

## Archival Storage for a Scientific Research Environment

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As the precision, energy, and output of scientific instruments such as particle colliders increase, so does the volume of data generated from science experiments. With this data has increasing rapidly, there is a serious need to keep the data in storage that is reliable and cost effective. Disk storage is efficient – ideal for frequently accessed data – but is often very costly, and is not a good solution for long-term archiving, especially when data becomes less active.

Cold storage, such as tape storage, has been an ideal solution for long-term data preservation, due to being cost-effective, environmentally friendly and having a long lifespan. Tape technology has been improved in both capacity and performance over the recent decades. Therefore, tape technology has been playing a very important role in managing the exponential growth of scientific data. Tape systems are great for archiving, due to the scalability and high sequential writing speed. However, accessing files from massive amounts of tapes usually is a major challenge for the tape storage system.

In BNL, we have implemented a high throughput active archive system currently stored near 150 PB of scientific data and serving scientists from multiple collaborations worldwide. The implementation concept is based on the most cost-effective and energy-efficient (green) memory model available today.

In this presentation, we will describe the concept of our archival storage and the underlying tape storage complex, as well as the challenges we are facing for future scientific data.

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