

Nor-Tech

Case Study

Nor-Tech Uses Seagate Drives to Help Find Gravitational Waves



Company

Nor-Tech

Location

Burnsville, Minnesota

Contact

www.nor-tech.com

Industry

High-performance computing

Challenge

Find rock-solid storage solutions for ultra high-performance computers used in science, government and military applications.

Solution

Seagate® enterprise drives

Benefits

- Superior reliability
- Low power consumption
- Speed

In 1915, Albert Einstein predicted gravitational waves—fallout from astronomical events so catastrophic that they ripple the fabric of space-time itself. It took more than 100 years for scientists to confirm Einstein's theory and they did it using laser-equipped sensors and super high-performance computers. The experts at Nor-Tech built computers that helped prove the existence of gravitational waves, and they used Seagate drives exclusively in the build.

With clients like Boeing, General Dynamics, Gulfstream, and dozens of well-known universities and colleges, Nor-Tech has earned a reputation as premier high-performance computing (HPC) experts. The company began as a conventional computer builder and parts vendor in the late '90s. But after several years it had become apparent to Nor-Tech founder and president David Bollig that PC sales were reaching a plateau.

“We started looking at other markets, from high-end storage to super computing,” recalls Bollig. “We made heavy investments early on to bring the right engineers on staff. Competing in those markets was tough at the beginning. The cost and time barriers are very high and it took many years to establish ourselves as a known and proven vendor.”

Nor-Tech’s persistence paid off and the company shifted more of its business to HPC. Bollig observes, “We’ve probably sold a hundred or so clusters in the last few years, and we just keep getting cooler and cooler projects now.”

Nor-Tech Cluster Plays Key Role in Observing Gravitational Waves

Nor-Tech’s coolest project is arguably the Orange County Relativity Cluster for Astronomy (ORCA). The system was instrumental in the recent groundbreaking observation of gravitational waves at the Laser Interferometer Gravitational-Wave Observatory (LIGO). Built to collect data and process it with custom software, ORCA provided confirmation of the measurements made with LIGO.

It has more than 1500 terabytes of overall storage, including 30 terabytes of local storage and 576 compute cores that are capable of more than 7 trillion operations per second. In addition to the LIGO gravitational waveform modeling and characterization algorithms, ORCA can simulate other astronomical phenomena like neutron stars.

LIGO is the largest and most ambitious project ever funded by the National Science Foundation. The work of LIGO, supported by Nor-Tech’s ORCA, has forever changed the way researchers view and study the universe—ushering in a new era of gravitational wave astronomy.

Why Nor-Tech Clusters Use Only Seagate Drives

Nor-Tech used Seagate drives exclusively for the ORCA build. In fact, the firm uses Seagate drives for every build unless a customer insists on another manufacturer. After years of testing components to near failure, Seagate drives came out on top. For every high-performance computing cluster, Nor-Tech builds a test cluster for evaluation. “We’ll send the customer several nodes and they will test for two, three months, just heat those machines up and work on them to make sure they’re going to be bulletproof,” explains Bollig. “Once they determine we’ve created a bulletproof unit, they’ll go to bid.”

This process has given Nor-Tech a strong reputation for ruggedness and reliability. “High end clusters run at 98% utilization, and they’ll run like that for years,” says Bollig. “You need rock solid parts, and we’ve found that over time and the hundreds of clusters we’ve built, we always have our best luck with Seagate. When it comes to our clusters, my engineers will use only Seagate drives.”

Seagate support has also helped maintain that reliability. Daninger recounts an experience with the Seagate support staff. Nor-Tech built a series of storage servers using Seagate drives for the University of Wisconsin to help support the IceCube Neutrino Observatory. Due to the unique demands of the project, some of the drives were experiencing intermittent issues. Daninger called Seagate support.

“The field engineer from Seagate, Joel Schulze, took the ball and ran with it,” says Daninger. “It turned out that the firmware had to be updated on the drives. The Seagate support team wrote a script and emailed a link to my technician out in the field. He put the script on a thumb drive and that automated the installation, solving the problem all in one day for the customer,” Daninger marvels.

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David Bollig
President and CEO
Nor-Tech

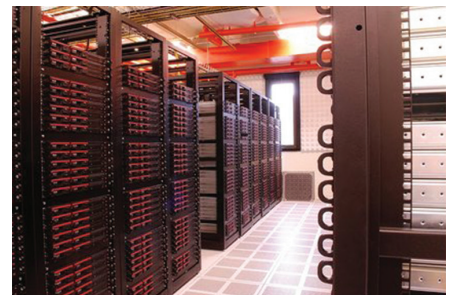


Figure 1. A LIGO supercomputer cluster at the University of Wisconsin – Milwaukee
(Photo credit: University of Wisconsin)

Seagate Enterprise Capacity 3.5 HDD: Superior Reliability for High-Density HPC Clusters

The Seagate Enterprise Capacity 3.5 HDD drive is an optimal match for Nor-Tech clusters because it combines enormous capacity, speedy performance and true enterprise-class ruggedness and reliability. With its industry-leading 6-disk technology, the Enterprise Capacity 3.5 HDD delivers up to 33% more capacity than its predecessor in the same storage slot. Supporting the industry's best response times for an 8TB nearline drive, it also enables the fastest data transfers, thanks to Seagate's comprehensive and advanced caching technology.

Factor in the drive's industry-leading rotational vibration tolerance design that helps ensure consistent performance in dense multi-drive systems, and the result is a capacity-optimized enterprise drive that's ideal for bulk-data applications:

- Up to 8TB for maximum density server and storage solutions
- Built to support enterprise-class 24x7 workloads of 550TB/yr
- 2 million hours MTBF
- 5-year limited warranty

To Learn More:

For more information on Seagate Enterprise Capacity 3.5 HDDs, visit <http://www.seagate.com/internal-hard-drives/enterprise-hard-drives/hdd/enterprise-capacity-3-5-hdd/>

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