

CentricStor Virtual Tape Appliance in use at Informatikzentrum Niedersachsen (izn)

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Virtual tape technology frees up space in the data center and provides fast and high-available tape processing

Economic data backup and guaranteed restore are bread-and-butter tasks for data center operators. Because of its high capacity and relatively low cost, magnetic tape has traditionally been the storage medium of choice for backup, but CentricStor Virtual Tape Appliance in use at the State of Lower Saxony's IT center is proof that significant additional savings in terms of resources, time and space can be realized with virtual tape technology. Thanks to the virtual tape solution developed by Fujitsu Siemens Computers, the Informatikzentrum Niedersachsen (izn) has reduced its tape library footprint by 90 percent and cut the number of tape cartridges required by more than 98 percent. izn customers benefit not only from lower costs, but also from better performance and from the comprehensive security offered by the storage solution from Fujitsu Siemens Computers.

In early 2002, Uwe Schneider, the project manager of the data center, faced the challenge of consolidating the center's hard disk and tape storage systems. "Analysis showed that our automated tape libraries took up 230 square meters at the time — space we urgently needed for additional computer systems because of our continuing growth," Schneider remembers. Most of the space was taken up by nine StorageTek PowderHorn 9310 Tape Libraries from the 1990s, managing a total of 35,000 tape cartridges. "Since the tape libraries and their usable tape capacity were no longer state-of-the-art, we decided to update our classic tape operation and to implement an innovative virtual storage solution," Schneider continues.

The izn chose a virtual tape solution to optimize the utilization of existing resources and make sure that the media capacities are always used up to the limit. Classic mainframe applications often store only a few records on a data cartridge and leave most of the theoretically available capacity unused. Virtual tape systems, on the other hand, first store the records over virtual tape drives on disk and are therefore able to combine many small records into one large record,

a practice referred to as volume stacking. That way, the system makes use of the total available capacity of the physical tape media, which reduces the costs significantly. In addition, virtual tape technology improves reliability, and the integrated disk-to-disk-to-tape solution provides the user the speed of disk, thereby significantly reducing the time window for backups.

The izn's decision in favor of CentricStor was the result of an EU-wide request for bids. Fujitsu Siemens Computers was the only manufacturer able to supply a virtual tape solution that could serve OS/390 resp. z/OS as well as BS2000/OSD systems. Open systems running UNIX and Windows can likewise be seamlessly integrated into the system.

Intelligently creating space

The first project phase in July 2003 involved linking the CentricStor solution via an ESCON interface to each of the two sets of BS2000/OSD and OS/390

systems. For disaster recovery, two CentricStor modules were installed: one at the main data center and one at the backup site. For the physical tape storage, two new ADIC Scalar 10K Libraries with six LTO-2 drives

Informatikzentrum Niedersachsen (izn)



The izn is an IT systems house that provides support for public administration agencies in the Federal state of Lower Saxony with a wide range of products and services, such as consulting, design and implementation of e-government solutions, the development of special software, training and continuing education courses or hardware procurement. With a workforce of some 420 employees, the izn also provides the various departmental systems for the state's administrative agencies via high-performance data centers.



each were connected to CentricStor, both of which initially ran in parallel with the nine existing PowderHorn systems. Explaining the decision, Schneider comments: "Our first goal was to collect some experience with the new Virtual Tape Appliance, and with our mainframes we could carry out the conversion step-by-step with no downtimes." This "soft" migration allowed the data center to integrate CentricStor with the new tape libraries into the ongoing operation on a gradual basis, by steadily reducing the data maintained on the old tape libraries in accordance with retention times. The transfer of the long-term archived data was accomplished with the help of appropriate tape management tools.

The data migration was complete after less than one year in April 2004, with the PowderHorn systems replaced gradually by two Scalar 10K systems, reducing the physical space required for tape libraries by 90 percent. Even more impressive were the savings resulting from the reduction of the number of tape cartridges: from 35,000 low-capacity tape cartridges to 250 high-capacity 200-GB tape cartridges at each of the two data centers. In addition to the higher capacity, the main reason for this tremendous reduction is the introduction of volume stacking via CentricStor. Writing multiple logical volumes on a single physical medium improves the media utilization rate from often less than 20 percent to now more than 90 percent on a single 200-GB cartridge.

More security, lower costs

In addition to lower tape costs and smaller space requirements, the consolidation also reduced the costs for administration, service, maintenance, electricity and air conditioning. Not only does the data center itself profit from these cost savings, it is also able to pass these on to its internal customers. At the same time, CentricStor improves data security and — an important factor when operating complex

interactive applications — reduces the backup window.

"CentricStor not only handles the autonomous duplication and archiving of tape media at a second location, it also automatically reorganizes the media, which nearly eliminates the risk of a physical tape error," Schneider explains.

Open systems integration has begun

In the second phase, the consolidation is benefiting also izn's customers in the open systems environment. Until 2004, backups were made using separate servers with the Tivoli Storage Manager (TSM). After a successful pilot project, several hundred Windows and UNIX clients have now been linked to the virtual tape system via the TSM servers. To handle the additional load, the number of front-end processors in the CentricStor system was doubled to two per data center. And at each location 128 virtual tape drives and a two-terabyte cache for open systems applications were added to the existing 32 virtual tape drives.

Since data in the open systems environment does not require any long-term archiving, the migration involved simply a direct switch to

CentricStor. In addition to the 11 terabytes of mainframe data, 30 terabytes of compressed data from the open systems have already been migrated. Schneider estimates the total amount of data to reach 80 terabytes by the end of the project, and the trend continues to point upward. While the amount of data in the mainframe environment keeps largely stable, Schneider expects a growth by ten percent annually for the Windows and especially the UNIX systems — challenges for which the izn is well prepared: "The standardized components and the intelligent internal architecture provides easy expansions and maximum scalability. In addition to the financial benefits of consolidated and standardized tape automation for all systems, CentricStor features significant benefits in the field of Information Lifecycle Management. Besides the already installed automatic failover function, the new CentricStor version, which we implemented in December 2005, now also features cache mirroring across both locations. The convincing concept of volume groups and cache partitioning allows us to keep individual logical volumes strictly separate from each other. After testing, we also plan to implement other CentricStor features in the near future, such as differentiated access rights for administrators and operators."

