CASE STUDY

Oak Ridge Leadership
Computing Facility
boosts efficiency to better
preserve user data with
Spectra solution

> " The new library has just shy of 14,000 slots
> for tapes. We were able to easily move all
> 70 petabytes of existing data into the new
> system and have grown to 104 petabytes
> in size and have plenty of room for at least
> a year or two before we have to start
> thinking about expanding.

HPC Linux Systems Engineer, OLCF

AT A GLANCE

Challenges

- Store supercomputer data
- Aging tape libraries in use
- Tech updates for efficiency
- Rare large-scale upgrades

Solution

- Deploy Spectra library system
- Consolidate all data storage
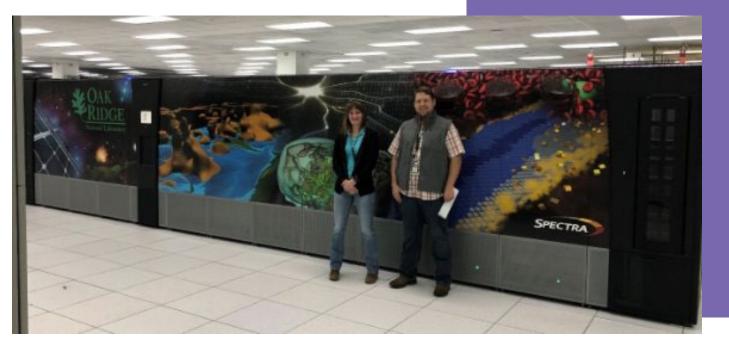- Reduce physical footprint 85%
- Expand capacity to 1.52 EB

CHALLENGE

Tape recorders and videocassette tapes may be
considered archaic in the entertainment industry, but
magnetic tape storage remains one of the most
durable, secure and cost-effective ways to archive big
data generated by supercomputers.

After researchers run code on high-performance
computing (HPC) systems, key results are initially
stored on disks and then transferred to tape libraries
for long- term storage. These systems contain tape
drives that write data onto magnetic tape and
hundreds or thousands of tape cartridges. Robotic
arms place these cartridges in slots for safekeeping
and retrieve them when users need to access data to
cite experiment outcomes in academic articles or
share accomplishments with colleagues.

Although tape drives and other individual storage
components are typically replaced about every 5 years,
libraries can operate much longer. Updates are
periodically required to incorporate new technologies
and enhance efficiency. Most of the OLCF's six existing
systems had been operating for 10 years or longer,
making this large-scale upgrade an infrequent and
significant undertaking.

SPECTRA

OAK RIDGE LEADERSHIP COMPUTING FACILITY ENVIRONMENT

SOLUTION

At the Oak Ridge Leadership Computing Facility (OLCF), the HPC Operations Group replaced its previous tape libraries with a Spectra Logic system. The libraries store data from the Summit supercomputer, the retired Titan supercomputer, and other OLCF resources. HPC/UNIX Storage System Administrator Gregg Gawinski manages the High Performance Storage System (HPSS), which protects and simplifies access to petabytes of data. The Spectra Logic system consolidates all current OLCF data, reducing the physical footprint by 85% while holding over 150 petabytes, with potential expansion to 1.52 exabytes. Its compact design uses TeraPack containers—nine tape cartridges per drawer— allowing higher density and efficient robot operations. New HPSS data is stored on tape in the system. Transferring data from old libraries to the new system took six months, after which the old systems were decommissioned. While the upgrade focused on hardware, software refinements are planned. Updated HPSS versions will improve tape loading rates, support command queues, and add new features.

Why OLCF Chose Spectra:
- Scalability
- Reliability
- Accessibility
- Superior density per footprint
- Future roadmap

ENVIRONMENT

- 17-frame Spectra® TFinity ExaScale Tape Library
- 85 IBM® TS1155 tape drives
- Two High Performance Transporters (HPT)
- BlueScale® Vision Camera
- BlueScale® Standard Encryption
- High Performance Storage System (HPSS) software

ABOUT OLCF

The Oak Ridge Leadership Computing Facility (OLCF) was established at Oak Ridge National Laboratory to accelerate scientific discovery and engineering progress by providing world-leading computational performance and advanced data infrastructure. As a US Department of Energy (DOE) Office of Science User Facility, the OLCF offers leadership-class computing resources to researchers from government, academia, and industry who have many of the largest computing problems in science. Every year, the OLCF hosts and works with several hundred users across a broad range of scientific domains at industry events, on-site meetings, and regular hackathons.

SPECTRA