



Storage Management Software

Special points of interest:

- TCO Tips
- Volume Spanning Tech Tip
- Release Update
- New Hardware Support

Volume 4

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From the President's Desk

Archive TCO By Roy Slicker

To determine your TCO for data lifecycle manager, it's important that you determine what you are trying to accomplish with your system. Determine what pressure points you have and how to best address them with available technology, both hardware and software. This will become your business case. Closely examine the regulation requirements your business needs to meet and understand them fully. Some are very specific, while others are vague and up for interpretation. This is an area where a consultant can come in handy. This area is key, as it can have both a legal impact on your company as well as a financial one.

Determine how often and by how many people archive data will need to be accessed. You will also need to determine what type of files and how long they will need to be retained. This can be different for each aspect of your business. Once these can all be identified then you can get

ment software. An archive system should include policy based automated migration of data, as well as prevent unauthorized user access to data. There are a number of packages available on both a broad scale as well as vertical market specific versions.

You will need to include all storage server and hardware annual maintenance as well as application and management software annual maintenance costs. This should be planned over the life of the data, not the expected life of the hardware. If your data is regulated for 7 years, it won't be of much use to do a TCO for 5 years and expect to hit that number.

Annual operating costs are also often overlooked, so be sure to consider the cost of storage administration, computer room space through your data lifecycle growth period, primary power consumption costs, and secondary cooling costs. Cooling costs can be significant if you are running a hard drive based system.

Also often overlooked is the cost of data migration. Consider the cost of system hardware upgrades over the life of the data to be managed, migration administration, and associated cost for

Simple Comparison of 8 to 13 TB over a 5 year period

Technology Type	Capacity TB	HW List Price	Media List Price	Storage Mgt SW Price	HW and SW Maint.	Power and Cooling	Est Space Cost	Est Server Cost	Grand Total	Price per GB
DVD-R	8,225	\$32,690	\$13,913	\$9,995	\$25,337	\$711	\$10,200	\$5,000	\$97,846	\$12
DVD-RAM	8,225	\$32,690	\$19,600	\$14,995	\$25,337	\$711	\$10,200	\$5,000	\$108,533	\$13
UDO	13,140	\$84,677	\$17,082	\$16,995	\$64,357	\$1,325	\$10,200	\$5,000	\$199,636	\$15
Disk System w/Parity	9,600	\$124,000	\$0	\$202,000	\$135,560	\$11,773	\$9,000	\$0	\$482,333	\$50
LTO Tape	13,000	\$44,959	\$13,766	\$8,500	\$45,889	\$9,905	\$6,418	\$5,000	\$133,074	\$10

down to the business of establishing a TCO.

Hardware costs you will want to consider include the storage system itself, the storage media (if separate) and any storage server needs you may have. This may be determined through regulation interpretation, or simply by how long data needs to be available and if it must be write-once. There may be more than one media choice that suites the application so a decision will need to be made between technologies. A TCO can help in that regard.

On the software side you will want to consider application and data lifecycle management software costs as well as storage manage-

audit trail management. Data migration triggers include:

- Upgrades to system hardware
- Migration to newer/higher capacity media
- Refreshing existing media (tape)
- Rebuilding existing media due to system failure

Additional costs to consider depending on media selection and regulation requirements:

- Remote site mirroring
- Data disaster recovery and backup
- Removable media vaulting

PEGASUS DISK TECHNOLOGIES, INC. **The Pegasus Flyer**

Tech Tips: Considerations for Creating Volume Sets

by Steve Heyer

In part one of this article I will discuss the changes in approach that are necessary when creating volume sets.

With the addition of Volume Spanning, a change in the existing paradigm has occurred for how media is created and used in the InveStore Storage Management software. The earlier concept was that of multiple, discrete single-surface volumes. InveStore v4 provides the ability to span multiple media surfaces into logically defined volume sets.

Volume Sets and Spanning provide new functionality to take advantage of, read how.

These new options and parameters provide the administrator with expanded functionality in how the storage system is used. **Write Order** can be set to **Contiguous** (the A and B side of a media is used before using the next media surface) or **Staggered** (All A side surfaces are used before using the B side surfaces). The **Volume Set Type** may be set to **Fixed**, **Automatic**, or **Manual** extensibility. Also the administrator is able to determine the maximum size of a volume set.

Because of these changes it is important that from the very beginning you are careful in your consideration for planning the implementation and creation of your volume sets.

For example, happy to get away from single surface limitations, you might decide that it would be best and easiest to simply “virtualize” the whole storage library into one large volume set. With this in mind, you format all of your WORM media surfaces in the library into a single volume set. While this is possible and may be easier for you up front, this may not be advisable. Due to the limitations in the capacity of the storage library itself and the number of surfaces contained in this single volume set, this may create practical management issues later on, once the volume set becomes full and you need to either write new data or move a member surface off-line.

Just as it is inadvisable to write all of your files to the root of the C drive of your server, likewise in most cases it is not advisable to simply create one large volume set, and write all of your files to the root of that volume. Keeping your volume sets logically organized and manageable in size and number is important. Careful planning of this is critical to the long-term practicality of your volume sets.

Start this process by determining the storage needs that you have. This is based on how your data is naturally grouped and accessed. For example, is your data logically divided into groups such as company departments (E.g. Accounting, Sales, Engineering)? Is your data stored based on the month and calendar year? Are you using this as a primary backup target? This forms the basis for the number and types of volume sets you will create.

Next determine how much storage space is required for each group of data. While this may be difficult to determine, you would obviously want allow for sufficient space on a given volume set, so that you do not run out of storage space when adding data to a given volume set that is now full.

In part two of this article, I will discuss storage library capacities and specific format options.

To correctly calculate your storage space requirements based on each of these groups of data, while keeping your volume sets manageable. At this point in your implementation you will have determined the number and size of your volume sets.

Capacities

You will need to keep in mind the physical media capacity of the storage libraries that you are using as it relates to the size of your volume sets. While InveStore v4 allows you to create a volume set using all of the surfaces in the library, or to create one that spans across more than one library, in general we do not advise that you do this. This is more of a practical management issue. The volume set may become physically too cumbersome especially if you should exceed the capacities of your storage devices.

Along the same lines, your volume sets should be created keeping in mind how you plan to store offline-archived data. Take into account the importance of being able to keep all the members for a single volume set together and properly labeled.

Format Options

When creating your initial volume sets there are several format options that you will set that define the functioning parameters for your sets.

Continued on Page 3

Tech Tip Continued

- 1) The first option is **Write Order**. This determines how data is written to the individual member surfaces. A **Contiguous** write order is where the A and B-side of media is used before using the next media surface. A **Staggered** write order is where all A side surfaces are used before using the B-side surfaces.

For example, if you are using a storage library that has 4 or more drives you may want to set your volume set to **Staggered**. This is so that more surface members of a given volume set can be under the read head of the drives in the library at the same time.

Or you may want to set your volume set to **Contiguous**, so that you keep like-kind data located on surfaces of a group of media in a given volume set, rather than potentially spreading out the data out over surfaces on a large number of media.

- 2) Consider setting the **Number of Surfaces** (used to begin the set) to an even number of either 2 or 4 surfaces (depending on the **Write Order**). The **Maximum Number of Surfaces** should be set to a value higher than the storage space requirement that you calculated. (You may set all of your volume sets to the maximum capacity of the storage device, even though you will not actually add all of these surfaces to the volume sets. This allows the greatest flexibility for your volume sets to grow as needed.)

Set the **Volume Set Type** to **Automatic** or **Manual** extensibility allowing the set to grow as needed. We suggest starting

in this fashion rather than formatting up front all members of the complete set at creation time.

The primary reason for this is that it allows you to manage the process better as you proceed. You may find that you only require 6 surfaces for a specific volume set for the data you have written to storage. If you had formatted all 20 members of WORM media for this volume set, you would now have 14 members that are no longer needed in the volume set they were created in.

Or you may find that one volume set requires more storage space than you initially calculated. Approaching your volume set creation process in this way allows you greater flexibility as your storage system grows and changes.

Note: Some exceptions to this would be if you needed to create a **Fixed** volume set or you were creating a volume set **Target** for use in a pair within the InveStore **Backup** program.

Conclusion

In conclusion, we recommend that you keep your volume sets logically organized and manageable in size and number, allowing InveStore to grow the volume-set as new surfaces are needed, better matching your actual storage needs.

Remember to keep in mind that careful planning and implementation of your volume sets at creation time will provide you with greater flexibility and manageability, as your storage system needs grow and change.

What's New:
Backup and
Devices

New Releases

New Functionality

In pending release version 4.11, Pegasus will add an unattended reformat media option for back up applications. This will allow customers to do unattended backups with their current backup software onto optical based devices, by allowing InveStore to reformat expired data backup sets and

rewrite new backups onto those sets.

New Hardware Support

Pegasus will be adding new hardware support in up coming version release 4.12, scheduled for July. The new hardware will be the AM DVD-RAM series libraries from Asasca, the NSM DVD-RAM series libraries from DISC, The DRM DVD-RAM series libraries from Pioneer, and the Enterprise D from Plasmon.



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OSTA Nominates Roy Slicker to Head Committee

In an effort to reorganize and refocus the High Performance Committee at the Optical Storage Technology Association, OSTA formed a new committee to focus on optical market issues. This new committee is the Commercial Storage and Archive Applications Committee, now headed by Roy Slicker, Co-founder and President of Pegasus Disk Technologies.

The charter of the CSA committee is to be the global independent authority in data archival systems, applications, solutions and provide a repository for information regarding the usage of optical storage in archival technology.

The first meeting was kicked off on March 24, 2003 and had representation for leading optical storage providers such as DISC, Imation, Fujitsu, HP, Plasmon, and Sony. The next meeting is being held on June 16, 2003. For more information on OSTA go to <http://www.osta.org>.



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About the Flyer

We are always looking for suggestions on content, particularly product stories with our hardware and software partners. If you have ideas or suggestions about future content, want to be added to our circulation or would like hard copies of the newsletter for your customers, please send us an email at marketing@pegasus-ofs.com.

Current Events

You can see Pegasus at the following Spring events:

VERITAS Vision in London, UK, June 4 and 5

VERITAS Vision in Frankfurt, GER,

June 17 and 18

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