



ACTIVE Archive

CHALLENGE:

NorStore is a Norwegian national data storage project designed to provide the Norwegian research community, including all universities, university colleges and research organizations with a centralized storage infrastructure, hosted by the University of Oslo. Due to unrelenting data growth, the University needed a new storage infrastructure that would offer a high degree of consolidation, management centralization, performance and flexibility, as well as scalability, within its budget constraints.

SOLUTION:

File-based active archive to disk and tape:

- Spectra Logic T-Finity enterprise tape library
- QStar Archive Manager 6.0
- Hitachi Data Systems HNAS disk solution

RESULTS/BENEFITS:

- Scalability – can scale up to Exabytes without adding complexity
- Cost savings – provides critical capabilities within available budget
- Reliability - provides the lowest bit error rate – 1,000 times better than other commercial tape and 10,000 times better than most enterprise-class disk drives
- High capacity – up to 4PB

CASE STUDY:

University of Oslo – Norway

University of Oslo Implements Active Archive to Support Storage Needs of NorStore

Norway scientific community benefits from easy and secure access to data

Founded in 1811, the University of Oslo is Norway's largest and oldest institution of higher education. The University has over 27,000 students, 5,900 staff and over 250 employees in the University Center for Information Technology Services (USIT) to support its IT infrastructure. This includes 12,000 Windows PCs, 1,500 Mac clients, 1,000 Linux clients, 300 Windows servers, 1,500 Unix/Linux servers and associated systems such as SANs and backup applications. The University of Oslo's NorStore project is a place where Norway's research community taps into a government-funded storage infrastructure. With a requirement for 24/7 and easy access to large volumes of scientific data, storage reliability is paramount.

HPC Environment

The first round of the NorStore project started in 2009, when the University of Oslo and Trondheim Universities shared storage resources. Researchers, including life and climate scientists, astrophysicists and chemists, shared unstructured data from model runs on high performance computing (HPC) systems via a 10Gbps link over a 500km distance.

USIT staff was finding that the capacity and flexibility of the legacy storage no longer met the University's requirements for the NorStore project. The system was comprised of solutions that operated on older architectures that were challenging and costly due to vendor fragmentation, expiring support contracts, frequent hardware failures and expensive and impractical offline requirements for routine maintenance.



CASE STUDY Active Archive Alliance

After extensive evaluation of alternative storage systems available in the market, the University selected a file-based active archive solution to disk and tape. The system consists of a Spectra Logic T-Finity enterprise library coupled with QStar's Archive Manager 6.0.

High Capacity Infrastructure

In the new NorStore setup, a combination of four Hitachi Data Systems Hitachi Unified Storage (HDS HUS) VM Controllers and a two-node High Performance NAS (HNAS 3090) provide a primary storage capacity of approximately 2.5PB. Approximately 75% is for research data while the remainder serves University administration. Data is tiered between SAS and SATA drives, according to a "heat map" of usage on a 24-hour cycle.

For data that is accessed less frequently, the NorStore system required an active archive with 3.6PB of nearline data residing on an enterprise-class Spectra Logic T-Finity tape library with 918 slots and four IBM TS1140 drives. The system is front-ended by a file system gateway

“The tape library gives us around 4PB of online capacity initially, and we expect this to be quickly allocated. For us, data preservation and bit corruption detection and correction are critical. The combination of technologies in the active archive system has allowed us to gain these critical capabilities while remaining within budget.”

Lars Oftedal, IT Director, University of Oslo

server running QStar Archive Manager and utilizing the proprietary TDO (Tape/Disk Object) file system. The QStar server provides 14TB of disk cache with access to the multi-petabyte tape back end.

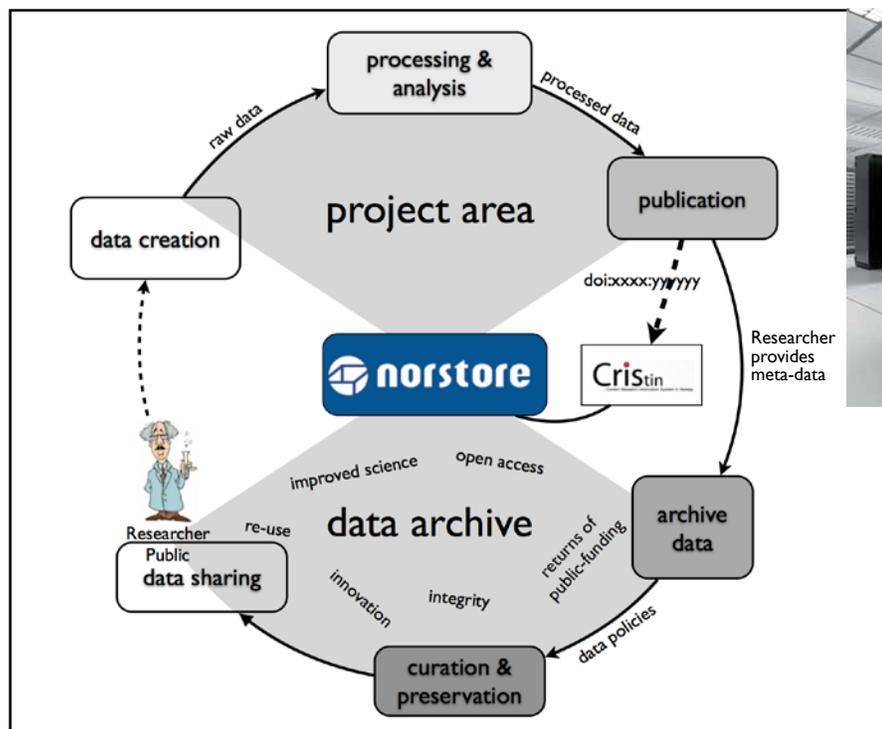
The enterprise tape library provides the

lowest bit error rate -- 1,000 times better than other commercial tape and 10,000 times better than most enterprise-class disk drives. This provides the University with unparalleled reliability.

Tiers of Data

Data is staged to a disk cache attached to the QStar Archive Manager server and gives the user the ability to store data to tape through a NAS-like NFS interface. Frequently accessed archived files are immediately available from the disk cache and older less frequently accessed content is automatically retrieved from the enterprise tape library.

“We use iRODS (Integrated Rule-Oriented Data Management Solution) to provide easy access to data for researchers via a web browser. Also, tape is cheaper than disk and we can potentially grow to Exabyte capacities without adding complexity,” said Hans Eide, department head for research computing at the University of Oslo. “The key benefits to the University have been cost savings and ease of use.”



WHY ACTIVE ARCHIVES?

- Scalability
- Cost savings
- Reliability
- High capacity

SYSTEMS in ARCHIVE

- Spectra Logic T-Finity enterprise tape library
- QStar Archive Manager 6.0
- Hitachi Data Systems HNAS disk solution