

Virtual Songs of Praise A closer look at the CentricStor Virtual Tape Appliance

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When is a VTL not a VTL?

Since the term VTL has become a buzzword in the storage industry, this has also blurred the difference between virtual tape appliances and more humble tape library emulators. Although these two technologies sound similar, in fact they're vastly different. In this article, Fujitsu Siemens Computers Principal Consultant Helmut Mühleis explains why enterprises considering how to consolidate their storage backup need to make the differentiation.

More and more, VTL is being used as an umbrella term for all the different approaches to tape emulation on disk storage, which means that the term is losing its meaning, much like the over-used phrase "information lifecycle management". When it comes to enterprise storage, VTL originally stood for Virtual Tape Library. There are in fact only a handful of VTL virtual tape systems that completely virtualizes tape storage, among them the VTS (Virtual Tape Server) from IBM, the VSM (Virtual Storage Manager) from SUN StorageTek and the CentricStor VTA (Virtual Tape Appliance) from Fujitsu Siemens Computers.

Of these, CentricStor's True Tape Virtualization technology is the only solution on the market that works with open systems in addition to mainframes and, what is key, seamlessly consolidates tape from both worlds. All other "VTLs" – and Google currently lists more than 25 vendors offering a variety of virtual tape implementations – most are actually emulating tape library interfaces in front of disk, using what are also known as Disk-to-Disk based libraries.

To make the grade, a true virtual tape system should be able to perform an integrated Disk-to-Disk-to-Tape backup, or D2D2T. True VTLs write all data to a disk-based Tape Volume Cache (TVC) before writing the data to physical tape media, performing tape volume stacking to utilize maximum tape capacity.

However, while CentricStor offers this autonomous, policy-based physical tape writing process, disk based virtual tape storage solutions do not. Although emulators do provide benefits in terms of overall business velocity, since data can be written and retrieved from disk faster than from sequential tape, therefore shrinking time windows, there is no tape optimization and that means no consolidation. Opting for an emulator also means losing out on the advanced tape management operations that are featured standards within CentricStor ILM for tape.



Some comparisons between a CentricStor Virtual Tape Appliance (VTA) with True Tape Virtualization and other disk-based tape emulation approaches:

1. Data transfer path

VTA: Data travels via the front-end processor to the Tape Volume Cache (TVC) and, after volume stacking, automatically to physical tape.

Others: Tape emulators in front of disk use full disk capacity for storing native tape data on disk, so data must be manually transferred from disk to tape under control of the backup server

2. Physical tape size

VTA: A true tape virtualization front-end provides interface and format flexibility, as it is totally independent from the back-end tape technology and can write to a wide variety of tape formats and sizes

Others: Data format on disk and tape must match: data on disk must have the same format, size and barcode as the optional physical environment

3. Read and write processes to and from physical tapes

VTA: Fully integrated automated tape processing and media management

Others: Export to physical tape must be controlled by a backup software tool, which needs to send individual requests to the disk-based library for it to save to a physical volume (a tape). Data recovery of physical volumes is manual.

4. Tape volume compression

VTA: Standard, does not degrade throughput (no reduction in maximum tape-write speeds) and is space-saving

Others: Compression has an adverse effect on both throughput and physical volume size (tape)

5. Migration of libraries or drives to new technology

VTA: Host-free. True Tape Virtualization offers total transparency between virtual interfaces at the front-end and physical tape systems at the backend

Others: Only via the host, a process that is laborious, time-consuming, and prone to error. The same applies to refreshing or repairing faulty tapes

6. Simple replacement of faulty tapes

VTA: Straightforward, the VTA detects faulty tapes and automatically creates a new copy

Others: Unavailable

So what makes CentricStor special?

Now the differences are clear between a CentricStor Virtual Tape Appliance and emulated tape library interfaces, let us examine what makes CentricStor stand out among VTLs. CentricStor is the only VTL in the world that provides simultaneous support for mainframe technologies, via ESCON and FICON, and open systems via Fibre Channel connections. CentricStor integrates tape into ILM strategies seamlessly: The CentricStor concepts of Volume Groups, TVC partitioning and Volume Attributes, which control the policy for the migration to tape, allow the realization of dedicated data protection service levels. With CentricStor site failover and mirroring technology, long distance disaster resistance is supported. These capabilities are also ideal pre-conditions for integrating CentricStor into managed storage concepts.



Let's take a look at some of the other benefits that set CentricStor apart:

- Throughput of up to 1500 MB/sec based on FICON, up to 2500 MB/sec on Fibre Channel – speeds that are unmatched.
- Every front-end processor in CentricStor has its own space saving co-processor for tape volume compression – this does not affect throughput
- Every component of the CentricStor Grid Architecture is redundant, offering highest availability
- Different tape emulation types, such as 3490E, Magstar 3590, STK 9840B, Generic SCSI and Mammoth II – all of which can run simultaneously – makes the integration with existing backup software environments easy
- Simultaneous support for Jukebox and LAN-controlled tape libraries (AMU, DAS, ACSLS, LMF) guarantees a high degree of investment protection
- Up to 500,000 logical volumes, each of which can be between 900MB up to 200GB in size – meaning that CentricStor offers more flexible (virtual) slot capacity than any physical device
- Enhanced system stability since all metadata is controlled by a dedicated pair of internal processors, responsible only for system control and not for data transfer
- Front-end and back-end are totally independent with True Tape Virtualization, which means CentricStor can emulate, for example, a library interface from SUN StorageTek at the front-end even when there are ADIC/Quantum and / or IBM libraries at the back-end
- Support for all standard operating systems, backup tools and tape management systems – even when all are running simultaneously
- Different volume size per logical volume group, depending on the back-end drive, restore restrictions and SLAs (Service Level Agreements)
- Nearly unlimited Tape Volume Cache size, divided into “floating” and “residence” partitions, with the CMF (Cache Mirror Feature) automatically mirroring the TVC synchronously for enhanced resilience
- As with RAID technology for disk, Dual Save generates multiple tape copies, called a RAIT (Redundant Array of Independent Tapes)
- Internal FC connections to the CentricStor Grid Architecture allow split configuration for disaster tolerance deployment, with two sites of CentricStor hundreds of miles apart, connected via DWDM (Dense Wavelength Division Multiplexing) data connections over fibreoptic cables
- Simultaneous support for nearly all standard tape libraries, tape drives and tape formats
- Automated physical tape refresh, and generation of a new tape when faults are detected
- Long distance support to tape libraries (up to 1000 KM)
- Support for tape encryption

As we have discovered, it's important to look beyond the hype when considering how a VTL solution will enhance an enterprise's data backup capabilities. Although at first glance, the choice of solutions may appear overwhelming, a second look reveals clear differences, and that is why this article began by asking when a VTL was not a VTL. Data centre managers looking to truly virtualize their tape processing should take a careful look at the value-add that a true VTL will bring to their day-to-day backup and restore operations before choosing a Disk-based Library as the single-box solution.

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