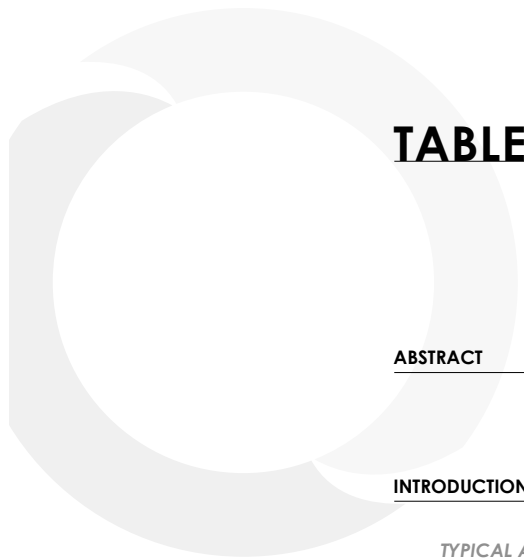


# **PARTITIONING IN TAPE AUTOMATION**

*Using Tape Automation in Heterogeneous Backup Environments*





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# ABSTRACT

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This paper describes a means to consolidate backup data in a typical Storage Area Network (SAN) where multiple backup environments (combinations of backup software and operating systems) are involved. The Library Partition Option (LPO) for Neo Series from Overland Storage Inc. enables users to create virtual libraries within a standard Neo Series product. For the user, this means that multiple backup environments—that would otherwise be incompatible with one another—can share one physical library enabling users to retain their legacy backup environments while centralizing the backup data.



**NEO SERIES™ AUTOMATED  
TAPE LIBRARIES**

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Option (LPO) for Neo  
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# INTRODUCTION

*This white paper introduces Partitioning, a more cost effective means to accomplish the separation of operating system data while improving reliability and throughput at the same time.*

One of the trends in the storage industry has been the evolution of Storage Area Networks (SAN), a Fibre Channel or Ethernet connected network having a group of hard disks, tape libraries and network switches all of which "appear" as a huge storage facility to a network of application servers. Typically the storage can be managed as a group resource at the disposal of all the network servers. For a group of Solaris servers, or a group of Win2K servers, this is an attractive solution. The advantages:

- A. Centralized backup creates backup tapes in one place making for improved media tracking and control.
- B. The process is automatic and driven by one backup software package.
- C. Depending upon the backup software, backups may even take place while the system is in operation making the backup window invisible.

However, not all datacenters are running Solaris Operating System software exclusively or Win2K software exclusively. Most real sites involve two or more operating systems, in fact four is not unrealistic (Solaris, Win2K, Linux and Mac OS). One of the conflicts this leads to in tape libraries is the need to keep cartridges segregated by operating system. Knowing that a Win2K application will not recognize data written by Solaris means that one operating system could over-write tapes written by another simply because it doesn't recognize the data as its own.

So in most real applications where multiple operating systems are in use, some means must be found to keep the cartridges for each operating system separate from one another. In the recent past, this was done by:

- A. Buying separate small libraries – one for each backup environment
- B. Buying special backup software which can create "soft" virtual libraries

Another factor involved in backup environment decisions involves the library interface. Some servers will have a SCSI interface for the tape library while others may have Fibre Channel. Most datacenters will have more than one interface, which adds to the challenge of centralizing backup.

This white paper introduces Partitioning, a more cost effective means to accomplish this separation of operating system data while improving reliability and throughput at the same time.

## TYPICAL APPROACH TO STORAGE AREA NETWORK (SAN) BACKUP

SAN backup solves the problems of Local Backup but then, as one might expect, adds some new ones. Without debating the merits of one SAN infrastructure over another, this paper will just assume a generic storage network whether it is based upon Fibre Channel, Ethernet or some new interface. The conclusions will still be the same.

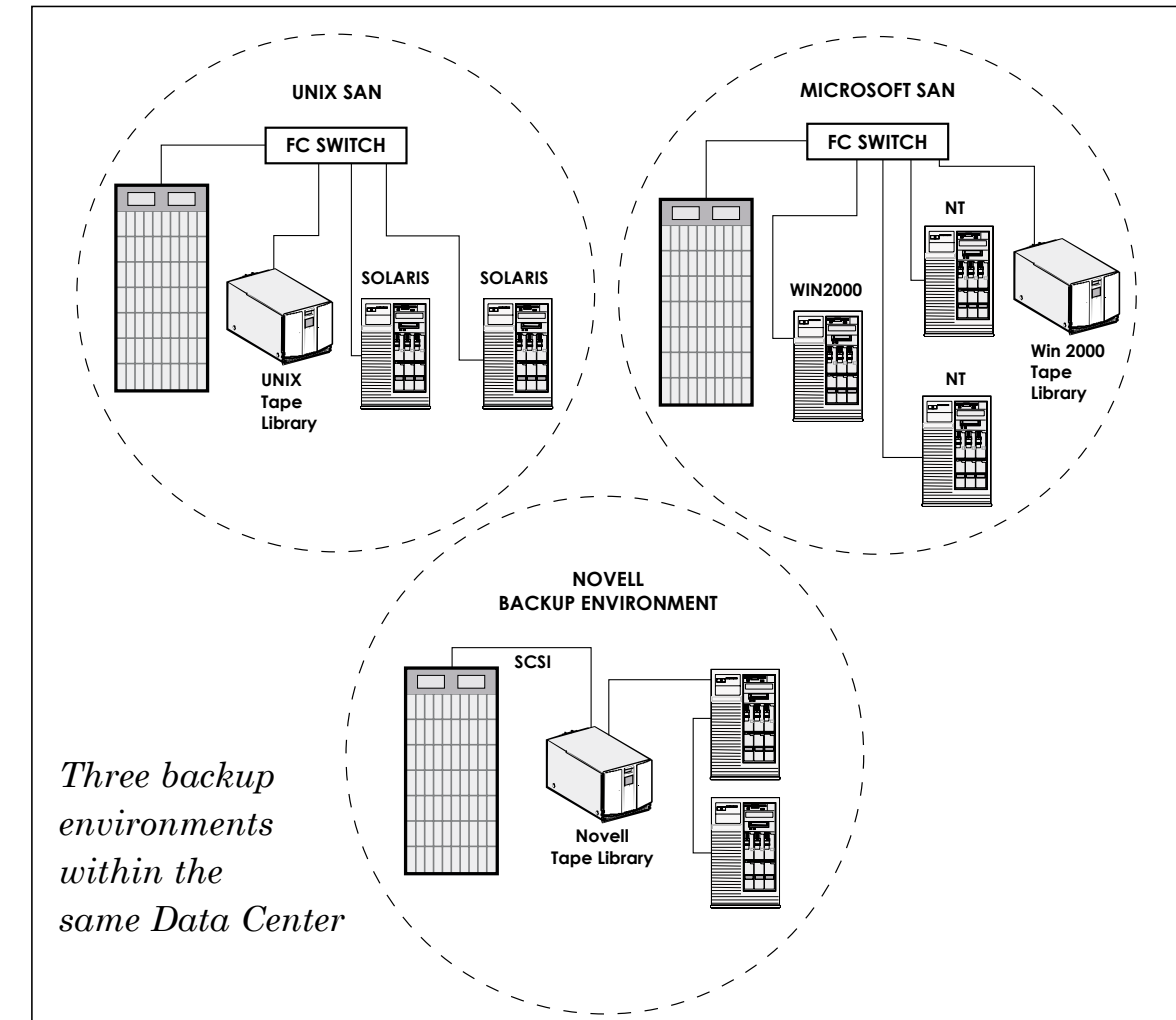
As mentioned above however, most real-life applications involve multiple environments and bring an immediate concern:

How does the user prevent one operating system from destroying data written by another?

In some cases, a user will employ multiple small libraries—one for each operating system. This brings back the problems of Local Backup in as much as multiple storage devices are involved and the problem of managing and tracking cartridges returns. In a way, it gives up the best advantages of SAN backup.

In other cases, users employ a software partitioning solution, an approach which requires that one server be assigned to host the backup software. Each of the other servers has complementary backup software installed such that they communicate with the Primary Group server in executing a backup job. However, only the Primary Group Server controls the library robotics. Thus the auxiliary backup servers must use the Primary Group server in order to execute their backup job.

*SAN backup solves the problems of local backup but then, as one might expect, adds some new ones.*



Software partitioning is architecturally successful but the reality is that the software requires a separate module to support each new operating system, thus forcing the users to buy different backup software packages. Not all backup software offers a similar sharing option so the customer may not have a complete solution if the existing backup software doesn't support sharing on a specific operating system.

More importantly, the Primary Group Server becomes a single point of failure in which the entire backup job can fail if the server fails. True, the Primary Group Server function can be re-assigned to another server but all this system re-configuration requires human intervention.

*Software partitioning is architecturally successful but the reality is that the software requires a separate module to support each new operating system, thus forcing the users to buy different backup software packages.*

# A NEW SOLUTION



## LIBRARY PARTITION OPTION FOR NEO SERIES (LPO)

*A hardware solution to heterogeneous backup is now available.*

*With the use of the Library Partitioning Option (LPO), multiple modules can operate as multiple partitions.*

A hardware solution to heterogeneous backup is now available. This approach is available from Overland Storage Inc. and is known as the Library Partitioning Option (LPO) for Neo Series tape libraries.

Essentially, this solution uses the modular tape architecture of the Neo Series to create multiple virtual libraries within one Neo tape library. Each of these virtual libraries operates as if it were a completely independent and free-standing tape library. It accepts normal tape library commands and data from a host server backup software package and executes those commands within the drives and cartridges over which it has control.

This approach:

- A. Enables the customer to use existing backup software
- B. Use existing Neo Series libraries where available
- C. Can be re-deployed or re-configured easily for changes in the environment
- D. Is substantially less expensive than software solutions

## NEO SERIES PARTITIONING IMPLEMENTATION

Starting with a modular tape library, it is a given that the tape library has multiple robotics because each module has one robotic "arm." Through the innovative Neo Series design, these modules can operate as one complete library or, with the use of the Library Partitioning Option (LPO), operate as multiple partitions. Some of the features of this option are:

- A. Partitions can be as small as one drive and one magazine or as large as 15 drives and 15 magazines.
- B. Up to 16 partitions can be created in one Neo Series 4400.
- C. Each partition has its own interface which can be HVD SCSI, LVD SCSI or Fibre Channel. All these interfaces can function simultaneously in one physical Neo Series tape library.
- D. NDMP and iSCSI interface options from Overland Storage will also be available for each partition. Please consult with Overland Storage on availability. Other interfaces will also be announced in the future.
- E. Each additional partition uses one LPO card which can be easily installed in the rear accessible Neo Series cPCI card slots by the customer. No need to buy more capacity than required.
- F. Each partition is independently accessed by a host thus assuring backup software compatibility. If the software supports Neo Series (and nearly all now do), that software will support a Neo Series partition.

Each LPO card uses a separate port on the Neo Series internal router to communicate with the master controller thus preserving the Neo Series feature of Remote Failover.

In sizing the system, the number of LPO cards required is equal to the number of partitions required less 1. For example, three partitions requires two LPO cards. Five partitions require four LPO cards and so on. This

relationship exists because the Neo Series library itself is the first partition. If no LPO cards were installed at all, there would be only one large partition equal to the size of the library. Adding a second partition reduces the size of the original partition by the amount of drives and magazines assigned to the second partition. So the first partition is free. Each subsequent partition requires an LPO card.

## PARTITIONING – HARDWARE/SOFTWARE TRADEOFFS

The LPO solution is not particularly aimed at replacing software solutions which do soft partitioning but LPO will be a better solution in most mixed environments. A very common example is a legacy application where a customer has multiple operating systems, a mixture of tape drives and autoloaders and multiple backup software running in an environment where they want to consolidate the tape storage into one physical library. The major advantage of LPO is that it will work with any backup software that recognizes the basic Neo Series and today that includes not only the major packages but just about every other one available. Every month Overland Storage adds more software programs to the compatibility list (see [www.overlandstorage.com](http://www.overlandstorage.com)).

Another advantage involves the architecture. If the application requires two partitions, the customer need only buy 1 LPO card. In the case of software partitioning, the cost of the partitioning is all up front whether the application needs two partitions or 10.

Third, software partitioning requires that one backup server be identified as the Primary Group backup server. If that server fails, the system has to be re-configured. In order to make that re-configuration, some software sharing packages require an additional purchase of additional software.

Fourth, software partitioning is not inexpensive. The user is advised to determine all the packages that need to be purchased before undertaking this approach. It is quite common that LPO is far less expensive than shared storage software.

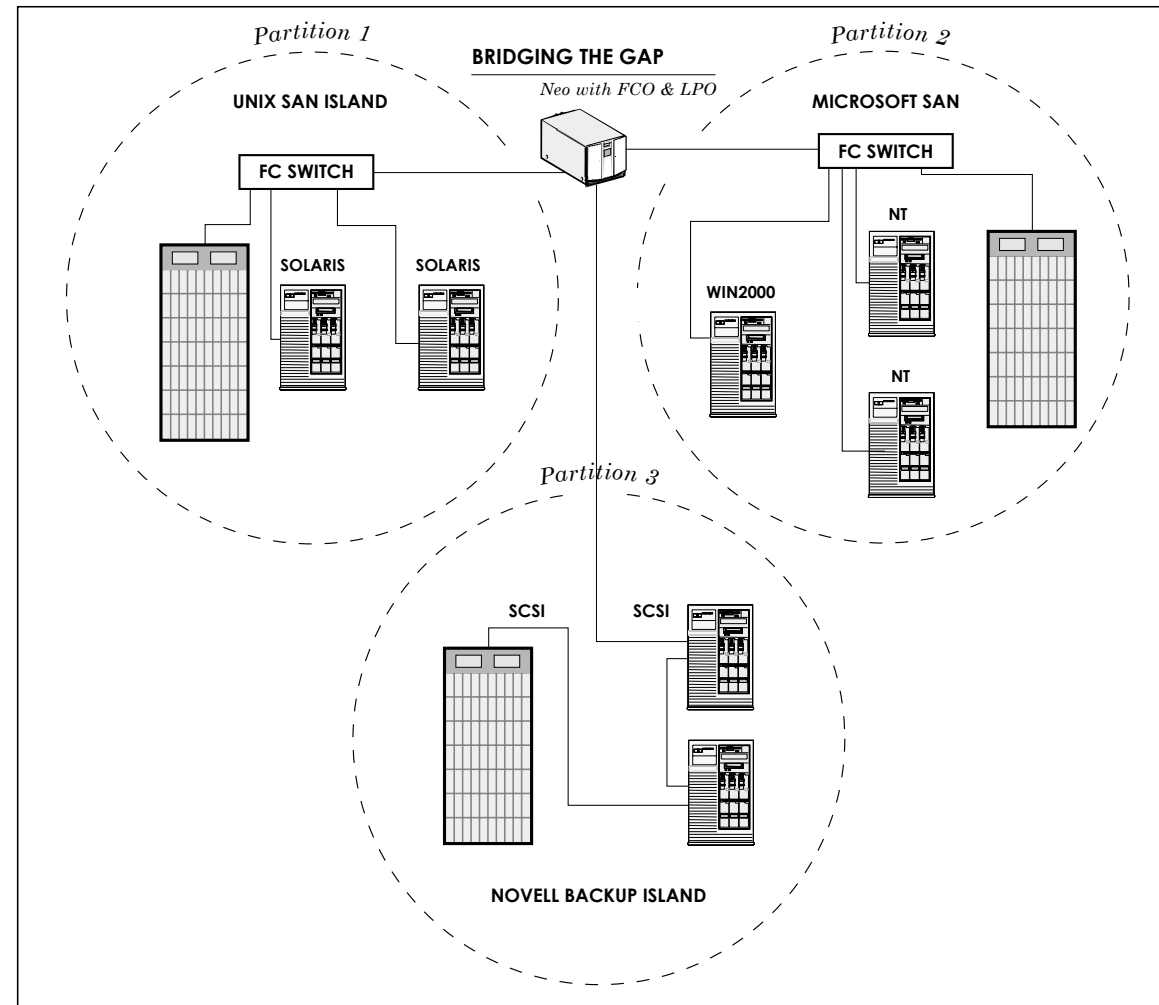
*The major advantage of LPO is that it will work with any backup software that recognizes the basic Neo Series and today that includes not only the major packages but just about every other one available.*

# EXAMPLE OF NEO SERIES PARTITIONING



An example of three backup environments was shown above on page 3—one UNIX, one Win2K and one Novell. In that situation, the user was using three separate libraries, one for each operating system island. Now we can show how that problem is solved with Neo Series partitioning and using only one physical library.

PARTITION NUMBER	INTERFACE	NUMBER OF DRIVES	NUMBER OF MAGAZINES
1 (UNIX SAN)	Fibre Channel	1	1
2 (Win2K SAN)	Fibre Channel	2	2
3 (Novell)	SCSI	1	1



The assignment of drives and magazines to each partition is accomplished through the operator's panel on the Neo Series tape library or through the WebTLC remote library management software.

With Neo Series partitioning, the user has all backup data, UNIX and Win2K in one library with no conflicts. Adding more servers, more storage or more library capacity is easily accomplished making the solution ideal for expanding in the future. All the Neo products and accessories purchased for this solution can be used in expanding to meet future needs. What's more, only Neo Series can provide simultaneous LVD SCSI, HVD SCSI and Fibre Channel in one physical library.

# SUMMARY

Partitioning is a powerful tool in obtaining the best use of storage resources. Today's environment requires every IT Dept. to do more with less and partitioning helps in that cause. With LPO on the Neo Series, users can share one tape library in an environment where multiple backup software packages would normally require multiple libraries or, at best, a major investment in new software.

IT users who need to centralize their back/restore operations in a multiple operating system environment should benefit quite well from partitioning their library. Any user answering yes to the following questions can benefit very well from partitioning:

- A. Do you have more than one backup environment running?
- B. Do you now or in the future plan to centralize your backup/restore operation?
- C. Are you currently doing local backup on part of your network due to conflicts on the tape library?

*IT users who need to centralize their back/restore operations in a multiple operating system environment should benefit quite well from partitioning their library.*



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