

Disk-to-Disk-to-Tape Backup

Using Snap Server 4500 and NetVault Virtual Tape Library (VTL)

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Introduction

A disk-to-disk-to-tape solution built on an Adaptec Snap Server and a third-party tape automation device offers tremendous advantages for backup and restore of network data. In addition, the GuardianOS includes BakBone's NetVault software with a unique Virtual Tape Library (VTL) feature to separate the backup and tape archive functions so you can complete a full backup in a minimum amount of time and archive it to tape without impacting the users or slowing the network. This paper steps details the steps required to configure sample hardware and create a disk-to-disk-to-tape solution. Specific instances may require slight variations; in general this paper illustrates the overall concepts and measures needed for those end users or Value Added Resellers interested in attempting a similar solution. Please consult your documentation or a qualified Pre-Sales Engineer for individual assistance.

The WorkGroup Edition of BakBone NetVault is integrated into the GuardianOS that powers the Snap Server. NetVault simplifies backup and restore with a

feature set that includes policy-based job management, enhanced reporting capabilities, and VTL. VTL staging acts as a buffer, facilitates device streamlining and minimizes the network impact of archiving staged data from the Snap Server to tape. To take full advantage of included drives and libraries make sure you have the latest version of GuardianOS.

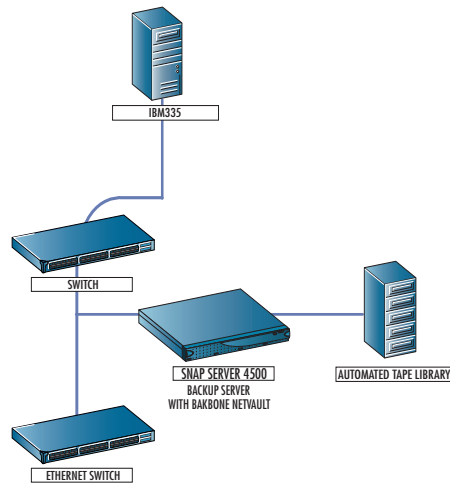
This solution is easily scalable as your needs change – expand the Snap Server 4500 from base configurations of 1.0 or 1.6TB with up to two 1TB Snap Disk 10 expansion arrays or three 2TB or 4TB Snap Disk 30 expansion arrays. As your storage grows, additional features and licenses may be added to NetVault without any additional installation or software re-configuration. Simply purchase a license key and apply it using the Snap Server user interface.

In the scenario described below, we have upgraded NetVault past the standard Workgroup Edition by adding a tape library license. Additional upgrades to the standard VTL capacity could be included; the capacity of the VTL is irrelevant to the functions described below.

A Typical Solution Topology

A Snap Server 4500 has been installed on this LAN, with NetVault enabled and additionally licensed for a 10-slot tape library. A 1U Exabyte PacketLoader is directly attached to the Snap Server using a SCSI controller and SCSI cable.

The VTL is the initial destination for backups, and backup windows can be much shorter since the job is performed from disk to disk. Thoughtful network administrators may configure the VTL to identically match the tape hardware and precisely fit the cartridge and drive configuration available in the library. Migrations of the VTL to the physical library can be done as needed outside of the regular backup schedule, reducing backup impact on the network, and extending the life of the tape hardware. Restores are usually done from the VTL and archived tapes can be used as a secondary restore method. For further details on the benefits of a VTL, please visit www.bakbone.com.



Compatible Media and Tape Devices

This solution can be used with a wide range of tape media and tape libraries, including those shown in the compatibility chart below.

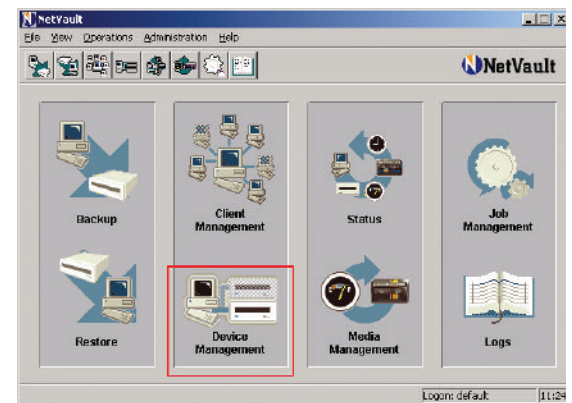
BakBone NetVault Compatibility Chart

Storage Media		Tape Libraries	
4mm	LTO	ADIC	Plasmon
8mm	SLR	Alacritus	Qualstar
DDS-2, DDS-3, DDS-4	Viper 200/400	Breece-Hill	Quantum/ATL
AIT-1/2/3	9840/9940	Compaq	Seagate
Mammoth/2	Sony SDT/SDX/SDZ	Exabyte	Spectra Logic
DLT1	Magstar	HP	StorageTek
DLTvs80	IBM348X/349X/35XX	IBM	Sun
DLT(4/7/8/1000)	VXA	MaxOptix	Sony
SDLT-320/600		Overland Data	Tanberg
		NEC	

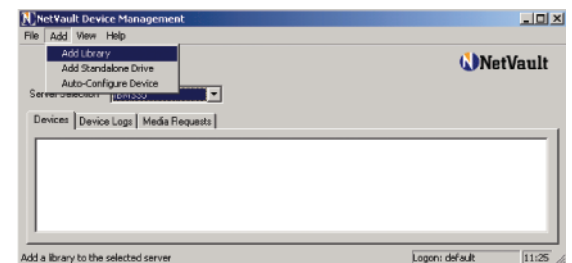
Configuring the Virtual Tape Library

The first step in implementing a disk-to-disk-to-tape solution is configuring the VTL.

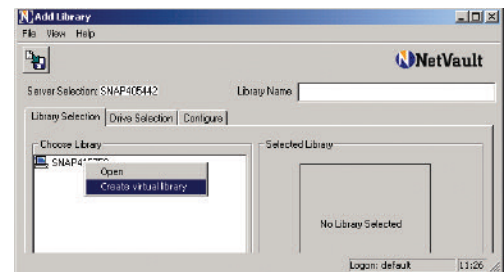
1. Open the main NetVault menu screen and click on “Device Management” to begin the process of configuring a VTL device.



2. Click on the “Add” menu selection and select “Add Library.”



3. At the next screen, select the icon of the system you want to configure, right-click, and select “Create virtual library.”



4. At the next screen, complete the appropriate fields:

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Library location: enter the desired path of the disk storage that you want to configure as a VTL device. (“/hd/vol_mnt0/MooneyVirtual” is the Library location for this scenario)

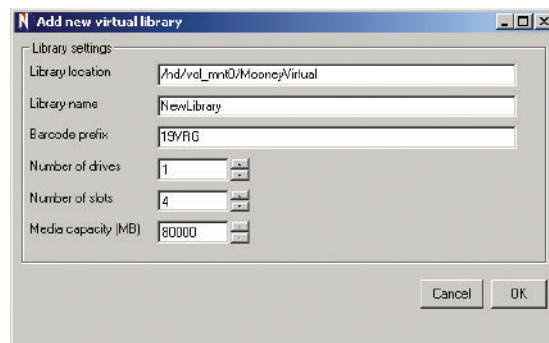
Library name: designate a name for your VTL device

Number of drives: enter the number of drives you want to emulate on your VTL device

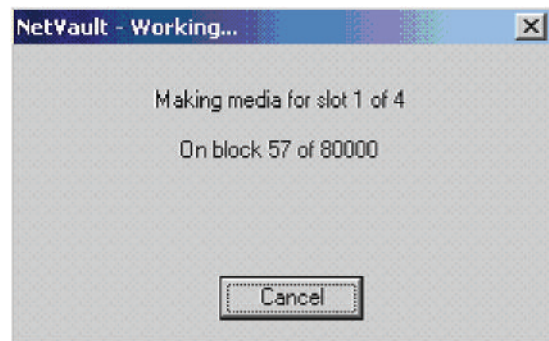
Number of slots: 4

Media capacity: enter the amount in MB that you want each drive to be.

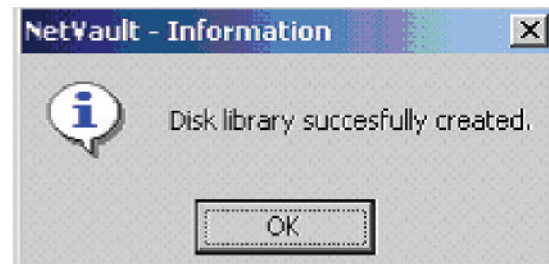
Click “OK” to add new virtual library.



- The NetVault Virtual Tape Library creation will take awhile to complete, depending on the size of the VTL.



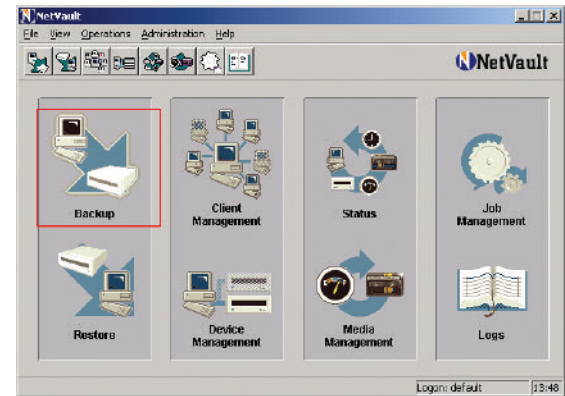
- The following will be displayed once media creation has completed.



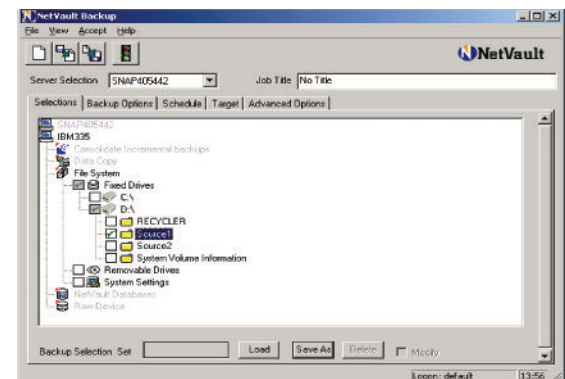
Backing Up and Restoring Data

Performing Backup (D2D)

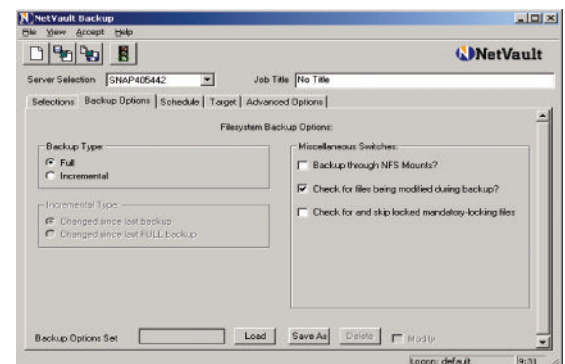
- Click on “Backup” from NetVault main menu selection.



- Select the source files and directories you want to back up.

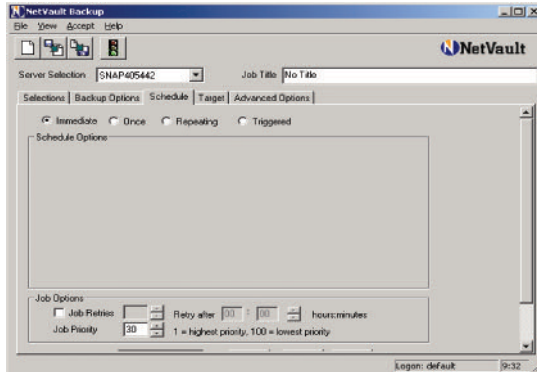


- Configure the required options in the “Backup Options” submenu.

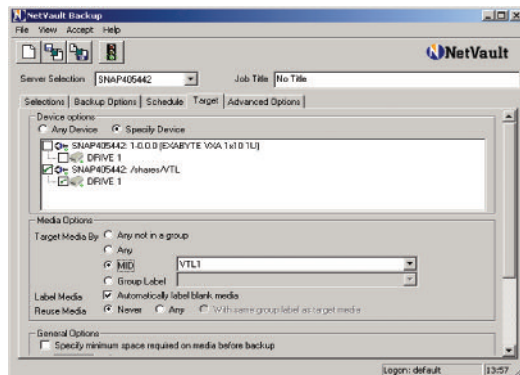


Using Snap Server 4500 and NetVault Virtual Tape Library (VTL)

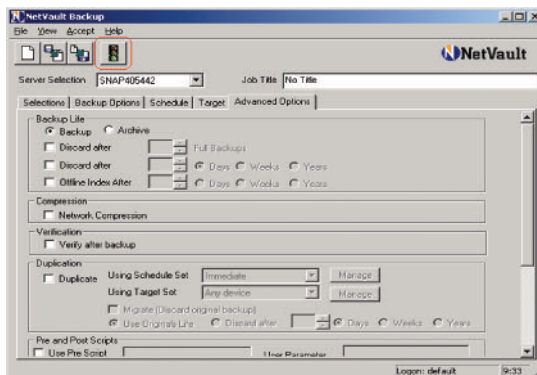
- Click on the “Schedule” tab to configure the required schedules for your backup job. (NOTE: the immediate backup option has been selected for this scenario.)



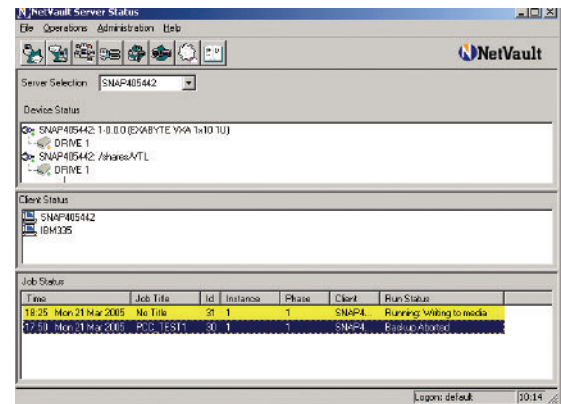
- Click on the “Target” tab and specify the destination of the backup. Select the VTL drive for D2D backup.



- Click on the “Submit the backup” icon to begin the backup job.

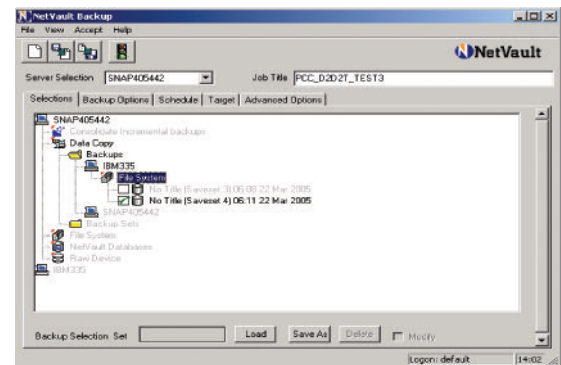


- Click “Status” from NetVault main menu selection to check the backup job status.

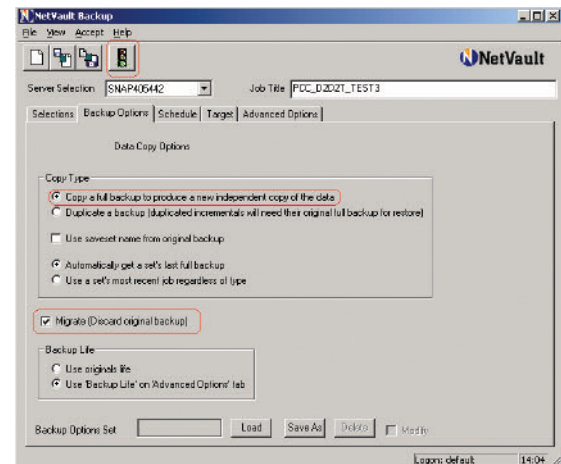


Performing Tape Copy (D2T)

- Click on “Backup” from NetVault main menu selection. Select the “Data Copy” selects the “File System” directories you want to copy to the tape library.



- Select Copy Type and check “Migrate [Discard original backup].” Click on the “Submit the backup” icon to begin the tape copy job.

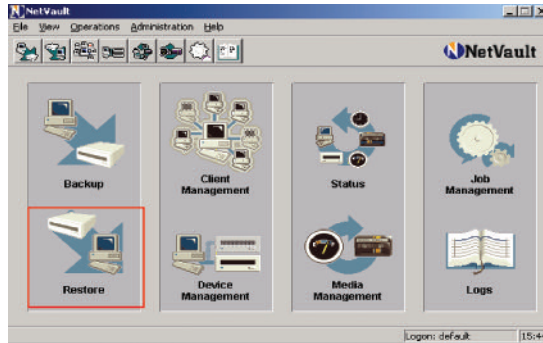


Using Snap Server 4500 and NetVault Virtual Tape Library (VTL)

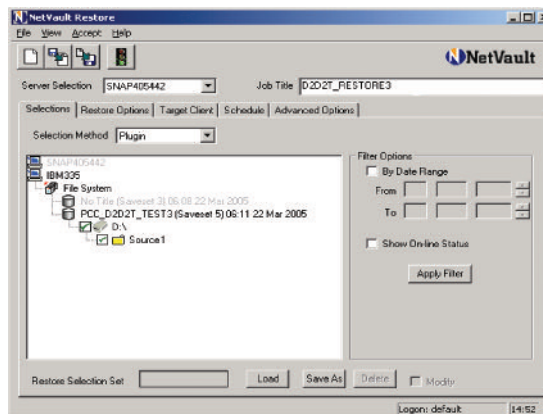
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Performing Restore from Tape

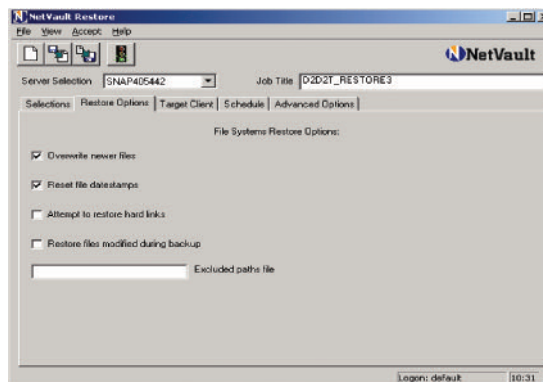
1. Going back to the NetVault main menu selection, click on “Restore.”



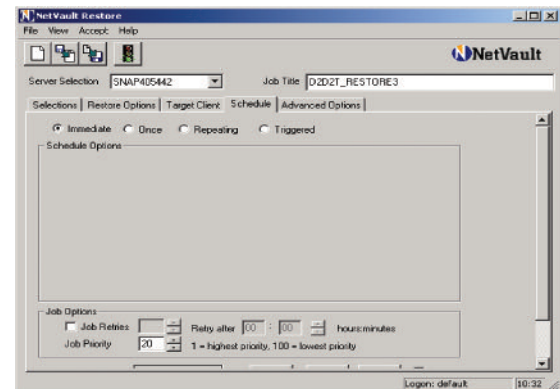
2. Click on the “Selections” tab. Select the client machine you want to restore and select file system. (Note: IBM335 is NetVault client machine for this scenario.)



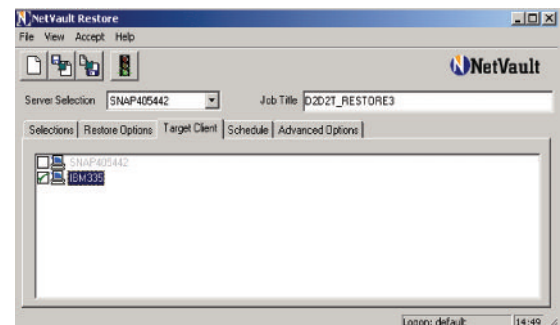
3. Click on the “Restore Options” tab and select desired restore option for your restore job.



4. Click on the “Schedule” tab to configure the required schedules for your restore job. (NOTE: immediate restore option has selected for this scenario.)



5. Click on the “Target Client” tab and select the target machine you want to restore. Click on “Submit Restore” button to start the restore job.



6. Click “Status” from NetVault main menu selection to check the restore job status.

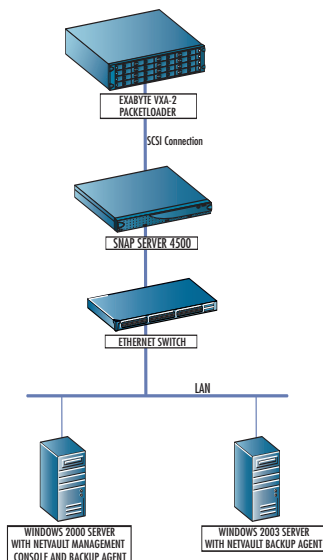
A Tested Configuration

As discussed earlier in this report, a disk-to-disk-to-tape solution integrating Snap Server 4500 and BakBone NetVault can be used with a wide range of tape media and tape libraries. However, to provide a real-world example of this solution, we tested a Snap Server 4500 and NetVault with an Exabyte VXA-2 PacketLoader tape device. This detailed test case report is intended to serve as an example for additional end-user or VAR test cases; other tape libraries will have very similar results.

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Tested Topology



Hardware/Software Tested

System & Peripherals Tested

Exabyte PacketLoader

Manufacture	Model	F/W version	Comment		
Exabyte	VXA-2	Changer vA108 Drive v 2105	1U 10 x Slots Tape Library		

Snap Server 4500

Make & Model	OS Version	CPU	# of drives	Drive Size	
Adaptec Snap Server 4500	GuardianOS 3.2.019	Pentium(R) 4 CPU 2.40GHz	4	244 GB WDC-WD2500BB-50	

Ethernet Switches

Manufacture	Model	F/W version	Comment		
Allied Telesyn	AT-9410GB	AT-S45 V1.0.5	10 x 100/1000 copper ports, 2 x gigabit optical ports		

Systems Tested

Mfg. / Model	CPU	Memory	BIOS	Chip Set	Operating System
IBM @server xSeries 335	Intel XEON 3.2 GHz x 2	4096MB	IBM 1.08 - 9/17/03	ServerWorks HE	Windows 2000 Adv. SP4
Supermicro 6022P-6	Intel XEON 1.80GHz x 2	1024MB	Phoenix 4.0 R6.0 P4PD6 Rev 1.3	Intel E7500	Windows 2003

Operating System Tested

Windows 2000 Advance Server with SP4

Windows 2003 Enterprise server

Backup Applications Tested

NetVault v7.11 (Embedded in Snap Server 4500)

NetVault v7.11 Windows Agent for Windows 2000 and Windows 2003

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Testing Details

Test Cases

Test Case	Description	Procedure
1001	Tape device setup/configuration	1)Connect the tape device via the SCSI connection on the Snap Server 4500 2)Boot up the Snap Server 4500 and verify that the GuardianOS is able to detect the tape device.
1002	NetVault setup/configuration on Snap Server 4500	1)Login to the Snap Server 4500 and enable the NetVault bundled tape backup application.
1003	NetVault client installation	1)Install NetVault 7.11 (Client) option on Windows client systems to be used as the tape backup client agent.
1004	NetVault installation on Windows server system for management console	1)Install NetVault 7.11 (Server) option on a Windows system to be used as the tape backup management station. 2)Remotely login to the Snap Server 4500 from this server. 3)Add the appropriate NetVault client host system to the list.
1005	VTL (Virtual Tape Library) configuration	1)Run the NetVault Device Management utility and configure a VTL device using a volume configured on the Snap Server 4500. 2)Verify that the configured VTL device is recognized and accessible by NetVault.
1006	VXA Packet Loader configuration	1)Run the NetVault Device Management utility and configure a VXA PacketLoader tape library which is connected to Snap Server 4500. 2)Verify that the configured VXA Packet Loader Tape device is recognized and accessible by NetVault.
2001	Disk-to-disk backup	1)Setup a disk-to-disk backup job to backup data on Windows server to the VTL device previously configured. 2)Verify that disk-to-disk backup jobs to the VTL device completed without error.
2002	Disk-to-tape backup	1)Perform a disk-to-tape backup job to backup data on Windows server to the to the VXA tape device. 2)Verify that backup job(s) complete without error.
2003	Restore from VTL device	1)Perform the restore job from VTL device to Windows server. 2)Verify that restore job(s) complete without error and the appropriate data is restored correctly.
2004	Restore from VXA tape device	1)Perform the restore job from VXA tape device to NetVault client(s). 2)Verify that restore job(s) complete without error and the appropriate data is restored correctly.
2005	Tape copy test (D2T)	1)Copy the backup set from VTL device to VXA tape device. 2)Verify that tape copy job complete without error.
2006	Restore from VXA tape device	1)Perform the restore job from specific backup set which is previously copied from VTL devices to VXA tape device. 2)Verify that restore job(s) complete without error and the appropriate data is restored correctly.

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Test Results

Test Case Number	Test Title	Results
1001	Tape device setup/configuration	PASS
1002	NetVault setup/configuration on Snap Server 4500	PASS
1003	NetVault client installation	PASS
1004	NetVault installation on Windows server system for management console	PASS
1005	VTL (Virtual Tape Library) configuration	PASS
1006	VXA PacketLoader configuration	PASS
2001	Disk-to-disk backup	PASS
2002	Disk-to-tape backup	PASS
2003	Restore from VTL device	PASS
2004	Restore from VXA tape device	PASS
2005	Tape copy test (D2T)	PASS
2006	Restore from VXA tape device	PASS

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