WHITE PAPER

VERITAS

VERITAS NetBackup™

BEST PRACTICES:

MIGRATING TO OR INTEGRATING NEW TAPE DRIVE TECHNOLOGIES IN EXISTING LIBRARIES

Version 2

Table of Contents

Abstract

An increasing number of new tape drives are able to read data written on previous-generation tape drives and in some cases even write to the media used with those drives, either at the existing density or at a new, higher density. Customers may want to migrate from an older tape drive technology to a newer one, move from one generation of tape drive to another, or combine multiple drive technologies in a single library. Administrators want to take advantage of these higher capacity and performance tape drives, but are concerned about migrating to or integrating these drives into an existing tape library. This paper will discuss different methods for doing so.

Current marketplace

As with every aspect of computer technology and mass storage, tape drive vendors work to increase the performance and capacity of their products. This is due to the increasing amount of data that needs to be backed up and the ever-decreasing backup windows caused by the requirement for data to be available on a 24x7 basis.

Most vendors design their next generation of tape drives so they can use the same tape media/cartridge, but write at a higher density. Often the next generation drives are able to read data written at a prior-generation drive's density. This paper will refer to those types of drives as Read Compatible (RC). In some case, the newer drive can also write at that density. This paper will refer to this type of drive as Read/Write Compatible (R/WC).

Customers are considering upgrading to these drives to gain capacity and performance advantages, but are concerned about the complexity of this type of upgrade. In lieu of replacing all drives in the library they may want different generations or types of drives to coexist for some period of time. With higher capacity media, the capacity of a library (assuming the same number of media slots are available) can be noticeably increased very quickly.

The difference in media cartridge size between the various tape technologies determines how many cartridges can fit within a specific library and, therefore, the overall storage capacity of the library. For example, one vendor that offers the choice of DLT/Super DLT, AIT, or LTO drives in one of their libraries provides up to 788, 1182, or 938 cartridge slots respectively, based on the drive type installed. The number of cartridges multiplied by the capacity per cartridge determines the total capacity of the library. When changing from one technology to another, the library may also need to be modified so that the media magazines and picker mechanisms are able to support the new media cartridge. Not all libraries are able to accommodate mixed media technologies.

It may also be possible to use multiple drive types and media within a single library. Most, if not all, tape libraries require updated firmware to support new drive types and mixed drive types and media. In addition, API-based robots, such as STK's ACSLS-based libraries, manage robotic control and can handle mixed drives and media. SCSI-based library robotics are directly controlled by VERITAS NetBackup software, so supporting multiple drive types and media is supported as long as the library supports this capability.

Many tape drives and libraries are offered in both SCSI and Fibre Channel (FC) versions. In a SAN environment, users want to share these new, high-capacity and high-performance drives among multiple servers. VERITAS NetBackup software provides this capability through its Shared Storage Option (SSO). With the NetBackup 6.0 release, drives can be shared among NDMP hosts and NetBackup media servers. The tables on page 4 and 5 provide information on the majority of tape drives currently used by NetBackup customers. The tables should help you determine which methodology to follow when implementing a migration or integration strategy. Please note that AIT, DLT, SDLT, and LTO drives that are offered by vendors other than those listed either OEM drives from the listed vendors or manufacture the drives under a licensing agreement from one of the listed vendors.

General considerations

VERITAS NetBackup software has a Device Configuration wizard that will automatically discover and configure drives and libraries that are supported by NetBackup. When a new device is supported by NetBackup software, information on the device is added to the External Device Mappings file that is available at www.support.veritas.com under **NetBackup Enterprise Server** in the **Software Updates & Downloads** section. This file should be downloaded and installed periodically or at least when installing new devices. Each drive is defined by NetBackup software as a specific device type. When the wizard finds a new drive that is not contained in the currently installed device mappings file, it will assume it to be a DLT drive. For example, if a SDLT drive has been installed and the wizard asks you to specify the type of drive, this indicates the most recent device mappings file has not been installed. The Device Configuration wizard can automatically configure shared drives among numerous media servers within SCSI-based libraries and API-based libraries from IBM (TLH robot type), ADIC (TLM robot type) and STK (ACS robot type); the latter two being supported with NetBackup 6.0 software.

The screen shots shown in this paper are from older versions of NetBackup and will updated in the future.

When using multiple drive types in a library, barcode rules must be used to allow NetBackup software to automatically determine the media type. NetBackup software supports barcode rules for SCSI and API-based robots.

Setting up barcode rules is covered in **Migrating to a new generation drive technology that provides read compatibility**, Section B, Step 2, starting on page 11.

Tape Drive Specifications

	NetBackup Default Drive Type	Uncompressed Speed (MB/sec)	Uncompressed Capacity (GB)	R/W Compatibility R=Read, W=Write, C=Compatibility
Certance				
LTO	HCART	15	100	
Exabyte				
VXA-2	8MM2	6	80	R/WC with VXA-1 and can rewrite the media at higher density
HP				
Ultrium 230 (LTO)	HCART	15	100	
Ultrium 460 (LTO2)	HCART2	30	200	R/WC with Ultrium 230 media at lower density
Ultrium 960 (LTO3)	HCART3	80	400	R/WC with Ultrium 460 media at lower density and RC with Ultrium 230 media
IBM				
3580 Ultrium (LTO)	HCART	15	100	
3580 Ultrium 2 (LTO2)	HCART2	35	200	R/WC with 3580 media at lower density
3580 Ultrium 3 (LTO3)	HCART3	80	400	R/WC with Ultrium 2 media at lower density and RC with Ultrium media
3590B	HCART	9	20	
3590E	HCART	14	40	RC with 3590B
3590H	HCART	14	60	RC with 3590B and 3590E and can rewrite those media at higher density
3592J	HCART2	40	300	

Note: SCSI and FC drives have the same default drive type and specifications.

	NetBackup Default Drive Type	Uncompressed Speed (MB/sec)	Uncompressed Capacity (GB)	R/W Compatibility R=Read, W=Write, C=Compatibility
Quantum				
DLT 4000	DLT2	1.5	20	
DLT 7000	DLT	5	35	R/WC with DLT 4000 at lower density
DLT 8000	DLT2	6	40	R/WC with DLT 4000 & 7000 at lower densities
SDLT 220	DLT3	11	110	RC with all DLTtape IV media
SDLT 320	DLT2	16	160	RC with all DLTtape IV media and R/WC with SDLT 220
SDLT 600	DLT	36	300	RC with SDLT 320, SDLT 220 and DLT 8000
DLT1	DLT	3	40	RC with DLT 4000
DLT VS80	DLT	3	40	RC with DLT 4000 and BR/WC with DLT1
DLT VS160	DLT	8	80	RC with DLT1, DLT VS80
DLT-V4	DLT	10	160	RC with DLT1, DLT VS80 and DLT VS160
LTO-2	HCART2	34	200	R/WC with Certance LTO media at lower density
LTO-3	HCART3	68	400	R/WC with LTO-2 media at lower density and RC with Certance LTO media
Sony				
AIT-1	8MM	4	35	
AIT-2	8MM	6	50	R/WC with AIT-1 at lower density
AIT-3	8MM2	12	100	R/WC with AIT-1 and AIT-2 at lower densities
AIT-4	8MM3	24	200	
S-AIT	HCART	30	500	
DTF-1	DTF	12	42	
DTF-2	DTF	24	200	RC with DTF-1
STK				
T9840A	HCART	10	20	R/WC with T9840B
T9840B	HCART	19	20	R/WC with T9840A
T9840C	HCART3	30	40	RC with T9840A/B media and can rewrite T9840A/B media at higher density
T9940A	HCART2	10	60	
T9940B	HCART2	30	200	RC with T9940A media and can rewrite T9940A media at higher density

Note: SCSI and FC drives have the same default drive type and specifications.

Migration

The goal of a migration strategy is to get rid of the older technology and replace it with newer technology. Some new-generation drives provide read compatibility or read/write compatibility with the prior generation(s) of drives. This paper will sometimes refer to these as RC or R/WC drives respectively.

Depending on the type of drives which are currently being used and to which you are migrating, drive migration can be separated into three methodologies. These are:

1. Migrating to a different drive technology.
2. Migrating to a new generation drive technology that provides RC.
3. Migrating to a new generation drive technology that provides R/WC.

Depending on which method is used, various strategies and implementations can be utilized. We will look at each of these in turn. In order to implement any of these drive migrations, both the library and NetBackup™ software must provide support for the new drive type.

Migrating from an existing drive technology to a different drive technology

A. Copy all existing media to the new format

To implement this strategy, all existing media must be copied to the new tape format so that existing backups can be restored using the new drives. One or more new drives should be installed in the existing library. The data from existing media can then be duplicated onto new media. Because of the typical capacity increase in new drive and media types, fewer pieces of media will likely be required. In addition, if the older media is not fully populated with data, then it may be possible to further consolidate the old data onto new media. The following steps should be followed.

1. Install some new drives while leaving some old drives in the library. In order to do this, both the library and NetBackup software must support multiple drive and media types. NetBackup software can support multiple drive types if both drive types are handled by the same robot type (e.g., both DLT and HCART drive types are used with a TLD robot type). These robot types include TLD, TL8, ACS, and TLM. The last two are API-based robot types. ACS is for STK's API-based robots and TLM is for ADIC's API-based robots. Although the NetBackup software TLH robot types supports IBM's API-based robots, only 3590 drives can be used in that library so it is not relevant to this migration methodology.

Define storage units for the new drives. To make certain future backups do not use the old drives and media, change all of the backup policies to use the storage units incorporating the new drives.

When multiple drive types are used in a library, barcode rules need to be used. An example of how to set up barcode rules is shown in **Migrating to a new generation drive technology that provides read compatibility**, Section B, Step 2, starting on Page 11.

2. Duplicate the data on the old media onto the new media. Initially, it would likely be wise to make sure there are more new than old drives in order to maximize backup performance while also being able to duplicate old media. Since NetBackup software uses the primary copy to satisfy restore requests, once the duplicate is created it should be configured as the primary copy by using the following command:

/usr/openv/NetBackup/bin/admincmd/bpduplicate –npc pcopy –backupid bid

where **pcopy** is the copy number you want to be the new primary (it must be 1 or 2) and **bid** is the backup identifier as shown in the Images on Media report.

Additional instructions for duplicating backup images can be found in the NetBackup System Administrator's Guide.

3. Remove the physical media from the library. The NetBackup GUI supports ejecting cartridges through the I/O port (also sometimes referred to as a Cartridge Access Port or Media Access Port) from TLD, TL8, or API-based TLH, TLM and ACS robot types. This procedure is recommended if you're using NetBackup software to guarantee the correct tape is removed. This is a two-step process as shown Figures 1 and 2.

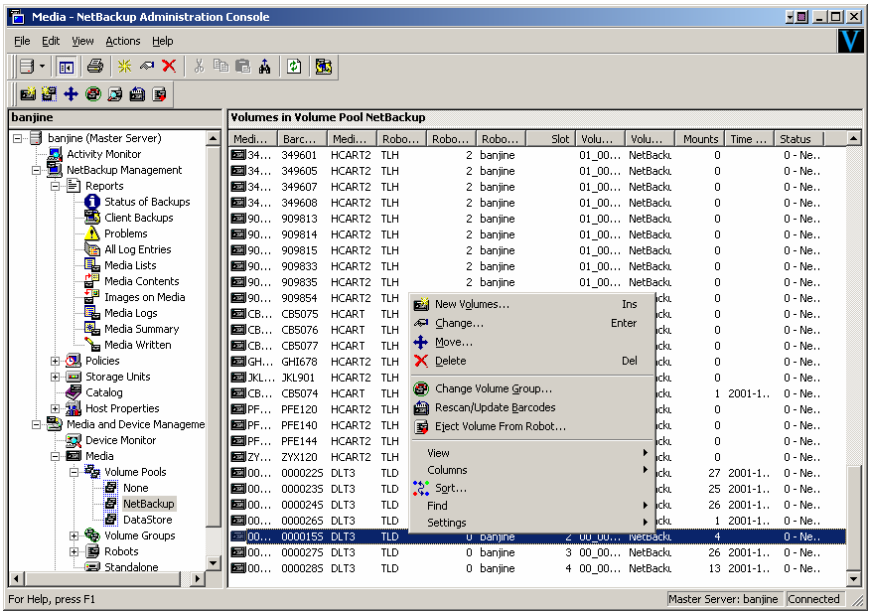

Figure 1

Click on Eject Volume From Robot and Figure 2 will appear. Then click on Eject to eject the selected media from the library.

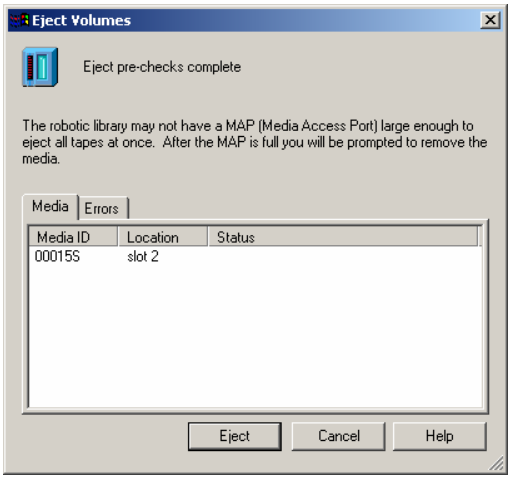

Figure 2

Removing the media can also be accomplished by opening the library door and removing the media. If this method is used, use **Actions > Inventory Robot** and select **Compare contents with volume configuration** to make certain the correct media are removed from the library. For the API robots, the library's administrative utility may also be used to remove the media.

Old media can be replaced with new media. Once all of the old media are duplicated, the old drive(s) can be replaced with new drives.

4. The media should then be expired and removed from the NetBackup image and media catalogs by using the "*bpexpdate*" command. The following command can be used to remove a single piece of media (media_id) from the catalogs:

/usr/openv/netbackup/bin/admincmd/bpexpdate -m media_id -d 0

5. Finally, the NetBackup Administration Console can be used to delete the volume from the NetBackup volume database. This is shown in Figure 3.

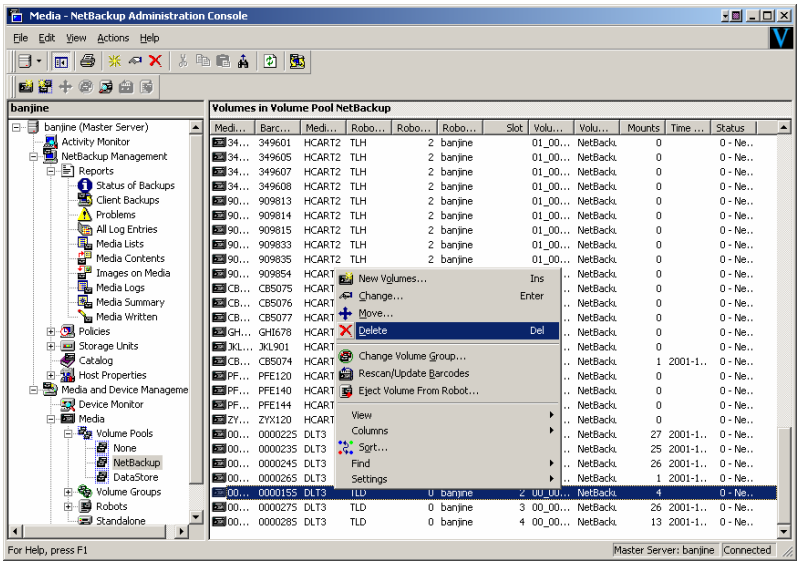

Figure 3

B. Retain existing media in the library until they expire

By retaining at least one old drive in the library, there is no need to duplicate the existing data. The downside, however, is the time it may take to restore data. If a large amount of data needs to be restored, the limited number of usable drives may significantly lengthen the restore time. The following steps should be followed.

1. Remove existing drives that will not be retained in the library and install new drives in available drive bays, adding new media in available slots and as the old media expire. As mentioned above, both the library and NetBackup must support multiple drive types.

Define storage units for the new drives. To make certain future backups do not use the old drives and media, change all of the backup policies to use storage units incorporating the new drives.

As mentioned in Section A above, barcode rules must be used. Setting up barcode rules is covered in **Migrating from an existing drive technology to a new generation that provides read compatibility**, Section B, Step 2, starting on page 11.

2. When backups on the old media expire, remove the media from the library as shown in **Migrating from an existing drive technology to a different drive technology**, Section A, Step 3 on page 6, and replace them with new media. Once all of the old media have been removed, the old drive(s) can be replaced with new drives.

3. Use the "*bpexpdate*" command to remove the media from the NetBackup media catalog. The following command can be used to remove a single piece of media (media_id) from the media catalog:

/usr/openv/netbackup/bin/admincmd/bpexpdate -m media_id

4. Follow Step 5 in Section A above to delete the volume from the NetBackup volume database.

Migrating to a new generation drive technology that provides read compatibility

If the new drive is able to read the existing media (e.g., Super DLT drives can read media written by DLT 4000, DLT1, DLT 7000 and DLT 8000 drives), then all drives within the library can be replaced with the new drives without having to worry about reading old media. However, this does create some additional media management effort. If this is not desired, then one or more old drives could be retained in the library similar to what was discussed earlier.

A. Replace all existing drives with new drives

The following steps should be taken to implement this type of migration with NetBackup™ software. For this example, we will assume we are updating from DLT 8000 drives that use DLT IV media to Super DLT drives.

1. Replace all of the DLT 8000 drives with SDLT220 drives. With NetBackup software, the DLT 7000 drives and DLT IV media would have been defined as the “DLT2” type if the NetBackup device configuration wizard was used and the SDLT drives will be auto configured as “DLT3” type. In order for NetBackup software to allow the SDLT drives to mount the DLT IV media, we must change the SDLT drive type from “DLT3” to “DLT2”. NetBackup software won’t insert “DLT2” media into a “DLT3” device. This can be accomplished by right clicking on the drive in the Media and Device Management GUI.

NetBackup software uses multiple drive and media types to facilitate using multiple drive types within a single library. This prevents incorrect media from being loaded into the wrong type of drive. Within a library, all media that will be mounted in a specific type of drive must be configured as the same type that the drive is. In other words, if a drive is configured as DLT2, then the media it will read or write needs to be configured as DLT2 media. In addition, all of the volumes of a particular media type must be the same NetBackup Media Manager type.

Although it would be possible to use the “*vmchange*” command to convert all of the old media from type “DLT2” to type “DLT3” so that NetBackup software could insert the DLT IV cartridges into the auto-discovered Super DLT drives, the images could not be properly restored because “DLT2” (the density) is associated with the image in the NetBackup catalogs.

With the SDLT drives configured as “DLT2” drives, the SDLT media will be automatically configured as “DLT2” media when it’s added to the library.

Define storage units for the new drives and add backup policies to use storage units incorporating the new drives.

2. Once the drive type change has been made, NetBackup software is capable of inserting the DLT IV media into the SDLT drives. However, since these drives can only read, not write, to the old media, we must prevent NetBackup software from attempting to write data to this media. This is accomplished by freezing the media using the “*bpmedia*” command. This must be done for each piece of media in the library, so generating a script to do this would be wise. It would probably be wise to freeze all of the old media before adding new SDLT media to minimize the difficulty in the script generation. The following command can be used to freeze a single volume by specifying its media id:

/usr/openv/netbackup/bin/admincmd/bpmedia –freeze –ev [media_id]

Note: You may be wondering why we are freezing the media instead of suspending it. If media is suspended, once it expires it is automatically deleted from the media catalog and unassigned from the NetBackup software. This makes it available for use, which we don’t want to happen since SDLT drives can’t write to this media.

Once the DLT IV media has been frozen, new SDLT media can be added to the library. Storage units will have to be created that contain these drives, but since the same robot and drive types are used, the backup policies will not have to be changed.

3. When media is frozen, it will be able to be restored until the retention period ends for all backups on that piece of media. Once that occurs, the media id will remain in the NetBackup media catalog and will remain assigned to the NetBackup software, however, it becomes unusable. A listing of the media status will show that it is both expired and frozen. By periodically viewing the status of the media using either the Media Lists in the Reports section of the NetBackup GUI as shown in Figure 4 or using the "*bpmedialist*" command, one can determine which media (now expired and frozen) may be removed and replaced with new media. Figure 4 shows the expiration date of the media as well as the status. When the status is frozen and the media is expired, then it should be removed from the library.

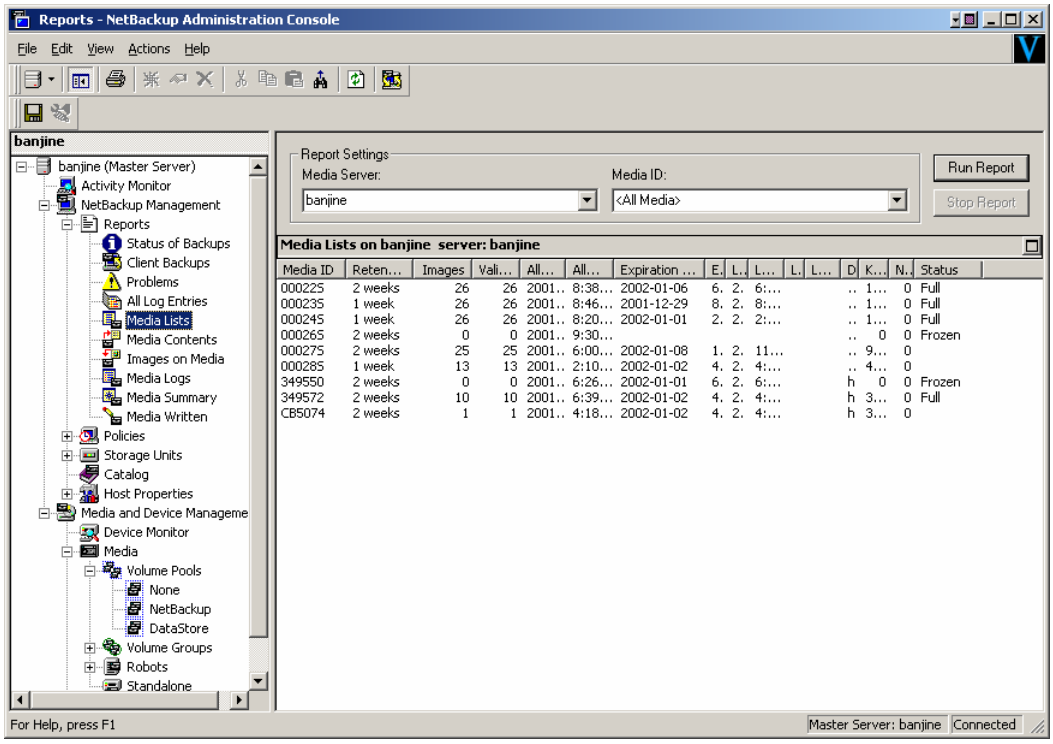

Figure 4

The following command can be used to view the current status of all media:

/usr/openv/netbackup/bin/admincmd/bpmedialist

It may be useful to write a script that can be periodically run to check for expired and frozen media and notify the administrator if any have reached that state.

In using this method, one should realize that if NetBackup software automatically configures a second library using SDLT drives, it will assign a "DLT3" drive type and then a "DLT3" media type to the volumes. SDLT media of "DLT2" type in the first library could only be read in the second library if at least one Super DLT drive in the second library was changed to a "DLT2" drive type. Another option would be to make sure the SDLT drives in the second library were changed to "DLT2" type after NetBackup software automatically configured them as "DLT3" or manually configure them as "DLT2" type.

4. Next, the physical media should be removed from the library. This can be accomplished as shown in **Migrating from an existing drive technology to a different drive technology**, Section A, Step 3 beginning on page 6.

5. Once the media has expired, it should then be removed from the NetBackup image and media catalogs by using the "*bpexpdate*" command. The following command can be used to remove a single piece of media (media_id) from the catalogs:

/usr/openv/netbackup/bin/admincmd/bpexpdate -m media_id

This could be scripted to use the output of a script that checks for expired and frozen media as discussed in Step 3.

6. Finally, the NetBackup Administration Console can then be used to delete the volume from the NetBackup volume database as shown in **Migrating from an existing drive technology to a different drive technology**, Section A**,** Step 5 and Figure 3 on page 8**.**

B. Keep at least one old drive in the library for restoring data

By retaining at least one old drive in the library, the new drive can be treated as a different type and there is no need to freeze the existing media. The downside, however, is the time it may take to restore data. If a large amount of data needs to be restored, the limited number of usable drives may significantly lengthen the restore time. The following steps should be followed.

1. Replace most of the DLT 7000 drives with SDLT220 drives. The NetBackup device configuration wizard will configure the SDLT drives as "DLT3" type.

With NetBackup software, the new drives and media must be configured as a different type than the old drives and media (e.g., DLT3 vs. DLT2 or HCART2 vs. HCART). In this scenario, with SCSI robots, it is necessary to use barcode rules to manage the different media types.

Define storage units for the new drives. To make certain future backups do not use the old drives and media, change all of the backup policies to use the storage units incorporating the new drives.

2. **Set up barcode rules** using the following procedure. API libraries provide NetBackup software with the media type so the use of barcode rules is typically not necessary. However, for integrating certain devices it is necessary to use them.

In the NetBackup Administration Console, click Media and **Device Management > Media > Robots** and select the library for which you want to add the barcode rules. Click **Actions > Inventory Robot** as shown in Figure 5. This can also be accomplished by right-clicking on the robot, then clicking on **Inventory Robot.**

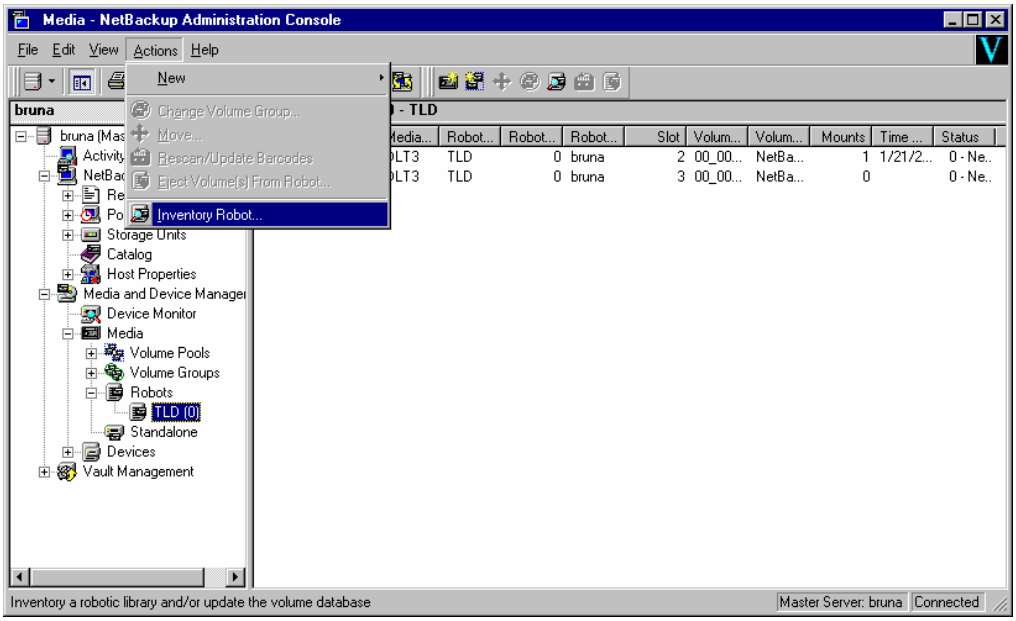

Figure 5

For this example in setting up barcode rules, we'll assume the robot being used is that shown in Figure 6 and that we're adding SDLT220 drives to a library currently using DLT 7000 drives. The DLT 7000 drives are defined as DLT drive types while the SDLT drives will be defined as DLT2 drive types. In this case we're defining the SDLT220 drives to be different type than NetBackup would select by default.

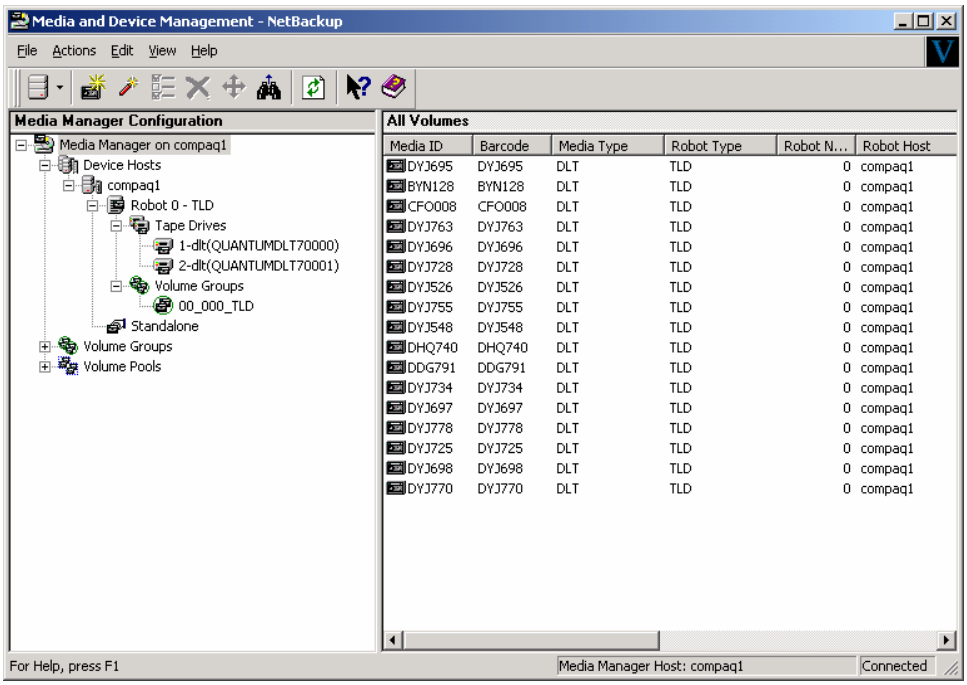

Figure 6

After clicking **Inventory Robot**, a dialog box will pop up. Click the **Barcode Rules** tab, and then click **New** as shown in Figure 7.

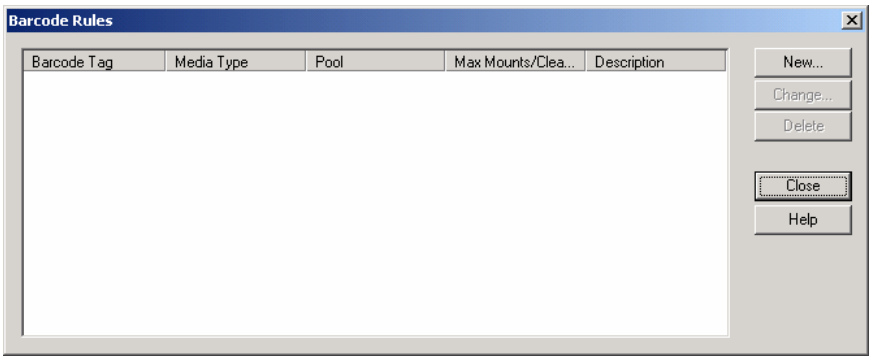

Figure 7

Figure 8 shows the window that opens to allow you to create the new barcode rule. The barcode tag you use will depend on the particular barcodes being used. Configure it similar to what is shown in the figure.

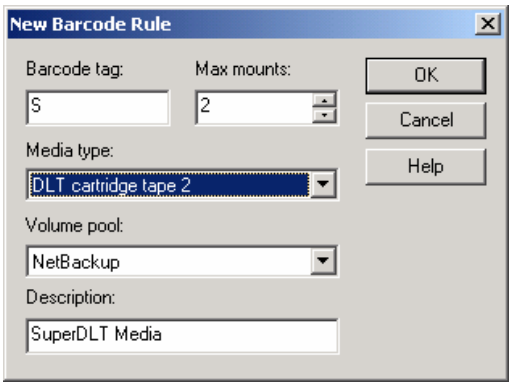

Figure 8

Note the media type has to be "DLT cartridge tape 2". You can use the same Volume pool as the original configuration. Click on **OK** and you will see the window shown in Figure 9. Click on **Close** to close the window.

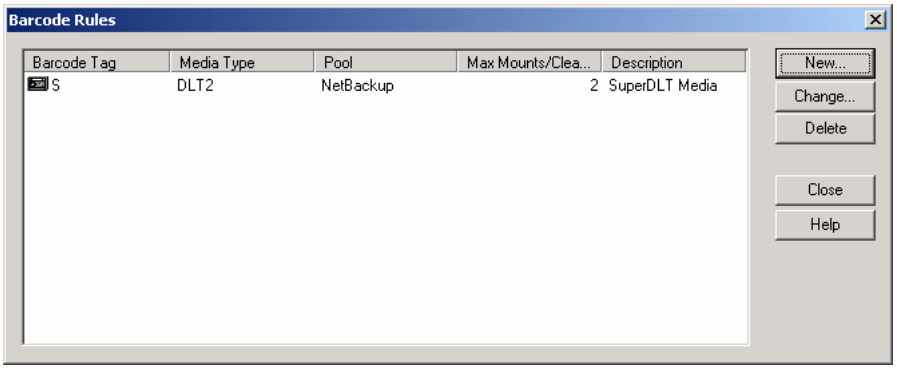

Figure 9

In the Media and Device Management window shown in Figure 10, right-click on the robot as shown and select **Inventory Robot**.

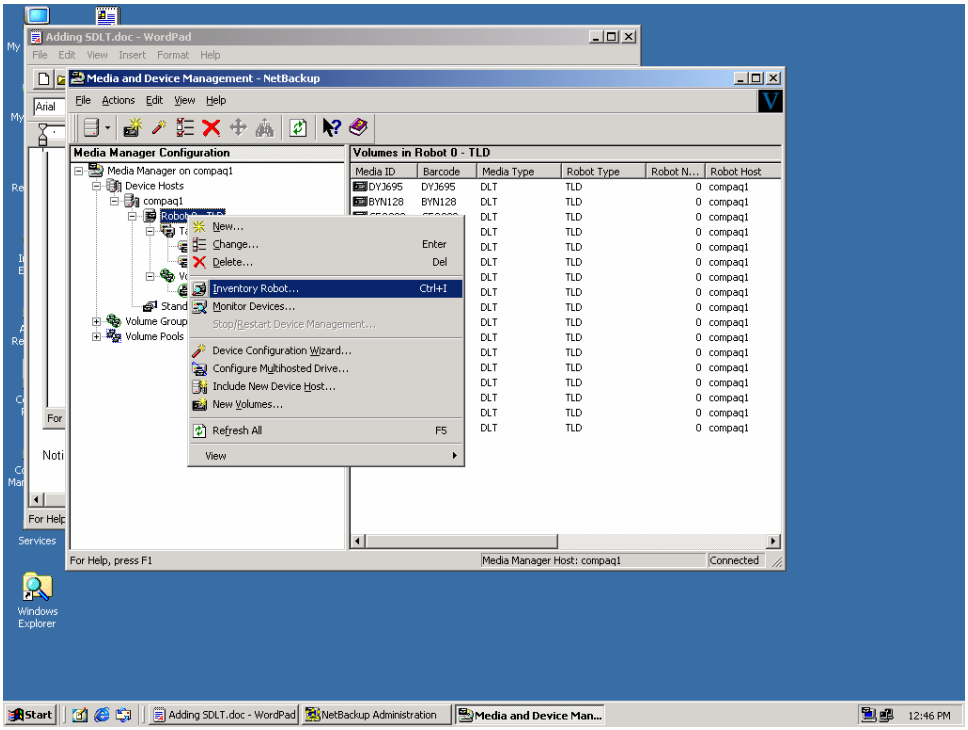

Figure 10

The window in Figure 11 will appear. Make sure to select **Update Volume Configuration** as shown.

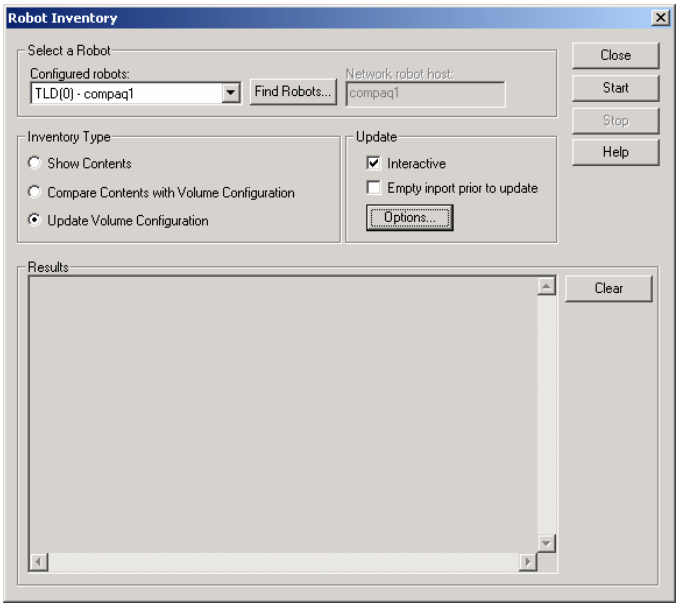

Figure 11

Click on **Options** (Figure 11) and make sure **Use barcode rules** is selected as shown in Figure 12, then click on **OK**.

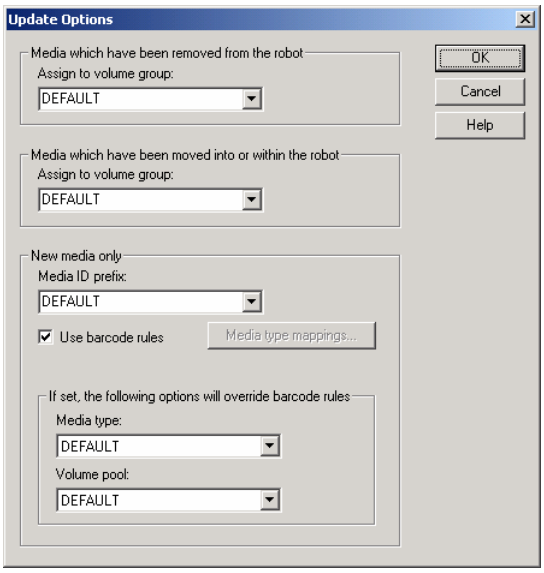

Figure 12

Click on **Start** to start the inventory. Then click on **Yes** as shown in Figure 13 to update the volume configuration.

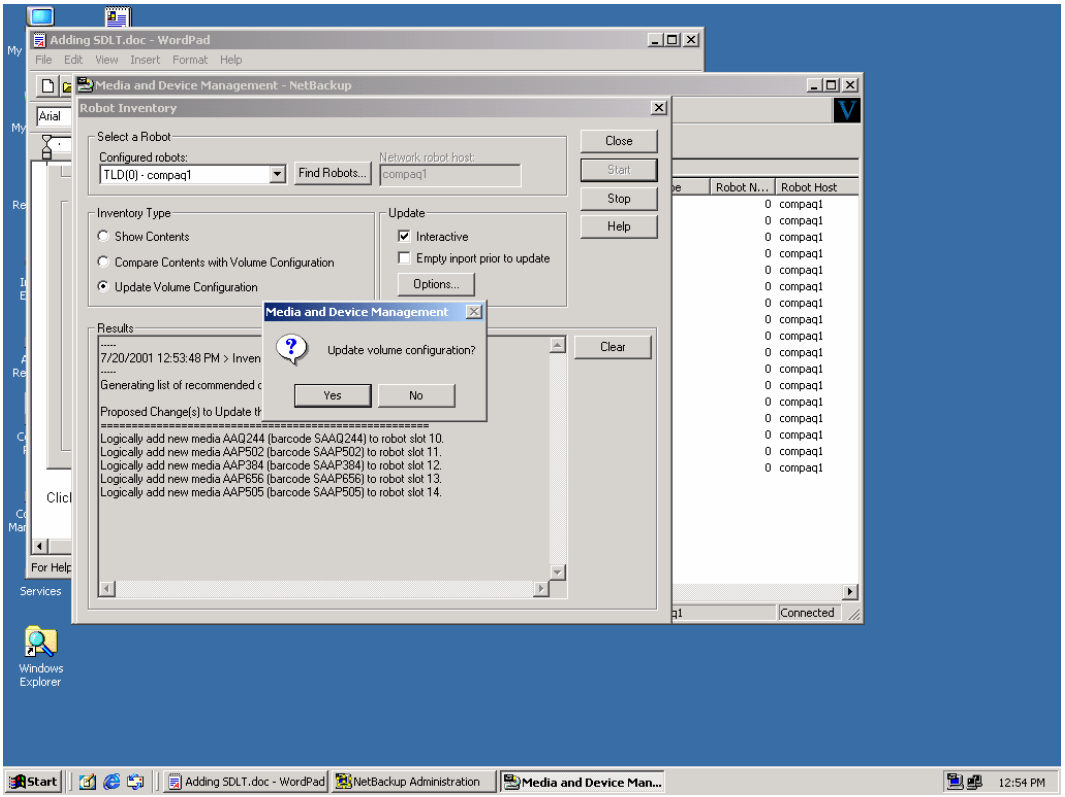

Figure 13

When the inventory is completed, the results are as shown in Figure 14.

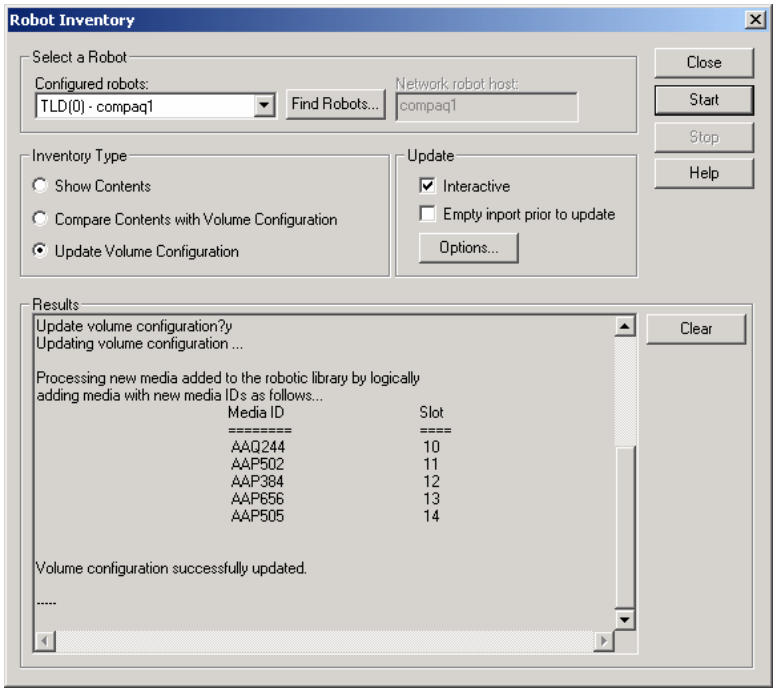

Figure 14

Click on **Close** to close the window.

Press F5 to refresh the display. Notice in Figure 15 there are now two Volume Groups (one group corresponds to DLT and other corresponds to SDLT) and that the SDLT media show up as Media Type DLT2.

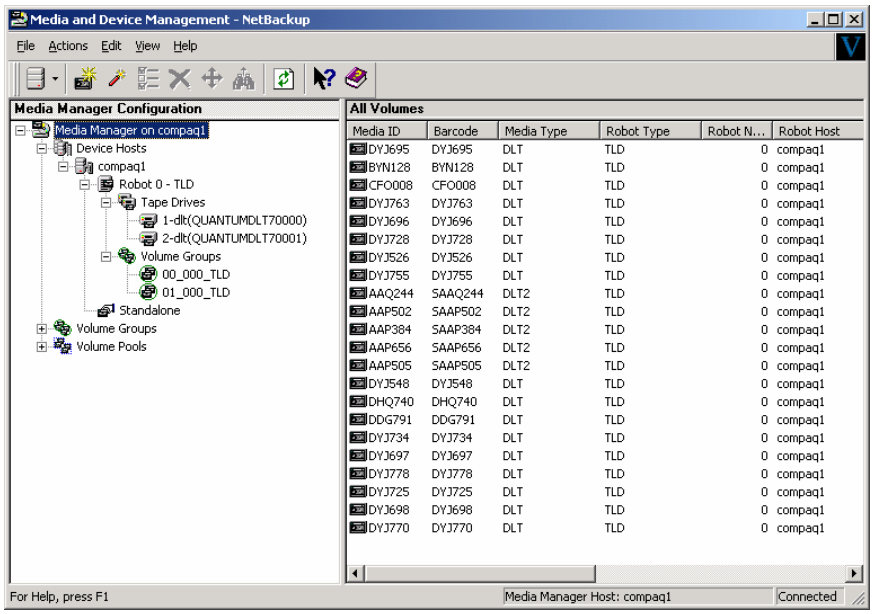

Figure 15

If you click on the first volume group, you will see only DLT media as shown in Figure 16.

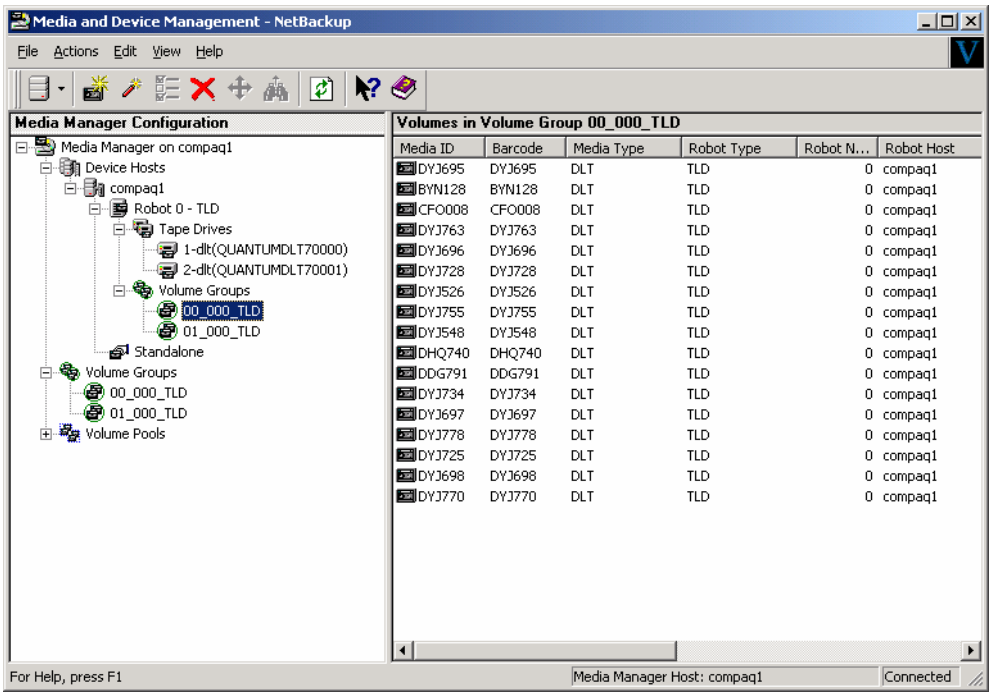

Figure 16

If you click on the second Volume Group, you will see only DLT2 media (SDLT) as shown in Figure 17.

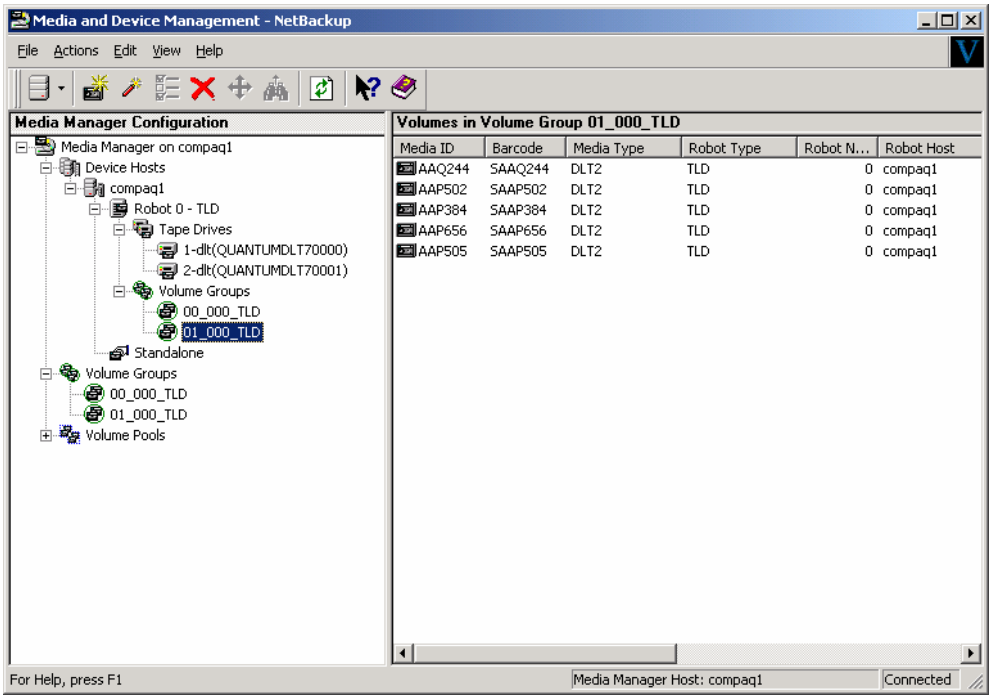

Figure 17

Notice, however, that if you open **Volume Pools** and click on the standard pool (in this case **NetBackup**) all of the media are in the same Volume Pool as shown in Figure 18.

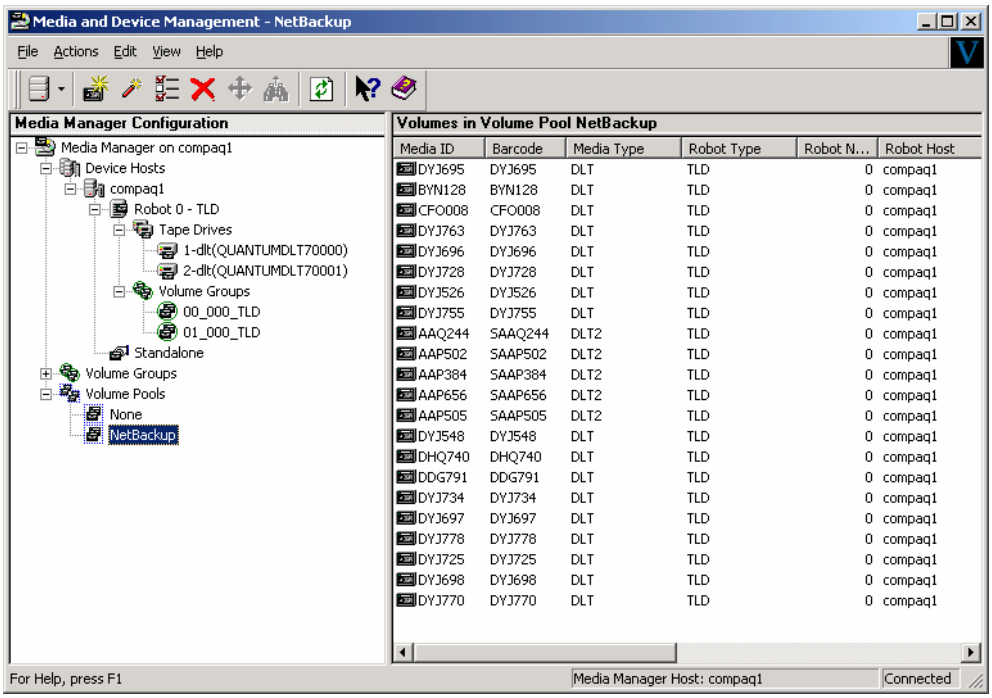

Figure 18

3. When backups on the old media expire, the media will be removed from the NetBackup media catalogs. Remove the media from the library as shown in **Migrating from an existing drive technology to a different drive technology**, Section A, Step 3, on page 6 and replace them with new media. Once all of the old media have been removed, the old drive(s) can be replaced with new drives.

4. Delete the volume from the NetBackup volume database by following the procedure in **Migrating from an existing drive technology to a different drive technology**, Section A, Step 5 and Figure 3 on page 8.

Migrating to a new generation drive technology that provides r/w compatibility

A. With new drives that CAN'T write to existing media at the higher density

The following steps should be taken to implement this type of migration with NetBackup software. Typical examples of this would be migrating from first-generation to second-generation LTO drives or migrating from AIT-1 to AIT-2 or AIT-3 drives.

1. Replace all of the old drives with new drives. Depending on how the NetBackup device configuration wizard automatically configures the new drives or how they may have been manually configured, the drives may need to be reconfigured to match the drive type of the old drives. This is necessary so that the new drives can read the existing media. Changing the drive type can be accomplished by right clicking on the drive in the Media and Device Management GUI. NetBackup software will automatically configure LTO drives as HCART and LTO2 drives as HCART2. In this case, the LTO2 drives would need to be reconfigured as HCART.

Define storage units for the new drives and add backup policies to use those drives.

2. The new drives can probably provide 2X the capacity and speed of the existing drives. However, since the new drives cannot write to existing media at the higher density, you may no longer want to use that media for backups. If you DO want to continue to use existing media for doing backups, then no other steps are required. When using both types of media for backups, backups will take longer and you may span backups across dissimilar media.

3. If you no longer want to use existing media for backups, follow Steps 2 through 6 in **Migrating to a new generation drive technology that provides read compatibility**, Section A, beginning on page 9. These steps will tell you how to freeze media and then remove the media from the NetBackup databases and library once the media has expired.

B. With new drives that CAN write to existing media at the higher density

The following steps should be taken to implement this type of migration with NetBackup software. Typical examples of this would be migrating from STK T9940A to T9940B drives or migrating from IBM 3590E to 3590H drives.

1. Replace all of the old drives with new drives. Depending on how the NetBackup device configuration wizard automatically configures the new drives, they may have to be reconfigured to match the drive type of the old drives. This is necessary so that the new drives can read the old media. Changing the drive type can be accomplished by right clicking on the drive in the Media and Device Management GUI.

Define storage units for the new drives and add backup policies to use those drives.

For this example, we will assume we are updating from STK T9940A drives to T9940B drives. These drives use the same media, but the T9940B drives write to the media at a higher density than do the T9940A drives. The T9940B drives are able to write to existing media at the higher density as long as it writes from Beginning of Tape (BOT).

If the NetBackup device configuration wizard is used, both T9940A and T9940B drives are defined as the "HCART2" type. Since the existing media for the T9940A drives would have been defined as HCART2, there is no need to change the drive type for the T9940Bs unless the T9940A drives were manually configured as a different type (e.g., HCART or HCAT3).

2. Since the T9940B drives can write to the existing media at the higher density, there is no need to remove the media from the NetBackup volume database or library. Because of this, instead of freezing the existing media as was done in the SDLT migration, we will suspend the media. When media is suspended (just like when it is frozen), it can be read, but not written to. To suspend a piece of media, use the "*bpmedia*" command. The following command can be used to suspend a single volume by specifying its media id. This could be scripted to suspend all of the existing media in the library. It would be wise to do this before adding any new media to the library.

/usr/openv/netbackup/bin/admincmd/bpmedia –suspend –ev *media_id*

Because the media has been suspended (instead of frozen), once the media expires it will automatically be deleted from the NetBackup media catalog (not the volume database) and unassigned from the NetBackup software. It will then be available for backup jobs in the T9940B drives.

NetBackup software can automatically return expired media to the scratch pool (as long as the media originally came from the scratch pool). When the NetBackup software attempts to write to one of these unassigned media, it will read the existing label, determine that it is NetBackup media, write a new label at the higher density and then proceed to write data on the media.

Integration

The goal of an integration strategy is to use both the old and new technology within the same library. Some new-generation drives provide backward read compatibility or backward read/write compatibility with the prior generation(s) of drives. This paper will sometimes refer to these as RC or R/WC drives respectively.

Depending on the type of drive which is currently being used and which type is being integrated, drive integration can be separated into three methodologies. These are:

1. With a different drive technology.
2. With a new generation drive technology that provides RC.
3. With a new generation drive technology that provides R/WC.

Depending on which method is used, various strategies and implementations can be utilized. We will look at each of these in turn. In order to implement any of these integrations, both the library and NetBackup software must provide support for the new drive type and multiple drive types within the library.

Integration with a different drive technology

The following steps should be taken to implement this type of integration with NetBackup software.

1. Install the new drives in the library. In order to do this, both the library and NetBackup software must support multiple drive and media types in the library. NetBackup software can support multiple drive types if both drive types are handled by the same robot type (e.g., both DLT and HCART drive types are used with a TLD robot type). These robot types include TLD, TL8, ACS, and TLM. The last two are API-based robot types, the former for STK's robots and the latter for ADIC's robots. Although the NetBackup TLH robot type supports IBM's API-based robots, only the 3590 drive can be used in that library so it is not relevant to this integration methodology. Different drive types must be defined as different NetBackup drive types.

Define storage units for the new drives and add backup policies to use storage units incorporating the new drives.

2. Add barcode rules. When multiple drive types are used in a library, barcode rules need to be used to determine which type of media is added to the library. An example of how to set up barcode rules is shown in **Migrating to a new generation drive technology that provides read compatibility**, Section B, Step 2, starting on page 11. Add media to the library.

Integration with a new generation drive technology that provides read compatibility

The following steps should be taken to implement this type of integration with NetBackup software.

1. Install the new drives in the library. In order to do this, the library must support multiple drive and media types in the library.

Since the existing drives will not be able to read or write to tapes that have been written to by the new drives, the new drives must be defined as a different drive type within the NetBackup software. In addition, the media that will be used by each drive type must be of the same type as the drive.

Define storage units for the new drives and add backup policies to use storage units incorporating the new drives.

2. When multiple drive types are used in a library, barcode rules need to be used to determine which type of media is added to the library. An example of how to set up barcode rules is shown in **Migrating to a new generation drive technology that provides read compatibility**, Section B, Step 2, starting on page 11.

Add barcode rules and then add media to the library.

If you are using an STK ACSLS-based library, ACSLS media mappings are used to determine the media type. Since ACSLS reports media used by the SDLT 220 and SDLT 320 drives as the same media type, barcode rules must be used.

A certain set of media will now be used with each type of drive. In the future, if you no longer want to continue doing backups with the lower performance drives and lower capacity media, you can follow the implementation in **Migrating to a new generation drive technology that provides read compatibility**, Section B, Steps 3 and 4 on page 18.

Integration with a new generation drive technology that provides r/w compatibility

The following steps should be taken to implement this type of integration with NetBackup software.

1. Install the new drives in the library. In order to do this, the library must support multiple drive and media types in the library.

Since the existing drives will not be able to read or write to tapes that have been written to by the new drives, the new drives must be defined as a different drive type within the NetBackup software. In addition, the media that will be used by each drive type must be of the same type as the drive. An example here may be beneficial. LTO2 (LTO Generation 2) drives are able to read and write to LTO media, but the opposite is not true. Therefore, the drive types and corresponding media types must be different.

The only way you would be able to use LTO media in the LTO2 drives would be to wait until they expire, then use the "*vmchange*" command to modify the media type. You may not want to do this anyway, because using the LTO media in an LTO2 drive won't provide the increased capacity and performance that you get by using LTO2 media. In any case, if you wanted to use the LTO media, the following command can be used to change the media type for a single piece of media (media_id):

/usr/openv/volmgr/bin/vmchange [-h *volume_database_hos*t] -new_mt *media_type* -m *media_id*

If this command is being run from the server that is the volume database host, then the volume database host does not need to be specified. In this situation, if NetBackup default settings had been used, you would be changing the LTO media type to HCART2. If the tape is not automatically returned to the scratch pool, you may need to move it to a different volume pool depending on how the NetBackup software has been configured.

You could also delete the media from the NetBackup volume database in **Migrating from an existing drive technology to a different drive technology**, Section A, Step 5 on page 8, then use **Actions > Inventory Robot**. Select **Update Volume Configuration** then click **Options** and override the barcode rules, as shown in Figure 19, to change the media type. Again, this would not increase the speed at which data would be written to the media or the capacity of the media, but if you wanted to remove the older drives from the library you could still use the older media.

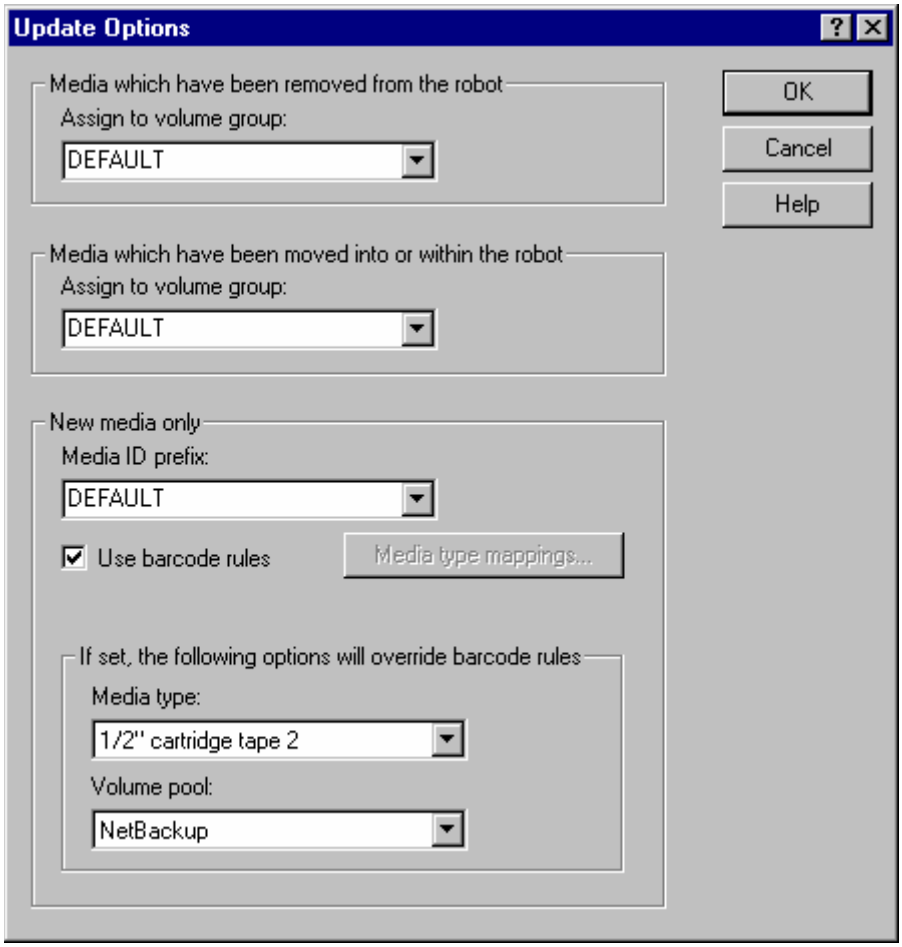

Figure 19

Define storage units for the new drives and add backup policies to use storage units incorporating the new drives.

2. When multiple drive types are used in a library, barcode rules need to be used to determine which type of media is added to the library. An example of how to set up barcode rules is shown in **Migrating to a new generation drive technology that provides read compatibility**, Section B, Step 2, starting on page 11.

Add barcode rules and then add media to the library.

If you are using an STK ACSLS-based library, ACS media mappings are used to determine the media type. Since ACSLS reports media used by the T9940A and T9940B drives as the same media type, barcode rules must be used.

A certain set of media will now be used with each type of drive. In the future, if you no longer want to continue doing backups with the lower performance drives and lower capacity media, you can follow **Migrating to a new generation drive technology that provides read compatibility**, Section B, Steps 3 and 4 on page 18.

If you want to have the media currently being used with T9940A drives, be used with T9940B drives, you will need to wait until the media has expired, then use the "*vmchange*" command to redefine the media type. The advantage of doing this is that the T9940B is able to write to the media at the higher density and speed because the media is identical.

Because the same media is used for IBM 3590B, 3590E and 3590H drives, it is possible for the 3590H drive to write to media previously used by those drives by waiting until the media has expired, then using the "*vmchange*" command to redefine the media type. This would allow writing to the media at the higher density and speed.

Summary

Migrating to or integrating new tape drive technology provides a dramatic increase in both capacity and performance. Upgrading an existing library with new tape drives (assuming the library vendor supports it) and media can be implemented in multiple ways depending on short term and long term capacity needs, performance needs, cost budget, simplicity of the conversion desired, and management complexity. The methodologies discussed above should help administrators determine the optimal implementation for their site.

NetBackup device support

VERITAS NetBackup software supports tape drives and libraries from a large number of vendors.

The URL for NetBackup Enterprise Server 5.x hardware compatibility matrices for specific devices on specific OS platforms is:

http://ftp.support.veritas.com/pub/support/products/NetBackup_Enterprise_Server/280666.pdf

The URL for NetBackup Enterprise Server 6.0 hardware compatibility matrices for specific devices on specific OS platforms is:

http://ftp.support.veritas.com/pub/support/products/NetBackup_Enterprise_Server/278692.pdf