**Nor-Tech**
HPC Clusters™

# Astrophysicists gravitate toward 300 Terabyte Beowulf HPC Cluster



The dedicated cluster room has 1400 sq. ft. of usable floor space and is cooled by four 26-ton air conditioning units. Heat is transferred to a water/glycol mixture which is circulated to dry the rooftop coolers.

## The Challenge

In his General Theory of Relativity, Einstein suggested that massive objects, such as planets and stars, curve the geometry of space and time. The more massive the object, the greater the disturbance, and the result is what we refer to as a gravitational field. If an object's gravitational field changes (i.e. a star goes supernova), then that change causes a wave that moves through time and space like ripples in a pond. It is these gravitational waves that scientists involved in the LIGO project are trying to measure.

It's a weighty task requiring such extraordinary computational processing that Einstein@Home was developed. Basically, Einstein@Home enables private PC users to "donate" their computer's downtime for data analysis. Each computer receives a complex wave, performs a bit of trigonometry and if the results meet a certain criteria, they are forwarded on to researchers for further analysis.

For scientists at a Midwestern university, with data coming in from over 120,000 computers worldwide, the amount of processing and storage required is staggering. The project relies on hardware able to support enormous volumes of ceaselessly expanding data. Specifically, they needed a storage cluster that could handle information coming from 1600 compute cores, as well as the LIGO laser interferometers in Livingston, LA and Hanford, WA, and connect to the existing network infrastructure of Beowulf-type machines.

## The Solution

Utilizing the Beowulf design for high performance parallel computing clusters, Nor-Tech developed and built a 300 Terabyte storage cluster to work with the University's 780-node linux Beowulf cluster. The cluster contains 1600 computer core and boasts 300 usable Terabytes of SATA-II drive space attached to hardware RAID controllers. The system is networked via Force10 E1200 ethernet switches. All of the equipment is connected to a 500kVA/400 kW UPS system, including backup power with six minutes runtime at full load. System status and performance can be checked via the web using the robust Ganglia monitoring system.



Built for Einstein@Home, a LIGO Project, funded by the National Science Foundation, the storage cluster contains 1600 compute cores and boasts a 300 Terabyte Storage Array.

Nor-Tech is the Exclusive Manufacturer of

**VOYAGEUR**™

**AMD** Solution Provider PLATINUM

**intel** Channel Partner Premier Member 2007

**Microsoft** GOLD CERTIFIED Partner