



# CASE STUDY

NCSA helps scientists achieve breakthroughs in a broad range of phenomena including nanotechnology and the Big Bang with Spectra's state-of-the-art active archive.

“ NCSA designed Blue Waters to be one of the largest, most powerful supercomputing ecosystems in the world. The Spectra Logic TFinity met our rigorous requirements. ”

*Bill Kramer, Deputy Director of the Blue Waters Project*



*4 Spectra TFinity units, each with 19 frames and IBM TS1140 drives and media*

## Who is NCSA?



The National Center for Supercomputing Applications (NCSA), located at the University of Illinois at Urbana-Champaign, provides computing, data, networking, and visualization resources and services that help scientists and engineers across the country better understand our world. Established in 1986, NCSA is supported by the State of Illinois, the University of Illinois, the National Science Foundation, and grants from other federal agencies.

## About Blue Waters

NCSA's Blue Waters is one of the most powerful supercomputers in the world, and is the fastest supercomputer on a university campus. Scientists and engineers across the USA use the computing and data power of Blue Waters to tackle a wide range of challenging problems, from predicting the behavior of complex biological systems to simulating the evolution of the cosmos. Blue Waters uses hundreds of thousands of computational cores to achieve peak performance of more than 13 quadrillion calculations per second. If you could multiply two numbers together every second, it would take you millions of years to do what Blue Waters does each second.

## The Challenge: Scale, Speed, Reliability, Density

The Blue Waters project is designed to meet the compute-intensive, memory-intensive, and data-intensive needs of a wide range of scientists and engineers. Multiple scientists use the Blue Waters supercomputer for a diverse set of applications. A few examples are to predict the behavior of hurricanes and tornadoes, analyze complex biological systems, understand how the cosmos evolved after the Big Bang, design new materials at the atomic level, and simulate complex engineered systems like the power distribution system in airplanes and automobiles.

NCSA wanted to effectively manage its massive amounts of critical data, while providing fast access to multiple users at any given time. Data was initially projected to grow to 50 petabytes in the first year and to 500 petabytes by 2017. With less than 27 petabytes of usable space on the Blue Waters machine itself, NCSA wanted to move data from expensive online disk to a more affordable near-line system.

Blue Water's high performance-computing (HPC) file system environment runs at 1.2TB/s to manage high transactional data commonly found at HPC sites. The Blue Waters project required a cost effective, scalable, reliable near-line storage system to achieve its goals and become a success.

# CASE STUDY: NCSA

“ Scalability was a key requirement for the Blue Waters project, and tape is the best platform to address explosive data growth. A 500PB disk system would have been financially astronomical and required a major migration every three to five years. ”

*Michelle Butler, Senior Technical Program Manager of the Storage Enabling Technologies Team*

## The Solution: Near-Line Tape Storage

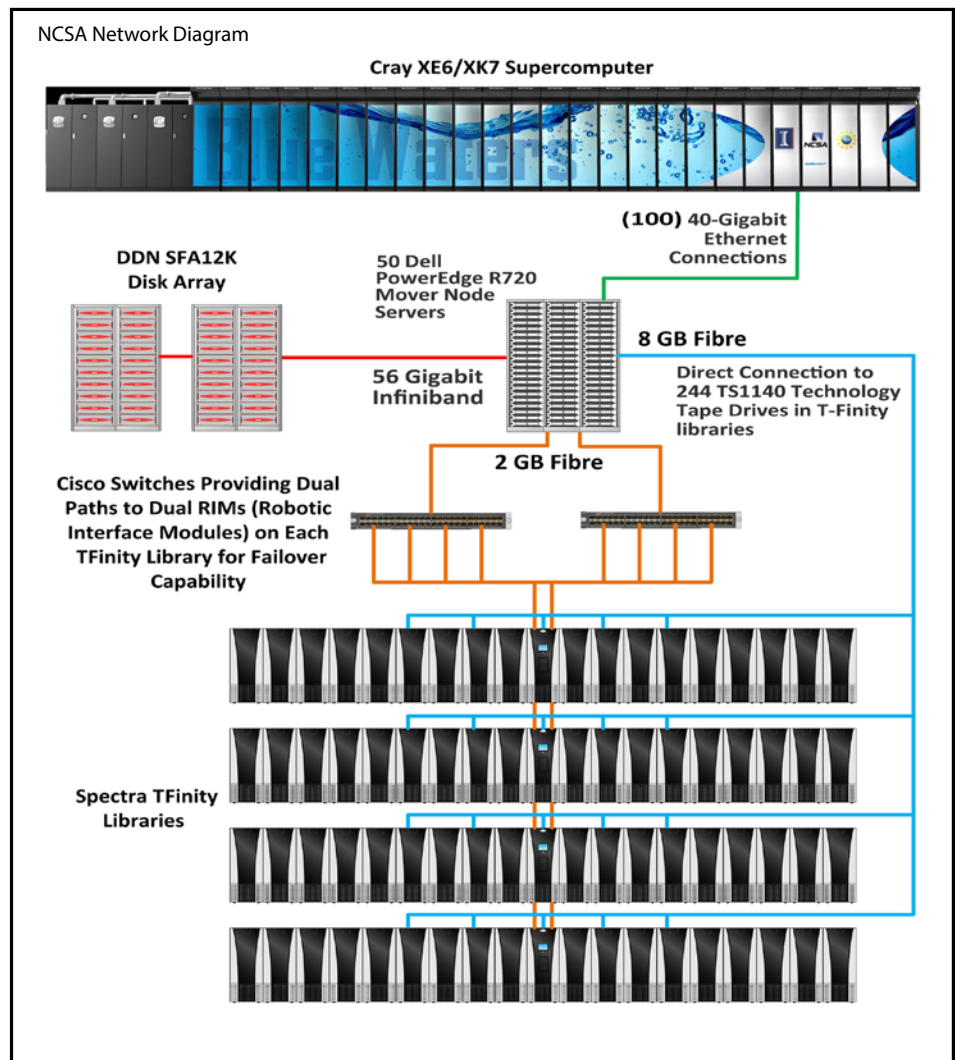
NCSA deployed four 19-frame Spectra TFinity tape libraries to provide 100 percent of the near-line tape data storage for its Blue Waters supercomputing system. Spectra TFinity tape libraries provide the Blue Waters project with the ability to keep all near-line data accessible in an active repository, perform automated data integrity verification for the data store, and deliver high performance read/write rates of up to 61 gigabytes per second for the four libraries installed utilizing enterprise TS1140 Technology Tape Drives.

## Results

NCSA's TFinity libraries protect 380 petabytes of data — the equivalent of 5,054 years of HD-TV video or a stack of books over 9 times the distance from the earth to the moon. The Blue Waters system is one of the world's largest active file repositories stored on tape media today.

## Why Spectra?

- TCO – low cost of unit and long shelf life of tape
- Small footprint offering high density
- Performance and uptime
- Low power & cooling requirements
- Exceptional support
- Innovative design
- Vendor's long-term viability and future roadmap



## Environment Snapshot

- Four 19-frame Spectra TFinity Tape Libraries
- 244 IBM TS1140 Technology Tape Drives
- IBM HPSS Software
- Spectra Data Integrity Verification
- Cray XE6/XK7 Supercomputer

## Blue Waters features:

- More than 1.5 petabytes of memory, enough to store 300 million images from your digital camera
- More than 25 petabytes of disk storage, enough to store all of the printed documents in all of the world's libraries
- Up to 500 petabytes of tape storage, enough to store 10 percent of all of the words spoken in the existence of humankind.