica Cranks Up Simulation Power

AT A GLANCE

- *Tecnica UK Ltd is an engineering design consultancy specialising in crankshaft, connecting rods and axle beam forging for the automotive industry*

- *Tecnica offers a hot forging process design service; Tecnica's engineers are capable of creating 3D computer simulations of the forging process for its customers*

- *The power and performance of a new High Performance Compute system (HPC system) is reducing processing time of Tecnica's extremely complex 3D computer simulations by up to 80 per cent (40 hours down to 8 hours)*

- *The HPC system also enables Tecnica to use performance from the HPC system proportionately depending on the complexity of the 3D simulation*

- *Tecnica is helping customers reduce time spent on the overall forge design process and helping them to bring products to market more quickly*

- *Sheffield-based OCF, the UK's premier High Performance Computing integrator, designed, implemented, configured and supports the HPC system*

BACKGROUND

Tecnica UK Ltd (Tecnica), is a Sheffield-based engineering design consultancy specialising in crankshaft, connecting rods and axle beam forging for the automotive industry – specifically the mid to large diesel range.

It also has experience in the mining equipment and aerospace components markets. Tecnica's worldwide customers include: Cat Perkins, Daimler Chrysler, Deutz AG, European Engine Alliance, Iveco, Perkins Shibaura and first tier forges which includes Bharat Forge, the World's second largest forging company.

PROBLEM

Amongst many 'product' design services, Tecnica also offers a hot forging 'process' design service. Tecnica's engineers are capable of actually simulating the forging process for its customers. Engineers can, for example, simulate the prediction of: material flow and defects in the part such as folds, cracks and underfills; and the optimisation of die life and press selection.

"3D simulation is an essential part of the forge design process," says Mark Wren, simulation and design, Tecnica. "Simulation helps fivefold: to wean out any errors from our engineers - it validates their design work and gives us confidence in our forge die designs; it reduces the amount of physical testing we must undertake on design dies; it enables us to get our forging die designs correct first time; it optimises materials use and therefore reduces wastage and it compacts time spent on the design phase of a product."

Tecnica has previously processed its 3D simulations on a single PC – it could take the PC up to one full week (40 hours) to process just one of the most complex simulations. The PC was also only capable of processing simulations sequentially – one after the other. This means the overall design simulation process could take many weeks.

SOLUTION

Having worked with Transvalor, makers of FORGE design software, to determine minimum IT hardware requirements to more efficiently and effectively process Tecnica's 3D simulations; Tecnica contacted the UK's premier HPC integrator, OCF plc (www.ocf.co.uk), to help create a more suitable IT infrastructure.

Live from February 2008, OCF designed, implemented, configured and now supports a bespoke High Performance Compute system (HPC system) – which is providing significant improvements in the power and performance available to process 3D simulations for Tecnica.

OCF's HPC system design – based on a cluster of servers - consists of both an IBM System x3655 Server with AMD Opteron Dual-Core processors - with 4GB of memory and six 146 GB SAS DISKS - and IBM System x3455 Servers with AMD Opteron Dual-Core processors – with 8GB of memory.

The design also includes AcoustiRACK, a sound-proofed rackmount cabinet, which enables Tecnica to house the HPC system in its main office without the HPC system's noise affecting staff productivity or breaching Health & Safety regulations. The AcoustiRACK was also selected by OCF because of its built-in cooling fans which help to remove the heat from the system.

The HPC system was pre-built at the OCF office in Sheffield which meant OCF could deliver, implement and configure the HPC system in just a few days.

Tecnica is also making use of OCF's HPC system support service which includes remote management of the HPC system (via the internet), telephone support and face-to-face support, if required.

Mark Wren adds, "We are a small team here with little IT knowledge and virtually no HPC system knowledge. OCF provides us with valuable consultancy and support ensuring that the HPC system remains operational at all times."

RESULTS

The power and performance of the new HPC system is reducing processing time of even Tecnica's most complex 3D computer simulations by up to 80 per cent (40 hours down to 8 hours).

The HPC system also enables Tecnica to use performance from the HPC system proportionately – for example Tecnica can use performance from all 16 cores of the HPC system on a single large simulation (and run other simulations sequentially) or it can use performance from 4 cores, for example, on a first smaller simulation, 4 cores on a second smaller simulation and so on (running smaller simulations concurrently).

The ability to run smaller simulations concurrently – potentially for different customers – enables Tecnica to complete more simulations in less time, increasing productivity and ultimately increasing profit.

Using the power and performance of the HPC system to make its simulation process more efficient and effective, Tecnica is helping customers reduce time spent on the overall forge design process and helping them to bring products to market more quickly.

Mark Wren adds, "The power and performance of the HPC system takes our simulation to another level – reducing processing time for simulations and enabling us to allocate performance to simulations which need it most."