

# Think fast! Nor-Tech cluster helps speed up neurological diagnoses



Nor-tech's cluster solution allows scientists to rapidly experiment with new algorithms which dramatically speed up research productivity. High-performance clusters are gaining popularity in Bioinformatics, a field of Computational Biology which applies algorithms and statistical techniques to biological datasets.

## The Challenge

Diagnosing neurological disorders is far from a "no-brainer". But promising new research at the University of Minnesota shows that patterns of neural activity from patients with a range of brain conditions can be evaluated by analyzing magnetic fields outside the patients' skulls. The magnetic fields, which are created by electrical activity in the brain, are measured with a non-invasive imaging technique called magnetoencephalography (MEG).

A medical firm and licensee of the university's medical technology, is using this process to develop a fast and simple clinical application to screen for brain disease and disorders (such as Alzheimer's disease, schizophrenia and multiple sclerosis).

To make diagnoses as accurate as possible, the research team is using MEG to assemble a vast library of scans, sampling both healthy and diseased brains. This results in a very large dataset of MEG scans, each with roughly 7.6 million data points. All of this data needs to be processed through their algorithms which, for some scans, can take days. With up to twenty new scans coming in each day, they realized they needed some faster thinking technology.

## The Solution

Nor-Tech developed a Rocks / Linux Data Center Cluster that was custom configured to meet the compute, network interconnect and storage needs of the medical firm.

To schedule job execution, the cluster uses Sun Grid Engine (SGE) which provides policy-based workload management and dynamic provisioning of application workloads. Thanks to the speed of running the robust SGE on the cluster, what used to take hours or days now is completed in a fraction of the time!

The cluster allows the research team to rapidly experiment with new algorithms which dramatically speed up research productivity. For example, previously, if they wanted to test a new technique with 80 scans it would require hours of processing. Now, however, the total time to process can be under ten minutes.

When perfected, the technique will be used to diagnose brain disorders earlier, monitor their progress and track the effectiveness of new drugs and treatments. With the aid of a Nor-Tech HPC Cluster, which came in on-time and under budget, their process may be available even sooner than expected.

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