Lawrence Livermore National Laboratory

CASE STUDY

Lawrence Livermore deploys world's largest tape library from Spectra for exascale era success

> Spectra's physically denser storage solution is much better for Livermore Computing. The Spectra libraries take up significantly less floor space than our previous libraries, which allows us to be more efficient and agile as the big computers come and go.

Todd Heer,
Deputy Program Lead,
Facilities Operations and
User Support, LLNL

CHALLENGE

LLNL's HPC users generate 30 terabytes of data daily, much of it classified and requiring indefinite, secure storage. Livermore Computing (LC) has archived data since 1967, but aging hardware necessitates upgrades every few years to maintain performance and security.

A well-run archive requires constant backend management, including seamless data migration to newer technologies. "Moving to a new tape library is a major undertaking, done only once a decade or two," says Todd Heer, who led the recent procurement. This transition was particularly notable as LLNL chose a new vendor, Spectra Logic.

SOLUTION

LLNL now hosts the world's largest Spectra TFinity system, supporting data archives behind Sierra, the second-fastest supercomputer. The tape library meets exascale demands with speed, agility, and a 294-petabyte capacity. It uses compact terapacks to optimize floor space and a rack form factor for scalability, currently configured with 23 racks, 128 IBM® TS1155 drives, and 19,575 slots. A nearby six-frame library stores secondary data copies on LTO-8 tape.

The system offers 50% better density and evolves with generational tape drive improvements. Tape remains cost-effective, with a low error rate and superior power efficiency for write-once, read-seldom tasks. Custom front panels highlight LLNL's HPC history, and data migration from old systems occurs seamlessly without downtime. The TFinity is funded by the ASC program for tri-lab use.

AT A GLANCE

Challenges

- Massive daily data output
- Strict data security needs
- Aging storage hardware
- Complex archive migrations

Solution

- Deploy world's largest Tfinity
- Achieve 50% denser storage
- Enable seamless media swaps
- Support scalable rack growth

SPECTRA

LAWRENCE LIVERMORE'S ENVIRONMENT

SOLUTION INFORMATION

Spectra TFinity ExaScale Tape Library – With unsurpassed storage density packaged in the smallest footprint of any enterprise library on the market, the Spectra TFinity ExaScale offers industry-leading scalability with the speed necessary to meet requirements of the most demanding environments. Deployed by some of the most recognized organizations in the world, the Spectra TFinity ExaScale provides maximum flexibility by allowing you to select the tape technology that is the perfect fit for your business. In addition to LTO tape technology, the Spectra TFinity ExaScale is also compatible with IBM® TS11X0 enterprise tape technology and Oracle T10000x enterprise tape technology, enabling all three in the same library.

Why Lawrence Livermore Nation Lab Chose Spectra:

- Smallest tape library footprint
- 50% or better density improvement over outgoing solution
- Designed for easy growth
- Custom front panel skins
- Media and data migration with no downtime to the users

ENVIRONMENT

- 23-frame Spectra® TFinity® ExaScale
- Tape Library
- 128 IBM® TS1155 tape drives
- 19,575 tape slots
- 21 SpectraVision cameras
- Up to 294PB of uncompressed data

ABOUT LLNL

For more than 60 years, the Lawrence Livermore National Laboratory (LLNL) has applied science and technology to make the world a safer place. Livermore's defining responsibility is ensuring the safety, security and reliability of the nation's nuclear deterrent. Since LLNL was created in 1952, computing has been essential to R&D, science and technology, and operations. Livermore Computing (LC) is making the world safer by shaping the frontiers of HPC, data sciences, and computer science. They design, develop and deploy HPC capabilities not only in support of Livermore's mission and program goals, such as the nation's Stockpile Stewardship Program, but to improve national security and advance U.S. economic competitiveness