



CUSTOMER
SUCCESS

NetVault Delivers Los Alamos Lab's Backup Over Gigabit Ethernet Storage Area Network

FAST FACTS

Challenge

To provide high-performance backup for large-scale image files used for scientific research in an advanced network storage environment, while delivering lower TCO and increased user control

Solution

Providing full NDMP capabilities via Gigabit Ethernet switch for Gigabit Ethernet-connected tape libraries and filers holding 50 terabytes of data

NAS/SAN convergence using NetVault, two Spectra Logic 64K libraries with a total of 16 Sony AIT-3 tape drives, Extreme Networks Gigabit Ethernet switch, eight Network Appliance Series F800 filers, and Linux server

Operating System

*Linux Red Hat 7.2
Kernel 2.4*

NetVault's ability to provide full NDMP capabilities over a Gigabit Ethernet SAN fabric promises increased quality of service, performance and capacity over the laboratory's existing network infrastructure.

The Company

Los Alamos National Laboratory conducts research in physics, biotechnology, advanced materials, computing, and environmental science for the U.S. Department of Energy's National Nuclear Security Administration. More than 10,000 people work at the laboratory, which is located in Los Alamos, New Mexico, and operated by the University of California.



The Challenge

Research projects typically generate immense data files. Los Alamos scientists run simulations in areas including Global Ocean Modeling and Quantum Chromodynamics, and have generated more than 50 terabytes of data stored on eight Network Appliance F800 filers. In their work, the group members create large image sets that range in size from hundreds of megabytes to multiple gigabytes.

The network architecture and backup capabilities were linked through a Gigabit Ethernet network to the Network Appliance F800 filers, which provide online disk storage. Data from the filers went through a Gigabit Ethernet switch to a Linux server, and then over SCSI to a Spectra Logic 64K tape library using Sony AIT-2 technology. The problem with this approach was that the data growth began to outstrip the capabilities of the systems to backup the data in the available time window.

Although the components of the network functioned properly, the network's growth created a design bottleneck. During a backup,

all the data on the filers passed through a Linux storage server to the tape library, and the server's restricted bandwidth caused backup times to stretch.

Another cause of low performance was that the existing setup did not allow load balancing, so some tape drives could be idle while others had queues of data waiting to be backed up. Also, the tape devices themselves had a transfer rate of 6 megabytes per second for native transfers, which was simply too slow, given the amount of data that needed to be backed up. In addition, Los Alamos sought to achieve the fastest restores possible, together with the highest amount of availability, such as recovery from failed tape drives, or failed filers, and to manage this on their existing GbE network.

The Solution: NetVault

NetVault's key features are its ability to support the advanced NDMP functionality the team wanted, NetVault's ability to do it over the existing Gigabit Ethernet fabric, and its ability to support the team's redesigned SAN/NAS backup strategy, including support for a virtual pool of dynamically shared tape drives with auto failover capability. NDMP, or Network Data Management Protocol, is the method by which Network Appliance filers allow high performance backups and restores of their data. Both BakBone Software and Network Appliance are leading contributors to the new NDMP standards.

The solution started with a redesign of the storage network. First, the Linux server was taken out of the data stream; it now handles job starts, messaging, and index updates after a backup is completed. At the same time, Spectra Logic installed two enhanced TAOS enabled Spectra 64K AIT-3-based libraries that have a total of 16 drives and a capacity of 645 media cartridges each, or a total of 166TB of compressed data. The new drives run at 12 to 31 megabytes per second, several times the

speed of the previous drives and reaching a total throughput of 690GB to 1.8TB per hour. By adding drives, to the maximum of 32 per library, the data speeds for backup can exceed 3.6TB per hour.

NetVault further increased performance by allowing Direct Access Restore (DAR) through NDMP, alternate filer restore via NDMP, and by supporting Jumbo Frames which are several times larger than the default GbE MTU frame size of 1.5K bytes, allowing backups to speed through the IP network at a far higher rate of speed. These capabilities helped solve the team's backup performance problems. The redesign of the storage network enabled NetVault to deliver enhanced NDMP

NETVAULT KEY DIFFERENTIATORS

- NDMP support for Dynamically Shared Drives
- NDMP support for Direct Access Restore
- NDMP support for alternative filer restore
- NDMP support for Gigabit Ethernet and Fibre Channel SAN fabrics
- NDMP support for Gigabit Ethernet Jumbo Frames
- Linux Server support for NDMP and SAN/NAS fabrics

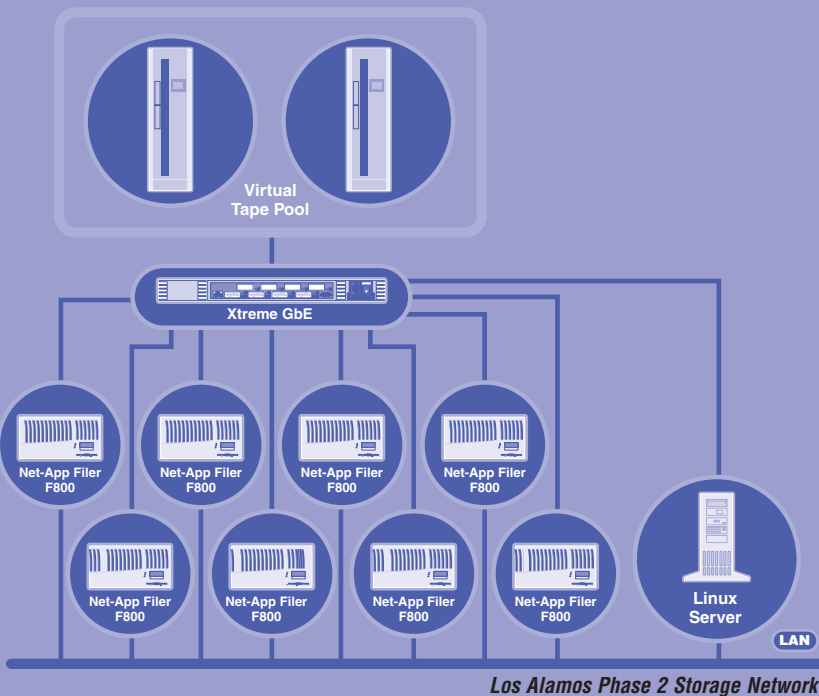
capabilities. For example, rather than assign one drive per filer as before, the team now has a SAN type virtualized pool that can backup from any filer, or a user can designate any of the 16 drives to backup any filer, helping to increase the levels of flexibility, redundancy and dynamic fail-over capability, all on the existing GbE network.

THE FUTURE

Scientific applications rarely get smaller. NetVault's ability to provide full NDMP capabilities over a Gigabit Ethernet SAN fabric promises increased quality of service, performance and capacity over the laboratory's existing network infrastructure.

SPECTRA LOGIC KEY DIFFERENTIATORS

- TAOS enabled native Gigabit Ethernet connectivity
- Ability to leverage existing network for backup traffic
- Native NDMP support
- Minimal additional cabling
- Smallest Footprint



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SPECTRA LOGIC



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