



## Computer Science & Artificial Intelligence Laboratory Safeguards Valued Research Data with Sony PetaSite Tape Library Solution

An internationally acclaimed research institute in the Northeast has a mission to advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century. With over 10,000 undergraduate and graduate students attending, including approximately 3,000 international students from 106 countries, the institute employs 9,500 faculty and staff, with eight current faculty being Nobel Prize winners. The computer science and artificial intelligence laboratory is the largest laboratory on campus in terms of research volume — and this research data must be safeguarded and protected with the best possible methodology. They chose Sony's PetaSite® Tape Library Technology for this vital task.

### The Challenge

The computer science and artificial intelligence laboratory was formed via a merger between two previous campus labs — the artificial intelligence (AI) lab and the laboratory for computer science (LCS). The old AI Lab had a centralized storage system; however, its backup system capacity of 3TB was already undersized for its 9TB of data storage. The LCS facility had a decentralized storage scheme and thus no centralized backup device. "After the merger, it became immediately evident that an upgraded, scalable, and more powerful centralized backup device was necessary to handle the ongoing needs and growth of the new combined lab," states Jonathan D. Proulx, the lab's Senior Systems Administrator.

"Our challenge, as my infrastructure group and I saw it, was to protect our vital research data, which has sometimes taken years to collect, with dependable backup by employing the best storage device on the market. This storage unit would have to meet our high expectations for reliability, performance, capacity, and scalability. Currently, we have approximately 20TB of data to be protected, generated by over 1,000 users who are principal investigators, research scientists, post-doctoral researchers, graduate students, and attendant support staff. Our data storage volume is expected to double every 18 months."

Finding a replacement for the new lab's over-burdened 19-slot (3TB capacity), 2-drive, AIT2 based Overland LibraryPro backup tape library (which was inherited from the old AI lab) became a team priority. "My team and I evaluated a number of options to upgrade our lab's backup capability, add the capacity required to meet current needs, and add the built-in scalability to meet projected future growth, thus protecting our investment in the equipment. Our research revealed that the Sony PetaSite Tape Library product was a cut above the competition, providing excellent scaling capacity, superior tape density with SAIT media, and powerful robotics," says Proulx.

## The Solution

The lab chose the Sony SAIT-based PetaSite Tape Library to solve its data backup and protection needs. "We believe that this product offers us the best cost/performance benefits for coping with our ever-growing volumes of data; plus, the library's expansion capability ensures that our laboratory wouldn't outgrow the tape library any time soon," states Proulx. The library was installed in July of 2004.

Sony's SAIT high-capacity tape media and SAIT-1 high-performance drives provide native capacities of up to 500GB with 30MB/sec transfer rates; or up to 1.3TB capacity with a 78MB/sec transfer rate using 2.6:1 compression. SAIT tape capacity yields the lowest cost-per-MB of any other archival options (e.g., disk or optical).

By replacing the lab's inadequate tape library with Sony's superior tape technology, they continue to enjoy the time-tested benefits of tape, which include reliable performance, large capacity, long-term durability, portability, and the lowest cost of ownership of any media.

## Backup Storage System Architecture

The Sony model CSM-100 series PetaSite Tape Library installed at the MITC SAIL lab includes four SAIT-1 internal drives and 108-cartridge slots (54TB capacity). The basic unit can accommodate up to 12 drives. The library can be further expanded by adding up to seven auxiliary drive and/or cartridge consoles, providing scalability to a maximum of 96 drives or a total capacity of up to 1.49 Petabytes (PB).

The lab employs Teradactyl's True incremental Backup System® (TiBS) software running under their backup servers' Linux operating system to move data over a 2Gb Fibre Channel interface to/from the Sony library. An Ultra160 SCSI interface controls the library's robotics. Currently, 13TB of data residing on the lab's 35 Linux servers and 1 BlueArc® NAS server along with over 7TB of AFS data in >5,000 volumes are backed up to the central PetaSite library through the back-up server. The lab is in the process of adding several Windows XP and MAC OSX servers to the centralized backup procedure. Incremental backups are performed on a daily basis; then the TiBS software creates weekly, monthly, and full quarterly backups on all stored data — each is the sum of differences since the last more complete class of backup.

"Currently, we're operating near the capacity of the CSM-100 with approximately 90 of the 108 slots in use. Our initial deployment was with a CSM-60 (with 60 tape slots versus the 108 in the CSM-100), so the scalability of the PetaSite model has already paid off for us, as I anticipate it will [again] at the next capacity step" notes Proulx.

Both Mean Time Between Failures (MTBF) and tape drive Head Life Expectancy are longstanding storage industry measurements of library reliability. The PetaSite libraries are rated at a MTBF of 300,000 hours; the PetaSite's SAIT-1 drives have a head life expectancy of 50,000 hours. Likewise, another good reliability measurement for media is the number of passes a cartridge can endure under heavy usage. Sony SAIT media is certified for error-free operation for up to 30,000 end-to-end passes.

## Delightful Results

With the PetaSite tape Library and the True incremental Backup System®, the computer science and artificial intelligence lab achieved its goals; they have been able to quintuple the amount of data backed up without the need to rotate cassettes, they now have the scalability to keep pace with future growing volumes of data, and they have a field-proven highly reliable library device. "With the combination of Sony's SAIT media, SAIT-1 drives, and the PetaSite's average 360/hour cassette exchange time, we're backing up 5 times more data than before in nearly half the time," says Proulx.

Proulx is also impressed with the PetaSite's mechanics and service. "The unit's robotics are amazingly fast and smooth, which will diminish wear and tear on the drives and cartridges. In addition, during installation, we've had excellent experiences with our Sony support engineer. The PetaSite Library and Sony have met all of our performance requirements, and I would say we are all extremely happy with our choice."

The Sony SAIT PetaSite family of tape libraries renders the reliability, performance, and storage capacity required to address the most demanding backup needs at an affordable price. Entry level pricing for a PetaSite library starts at \$63,000, while SAIT-1 media pricing is under 40 cents per GB.

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