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Supercomputer Delivers Complete Brain View 24 Times Faster

Scientists gain better understanding of how the brain works in less time

22nd May 2007, just 10 months after the launch of the UK's largest High Performance Compute Cluster (HPCC) for neuroimaging data analysis at Cardiff University Brain Research Imaging Centre (CUBRIC), scientists now receive a more complete view of the brain faster.

Overlaying MEG brain scans onto MRI brain scans[1]; scientists can use the power of the cluster to simultaneously process 100 complete brain images in just 16 minutes – 24 times faster than processing the images consecutively.

Overlaying MEG onto MRI scans to create a single view in just a few minutes enables scientists to receive results, analyse findings and, if necessary, adjust research parameters to complete projects more quickly. Researchers can now get a better understanding of how the brain works and responds to specific stimuli in less time. Visiting scientists are also reducing costly repeat visits to the facility as the availability of a HPCC to process brain scan images simultaneously increases on-site productivity.

"The work of scientists using the CUBRIC facility involves complex mathematical analysis on data sets and in the past that would take significant time," said Spiro Stathakis, IT Systems Manager. "The High Performance Compute Cluster has successfully increased performance of processing brain scan images to near real-time. This enables Scientists to gain a better understanding of how the brain works and the effects brain injuries have on people in less time. We are getting a deeper look into a complex organ and how it reacts to adverse conditions."

The solution's entire design, install and maintenance is provided by OCF, the UK's premier High Performance Computing integrator.

IBM Premier Business Partner

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"Scientists using the CUBRIC facility place great demands on the computing environment," said Julian Fielden, Managing Director, OCF plc. "Cutting brain scan image overlay time from hours to minutes is proof that the CUBRIC HPCC is a world class system that meets the storage, data backup and processing demands of scientists."

The High Performance Computer – based on a cluster model – consists of 75 node cluster of IBM e326m dual processor, dual-core AMD Opteron servers, providing 300 processors.

The solution also includes 40 IBM IntelliStation A Pro graphical workstations to view and manipulate the brain scan images. These workstations can be either completely stand-alone processing engines, or can be recruited into the compute cluster to give a total of 460 processing cores. A conservative estimate puts the performance of the CUBRIC cluster at 530 GFLOPS.

Together with the cluster and the workstations, CUBRIC also houses high-performance network and storage solutions for the large amount of data generated by the scanners and subsequent analysis. These include:

- Infortrend 40 TB storage configured in RAID5 and using a GPFS file system
- Nortel Network GB ethernet with stacking switches
- A tape-library for data archiving

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About OCF plc
Based in Sheffield UK, OCF designs, integrates and supports High Performance Computing (HPC), Visualisation (HPV) and Data Storage (HPS) solutions for the public and private sectors.

OCF provides solutions for over 38 (21 per cent) of the UK's 176 Universities, Higher Education Institutes and Research Councils. Plus, it provides solutions for over 25 commercial clients from the automotive, aerospace, utilities, pharmaceutical, manufacturing, oil & gas and financial industries.

OCF is the UK's premier High Performance Computing integrator. OCF holds IBM Premier Partner status and enhances its IBM-based solutions using technology from a range of partners: AMD, Cisco, Dataram, Fakespace, Infortrend, Intel, Microsoft, Nallatech, Qlogic, Supermicro Computer, Inc., Tyan and Voltaire.

For more information, please visit the OCF website www.ocf.co.uk/pressroom

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CUBRIC
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[1] Magneto Encephalography (MEG) and Magnetic Resonance Imaging (MRI)

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