

**Technical Report** 

# Implementing an NDMP Backup Solution Using NetBackup 6.5 and 7.0 on NetApp Storage

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This technical report describes how to implement an NDMP backup solution using NetBackup<sup>™</sup> 6.5 and 7.0 on NetApp® storage. It contains solution design and implementation details about how to configure NetBackup backup software.

This paper is intended for storage and system administrators who are responsible for NetBackup infrastructure. It assumes that you are familiar with general backup and NetBackup administration concepts and terminology.

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# 1 NDMP

## 1.1 NDMP ABSTRACT

Network Data Management Protocol (NDMP) is an open protocol for managing data stored on networked servers. The protocol was developed by NetApp and Intelliguard (now part of Legato). Further development is under the direction of the Storage Networking Industry Association (SNIA), which has a work group for NDMP. Data ONTAP® implements several versions of NDMP.

The Network Data Management Protocol is defined in fine granularity within the NDMP specification. However, a quick synopsis follows:

Currently an NDMP server can be thought of providing two services:

- NDMP DATA server: This service either reads from disk and produces an NDMP data stream (in a specified format) or reads an NDMP data stream and writes to disk, depending upon whether a backup or restore is taking place.
- NDMP TAPE server: This service either reads an NDMP data stream and writes it to tape or reads from tape and writes an NDMP data stream, depending upon whether a backup or restore is taking place. All tape-handling functions, such as split-image issues, are dealt with by this service.

Each service has a separate state diagram that dictates its behavior; for example, the tape server (mover state machine) can enter the pause state while tapes are being changed by the NDMP client.

NDMP messages are categorized into distinct groups or NDMP interfaces, such as SCSI, CONFIG, and TAPE. These messages (as well as actions and errors) can trigger state changes.

#### 1.2 NDMP SUPPORTED CONFIGURATIONS



Figure 1) Local backup: Backup/restore data travels between disks and tape drive directly.

## 3-Way Backup



Figure 2) Three-way NDMP backup: Data travels between storage system and tape device, which is connected with another storage system through IP.



Figure 3) Remote NDMP: Data travels between storage system and tape device, which is connected with backup server host through IP.

Note: All the above mentioned configurations are supported in SMTAPE as well.

# 2 NDMP CONFIGURATION IN NETBACKUP

#### 2.1 NDMP CONFIGURATION IN DATA ONTAP 7G CLI

In this chapter we provide the steps involved in configuring the tape library with NetApp storage running Data ONTAP 7G. Connect the tape library to NetApp storage using FC or SCSI interface and make sure that tape library gets detected. Follow the steps mentioned.

1. On the CLI, check the NDMP status/version details:

FILER1> ndmpd status ndmpd ON. No ndmpd sessions active.

Note: If ndmpd is not on, run "ndmpd on" command to enable ndmpd.

FILER1> ndmpd version ndmpd highest version set to: 4

2. Check the tape drive configuration details by running the following command:

#### FILER1> sysconfig -t

Tape drive (b200e-nb02:5.126) IBM ULTRIUM-TD4 rst0l - rewind device, format is: LTO 2 ro 400GB cmp nrst0l - no rewind device, format is: LTO 2 ro 400GB cmp urst0l - unload/reload device, format is: LTO 3 800GB cmp rst0m - rewind device, format is: LTO 3 800GB cmp urst0m - no rewind device, format is: LTO 3 800GB cmp urst0m - unload/reload device, format is: LTO 3 800GB cmp rst0h - rewind device, format is: LTO 3 800GB cmp rst0h - rewind device, format is: LTO 4 800GB urst0h - no rewind device, format is: LTO 4 800GB urst0h - unload/reload device, format is: LTO 4 800GB rst0a - rewind device, format is: LTO 4 1600GB cmp nrst0a - no rewind device, format is: LTO 4 1600GB cmp urst0a - unload/reload device, format is: LTO 4 1600GB cmp

Tape drive (b200e-nb02:6.126) IBM ULTRIUM-TD4 rst11 - rewind device, format is: LTO 2 ro 400GB cmp urst11 - no rewind device, format is: LTO 2 ro 400GB cmp urst11 - unload/reload device, format is: LTO 3 800GB cmp rst1m - no rewind device, format is: LTO 3 800GB cmp urst1m - no rewind device, format is: LTO 3 800GB cmp urst1m - unload/reload device, format is: LTO 3 800GB cmp rst1h - rewind device, format is: LTO 4 800GB nrst1h - no rewind device, format is: LTO 4 800GB urst1h - no rewind device, format is: LTO 4 800GB rst1a - rewind device, format is: LTO 4 1600GB cmp nrst1a - no rewind device, format is: LTO 4 1600GB cmp urst1a - unload/reload device, format is: LTO 4 1600GB cmp urst1a - unload/reload device, format is: LTO 4 1600GB cmp

Tape drive (b200e-nb02:7.126) IBM ULTRIUM-TD4 rst2l - rewind device, format is: LTO 2 ro 400GB cmp urst2l - no rewind device, format is: LTO 2 ro 400GB cmp urst2l - unload/reload device, format is: LTO 3 800GB cmp nrst2m - no rewind device, format is: LTO 3 800GB cmp urst2m - unload/reload device, format is: LTO 3 800GB cmp urst2m - unload/reload device, format is: LTO 3 800GB cmp rst2h - rewind device, format is: LTO 3 800GB cmp rst2h - no rewind device, format is: LTO 4 800GB urst2h - unload/reload device, format is: LTO 4 800GB rst2a - rewind device, format is: LTO 4 1600GB cmp nrst2a - no rewind device, format is: LTO 4 1600GB cmp urst2a - unload/reload device, format is: LTO 4 1600GB cmp

Tape drive (b200e-nb02:4.126) IBM ULTRIUM-TD4 rst3I - rewind device, format is: LTO 2 ro 400GB cmp urst3I - no rewind device, format is: LTO 2 ro 400GB cmp urst3I - unload/reload device, format is: LTO 3 800GB cmp nrst3m - rewind device, format is: LTO 3 800GB cmp urst3m - no rewind device, format is: LTO 3 800GB cmp urst3m - unload/reload device, format is: LTO 3 800GB cmp rst3h - rewind device, format is: LTO 3 800GB cmp rst3h - rewind device, format is: LTO 4 800GB urst3h - no rewind device, format is: LTO 4 800GB urst3h - no rewind device, format is: LTO 4 800GB rst3a - rewind device, format is: LTO 4 1600GB cmp nrst3a - no rewind device, format is: LTO 4 1600GB cmp urst3a - unload/reload device, format is: LTO 4 1600GB cmp urst3a - unload/reload device, format is: LTO 4 1600GB cmp

3. Check the medium changer configuration details by running the following command:

FILER1> sysconfig -m Medium changer (b200e-nb02:7.126L1) ADIC Scalar i500 mc0 - medium changer device

Note: Some of the unqualified tape drives might not be detected dynamically in Data ONTAP. Compatibility information of a tape drive is available at <a href="http://www.netapp.com/us/solutions/a-z/data-protection-devices.html">www.netapp.com/us/solutions/a-z/data-protection-devices.html</a>. If the drive is supported as per the matrix, update the latest tape configuration file from <a href="http://now.netapp.com/NOW/download/tools/tape\_config.">http://now.netapp.com/us/solutions/a-z/data-protection-devices.html</a>. If the drive is supported as per the matrix, update the latest tape configuration file from <a href="http://now.netapp.com/NOW/download/tools/tape\_config.">http://now.netapp.com/us/solutions/a-z/data-protection-devices.html</a>.

#### 2.2 NDMP AUTHENTICATION AND DETECTION OF TAPE DRIVES/MC IN DATA ONTAP 7G

To configure NDMP with NetBackup 6.5, perform the following steps.

1. Configure the storage device by clicking "Configure Storage Devices" in NetBackup Administration console window.



2. The Device Configuration Wizard appears.

Device Configuration Wizard	×
	Welcome to the Device Configuration Wizard.
	This wizard configures storage devices for use with NetBackup. This wizard uses device serialization to configure robotic libraries and drives.
	Before starting, physically attach your storage devices to the server and perform all configuration steps specified by the device or operating system vendors.
	To begin, click Next. For assistance, click Help.
	<back next=""> Cancel Help</back>

3. Click Next.

If you are running this wiz devices.	ard for the first ti	me, please add and check all hosts wi	th attached
Only hosts that are check affected hosts need to be	ed will be scann scanned. How	ned. So, if updating after device chang rever, all hosts sharing a device must b	ges, only the ie scanned.
D			Channel
win2k3nbu		_ optional Devices to be ocalified	
	<u></u>		
Configure Drive Nam	e <u>R</u> ules	To start device dete	ction, click Next

4. Select the NetBackup server host and click **Change** to select NDMP host.

n2k3nbu		
dministrator Assisted	Discovery	
is device host contro	s the following types	of devices:
NDMP host		
ACS robot		
The second second		

5. Select the "NDMP host" in the Change Device Host dialog box and click **OK** to continue.

Device Configuration Wizard	X
NDMP Hosts Select the NDMP hosts on which to configure devices by clicking the adjacent checkbox.	
NDMP hosts:	
NDMP Host	Ne <u>w</u>
	<u>C</u> hange
Add NDMP Host	<u>D</u> elete
NDMP Host Name:	
<u>QK</u> <u>Cancel</u>	
< <u>B</u> ack <u>N</u> ext > Cancel	Help

6. Click New, add NetApp Storage IP Address in "NDMP Hostname", click OK, then click Next.

_Add NDMP Host: NetApp_Storage
NDMP Host: NetApp_Storage
Credentials
C Use global NDMP credentials for this NDMP host (Not valid for back-level servers)
<ul> <li>Use the <u>following</u> credentials for this NDMP host on all media servers (Not valid for back-level servers)</li> </ul>
Username:
root
Password:
****
, Confirm Password:
*****
<ul> <li>Use different credentials for this NDMP host on each media server (Use Advanced Configuration)</li> <li>To configure individual media server credentials, credentials for back-level servers, or to override global and NDMP host level credentials, use Advanced Configuration</li> </ul>
QK <u>C</u> ancel <u>H</u> elp

7. Select the "Use the following credentials for this NDMP host on all media servers (Not valid for back-level servers)" option and type username and password of the storage system, then click **OK**.

evice Configuration Wizard	
NDMP Hosts Select the NDMP hosts on which to configure devices by clicking the adjacent checkbox.	
NDMP hosts:	
NDMP Host	Ne <u>w</u>
NetApp_Storage	<u>C</u> hange
	<u>D</u> elete
,	
< <u>B</u> ack <u>N</u> ext > Cancel	Help

8. Select the NDMP Host, then click Next.

Scanning Wait w	Hosts /hile devices are auto-discove	ered.	3
losts are now <sup>D</sup> rogress:	being scanned.		9
Host	Operation	Status	
Y All Hosts	Preparing to scan for devices.	Done.	 

9. It scans the MediaChanger and the tape drives that are connected with the storage system through the NDMP protocol.

vice Co	nfigurat	ion Wiza	ard					
Backu Re	<b>Ip Devi</b> eview th	c <b>es</b> le device	es NetBa	kup has found.				J
f you hav device is p system ve	e a backi ohysically ndor havi	up device attached e been pe	that does , and that erformed.	not appear in this all installation step	list, cancel t is specified b	his wizard y the devi	and verify ce and op	that the erating
							Pro	perties
Device				State	Serialized	Limital	ions	-
ADIC	Scalar	i2000 C	001	Configured	Yes	None		
BIBM	ULTRI	JM-TD4	022C	Configured	Yes	None		
BIBM	ULTRI	JM-TD4	022C	Configured	Yes	None		
lost and	device pa	ath config	uration info	ormation for select	ed device:			
Host		NDMP	Host	Path	Port	Bus	Target	LUN
win2k3n	bu	NetApp_	Storage	mc0	0	2	0	0

10. Click **Next** to continue.

Drag and Drop Configuration Verify the drive configuration is correct.		9
you need to make any changes, simply drag a drive to its proper loc hould appear under their robotic library. Drives not in libraries should	ation. Drives in rob appear under "Sta	otic librarie ndalone
evices can be enabled and disabled by clicking the adjacent check	kboxPr	operties
🗆 🗹 📄 Robot 1 <win2k3nbu> (ADIC Scalari500 520G)</win2k3nbu>		
Reverse Street	ULTRIUM-TD4	85V1]
- Vive 2 IBM.ULTRIUM-TD4.001 <win2k3nbu> [IBM</win2k3nbu>	ULTRIUM-TD4	85/1]
	ULTRIUM-TD4	85/1]
□ Inive 4 IBM.ULTRIUM-TD4.003 <win2k3nbu> [IBM □ Inive 4 IBM.ULTRIUM-TD4.003 <win2k3nbu> [IBM</win2k3nbu></win2k3nbu></win2k3nbu></win2k3nbu></win2k3nbu>	ULTRIUM-TD4	85/1]
- V P Drive 1 IBM.ULTRIUM-TD4.004 (win2k3nbu) [IBM	ULTRIUM-TD4	022C]
- V Prive 2 IBM.ULTRIUM-TD4.005 <win2k3nbu> [IBM</win2k3nbu>	ULTRIUM-TD4	022C] •
o continue, click Next.	ULTRIUM-TD4	022C)

After the scaning process, it would detect all available tape devices and media changers from the storage system. To change tape device mapping, drag and drop the tape devices between robots, if you are sure about tape library element ID and device ID. However, it is not recommended to change default configuration. Click **Next** in above screen.

Device C	ionfiguration Wizard
1	After this point, the device configuration changes will be committed. The original configuration cannot be restored once these change have been made.
	Do you want to continue?
	<u>Yes</u> No

11. Commit the new device configuration by clicking Yes.

Jpdate complete.			
Operation	Host	Stat	
Y Committing d		Done.	-
Y Restarting th.	win2k3nbu	Done.	
Fo continue, click	Next.		

12. Update new device configuration changes and restart the device-related services. Click Next.

onfigure Storage Units	
You can make the devi units.	ices available to NetBackup by configuring storage
A storage unit is a logical gr In order for NetBackup to w storage unit must be configu	ouping of one or more storage devices attached to a serve wite to the devices attached to the NetBackup server, a ured for these devices.
Check devices that you wa "win2k3nbu".	nt configured as NetBackup storage units on Master Serve
	Properties
win2k3nbu-hcart-robot- win2k3nbu-hcart-robot-	tld-NetApp_Storage tld-1-NetApp_Storage
<ul> <li>✓ win2k3nbu-hcart-robot-</li> <li>✓ win2k3nbu-hcart-robot-</li> </ul>	tld-NetApp_Storage tld-1-NetApp_Storage
<ul> <li>✓ win2k3nbu-hcart-robot-</li> <li>✓ win2k3nbu-hcart-robot-</li> </ul>	tld-NetApp_Storage
<ul> <li>✓ win2k3nbu-hcart-robot-</li> <li>✓ win2k3nbu-hcart-robot-</li> </ul>	tld-NetApp_Storage tld-1-NetApp_Storage
win2k3nbu-hcart-robot- win2k3nbu-hcart-robot-	tld-NetApp_Storage
win2k3nbu-hcart-robot- win2k3nbu-hcart-robot-	tld-1-NetApp_Storage

13. Click **Next** to continue.

Device Configuration Wizard		×
	Finished! You have successfully completed the NetBackup Device Configuration Wizard. You may view or change current configuration settings within Device Management or Storage Unit Management.	
	To exit the wizard, click Finish.	
	< <u>Back</u> FinishClose Help	

After successful completion of above steps, click **Finish.** List the configured tape library and tape drives in NetBackup Administrator console under "Device and Media management" section.

#### 2.3 NDMP CONFIGURATION IN DATA ONTAP 8.0 CLUSTER-MODE CLI

In the following chapter the steps involved in configuring the tape library with NetApp storage on Data ONTAP 8.0 Cluster-Mode are provided. Connect the tape library to NetApp storage using FC or SCSI interface and make sure that tape library gets detected. Follow the steps mentioned.

1. Check the NDMP service status and make sure that NDMP is enabled.

<pre>cmode1::&gt;</pre>	system	servi	ces ndmp :	show				
Node			Enabled	Clear	text	User	Id	Password
cmode1			true	true		root		admin
cmode2			true	true		root		admin
2 entries	were d	isplay	ed.					

2. Check the tape drive's configuration details by running the following command.

3. Check the tape library configuration details by running the following command:

Additionally, you can run "system node run -node cmodel sysconfig -t" and "system node run -node cmodel sysconfig -m" to check the Tape Library and Drives and configuration details.

#### 2.4 DETECTION OF TAPE DRIVES/MC IN DATA ONTAP 8.0 CLUSTER-MODE

Follow the same steps mentioned in "Detection of tape drives/MC in Data ONTAP 7G."

#### 2.5 INVENTORY OF TAPE LIBRARY

In this chapter we provide the steps involved in inventorying the tape library on NetBackup Administration console.



Right click Robot and select Inventory Robot.

belect rodot	Inventory operation
Device Host:	- C Show contents
win2k3nbu	
Robot:	Compare concents with volume configuration
TLD(0) - win2k3nbu	<ul> <li>Update volume configuration</li> </ul>
	<u>A</u> dvanced Options
	Preview changes
	Exercise parts prior to undate
	Empty modia access porciprior to aparate
35 No 36 No  11/30/2009 12:32:37 PM > In	Augustory & Undate for TLD(0) on win2k3n
35 No 36 No 11/30/2009 12:32:37 PM > In Generating list of recommen	
35 No 36 No 11/30/2009 12:32:37 PM > In Generating list of recommen Proposed Change(s) to Updat	
35 No 36 No 11/38/2009 12:32:37 PM > In Generating list of recommen Proposed Change(s) to Updat Logically add new media 000 Logically add new media 000	Aventory & Update for TLD(0) on win2k3n aded changes te the Volume Configuration 1011 (barcode 000011) to robot slot 1. 1013 (barcode 000012) to robot slot 2. 1012 (barcode 000012) to robot slot 3. 1001 (barcode 000001) to robot slot 4. 1001 (barcode 000001) to robot slot 4.
35 No 36 No 37 No 36 No 11/30/2009 12:32:37 PM > In Generating list of recommen Proposed Change(s) to Updat Logically add new media 000 Logically add new media 000 Logically add new media 000 Logically add new media 000 Update volume configuration 4	Aventory & Update for TLD(0) on win2k3n aded changes te the Volume Configuration 1011 (barcode 000011) to robot slot 1. 1013 (barcode 000012) to robot slot 2. 1012 (barcode 000012) to robot slot 3. 1001 (barcode 000001) to robot slot 4. 1?
35 No 36 No 11/30/2009 12:32:37 PM > In 11/30/2009 12:32:37 PM > In Generating list of recommen Proposed Change(s) to Updat Logically add new media 000 Logically add new media 000 Logically add new media 000 Logically add new media 000 Update volume configuration Ipdate volume configuration?	Aventory & Update for TLD(0) on win2k3n aded changes te the Volume Configuration 1011 (barcode 000011) to robot slot 1. 1013 (barcode 000012) to robot slot 2. 1012 (barcode 000012) to robot slot 3. 1001 (barcode 000001) to robot slot 4. 12 12 12 12 12 12 12 12 12 12 12 12 12

Clicking **Yes** in the above screen would update the tape media information in NetBackup media server database.

ielect robot	Inventory operation
Device Host:	C Show contents
	□
<u>k</u> odot: TLD(0) - wip2k3phu	Update volume configuration
	Advanced Options
	Preview changes
	Empty media access port prior to update
Processing new media added adding media with new media Media ID Slot ====================================	to the robotic library by logically IDs as follows
Processing new media added adding media with new media Media ID Slot ====== 000011 1 000013 2 000012 3 000001 4	to the robotic library by logically IDs as follows
Processing new media added adding media with new media Media ID Slot ======= 000011 1 000013 2 000012 3 000001 4 Volume configuration succes	to the robotic library by logically IDs as follows sfully updated.
Processing new media added adding media with new media Media ID Slot ====== 000011 1 000013 2 000012 3 000001 4 Volume configuration succes	to the robotic library by logically IDs as follows sfully updated.
Processing new media added adding media with new media Media ID Slot ====== 000011 1 000013 2 000012 3 000001 4 Volume configuration succes 	to the robotic library by logically IDs as follows sfully updated.
Processing new media added adding media with new media Media ID Slot ======= 000011 1 000013 2 0000012 3 000001 4 Volume configuration succes 	to the robotic library by logically IDs as follows sfully updated. Clear Resul

Click **Close** to complete the process.

# 2.6 CREATION OF NDMP POLICY

In this chapter we provide the steps to create an NDMP policy on NetBackup Administration console.



1. Right click "Summary of all Policies" and click "New policy" to create a new policy.

Backup Policy Configuration	Wizard	×
<ul> <li>Control of the second se</li></ul>	Welcome to the Ba Configuration Wiz	ackup Policy ard.
	This wizard guides you through th policy for backing up similar client	ne process of creating a ts.
	A NetBackup policy defines the f	ollowing information:
	<ul> <li>Which clients to back up</li> </ul>	
	<ul> <li>What data to back up</li> </ul>	1
	<ul> <li>Where the data is stored</li> </ul>	.
	<ul> <li>When the data is to be backet</li> </ul>	dup
	The default settings in the wizard Policies portion of the NetBackup	can be customized using the Administration Console.
	To begin, click Next.	For assistance, click Help.
	< <u>B</u> ack Next>	Cancel Help

### 2. Click **Next** to continue.

Policy nam	a'
NDMP_P	o. olicy1
Select the	policy type.
NDMP	

3. Select "NDMP" as policy type and click Next.

Backup Policy Configuratior	ı Wizard		×
Client List Specify clients for th	nis policy.		
NetBackup will back up tł the policy. NetBackup cli	nese clients according ents can be in more th	to the file list, schedules, an an one policy.	d attributes for
For easier management, fil perform the same type of v	I the client list with clie vork.	nts that have similar configu	rations and
Name	Hardware	Operating System	Add
账NetApp_Storage		<b>_</b>	Change
			Delete
			Properties
Detect <u>operating</u> syste (This is successful on	m when adding or cha y on Windows platform	nging a client. Is.)	
	< <u>B</u> ack	Next > Cancel	Help

4. Click **Add** to add the storage host name into client list, then click **Next** to continue.

Select the	hardware and opera	ting system	
NDMP, N	DMP		
	OK	Cancel	Help

5. Select operating system as "NDMP, NDMP" and click **OK**.

op roncy configuration means	
iles Specify the files and folders to backup.	
The file list identifies the files and folders to be backed up by scheduled clients in this policy. All files and folders do not have to exist on all the	l backups for all clients.
This file list is ignored by user directed backups because in those insta	nces the user select
the files to back up.	
Back up all local drives	
Backup Selections	Add
Backup Selections * [/vol/voldb]	Add [nsert
Backup Selections X /vol/voldb	Add Insert
Backup Selections * /vol/voldb	Add Insert Change Delete
Backup Selections /vol/voldb	Add Insert Change Delete
Backup Selections X /vol/voldb	Add Inset Change Delete
Backup Selections	Add Insert Change Delete

6. Add the volume that needs to be backed up, then click **Next** to continue. Qtrees and subdirectories of volumes can be specified as well.

Note: Wildcard characters are not allowed when listing the pathnames.

Policy Configuration Wizard
ckup Type Specify the types of backups.
Eull Backup
Backs up all the files specified in the file list.
Incremental Backup
Backs up all changed files specified in the file list.
C Differential (files changed since last full or incremental backup)
C Cumulative (files changed since last full backup)
∐ser Backup
Allows users to initiate backups on their own.
< <u>B</u> ack. <u>N</u> ext > Cancel Help

7. Select Full Backup and click Next.

Start a full backup eve	ery:	Retain full backups for:
Weeks	<u>•</u>	2 weeks (level 1)
itart an incremental b	ackup every:	Retain incremental backups for:
1 🕂 Days	Y	2 weeks (level 1)

8. Select the retention period as per customer requirement and click Next.

					_									
2	4	6	8	10	)	12	1	14	1	.6	18	20	22	2
Sun		•	• •	• •	•	•	•	•	•		-			•
Tue		::	::	::	:	•	:	:	•	::				
Ved				• •	•	•	•	•	+		-		• •	•
Fri		1	::	::	:	:	-	:	•	::	E		::	•
Sat							-				_			-
Scheduled with the scheduled	indow		1	Jser v	ind	ow				L CO	istom	Setting	18	
• Off hours			(	C Off	hou	ifs:					5 <u>9</u>			
C Working h	ours		(	e Wo	r <u>k</u> in	ig ho	an			A		Ť	-	
C All day			(	C All	day					St	art	1	Durat	ion
C Custom			(	Cus	torr	ñ				110	2	-	1	1

9. Schedule the backup as per customer requirement and click Next.



10. Click Finish to complete policy creation.

# 2.7 NDMP BACKUP

In this chapter we provide the steps to run NDMP backup manually on NetBackup Administration console



1. Select appropriate storage unit for NDMP backup by right clicking the backup policy and select "Change".



2. Right click the NDMP policy and click "Manual backup" to run backup.

Manual Backup	×
Start backup of policy: NDMP_Polic	у
<u>S</u> chedules:	Clients:
Full	NetApp_Storage
Select a schedule and one or n To start a backup for all clients, pre	nore clients to start the backup. ess OK without selecting any clients.
ОК	Cancel Help

3. Click **OK** to initiate backup.

Job ID: 1		Job State: Active		4
lob Overview D	etailed Status			A.
Job type: Sub type:	Backup Immediate	Started (queued): Elapsed:	9/17/2009 5:12:51 PM 00:00:53	
Client: Master server:	NetApp_Storage win2k3nbu	Ended: Retention:	2 weeks	
Policy: Policy type: Schedule: Schedule type:	NDMP_Policy1 NDMP Full Full Backup	File list: /vol/voldb		*
Priority: Owner: Group: Compression:	0 root root No			-
Off-host:	Stanualu	3	P	ſ
Perc	ent Complete:			

Job details screen.

Decomstr											
Job ID: 1		Job State: Active									
ob Overview	Detailed Status										
	Job PID:	1596	Started:	9/17/2009 5:12:51 PM							
	Storage unit:	win2k3nbu-hcart-ro	Elapsed:	00:04:02							
	Transport Type:	WINZKONDU	KB/Sec:	45453							
Status:											
9/17/2009 5 9/17/2009 5 9/17/2009 5	:13:09 PM - position :13:10 PM - position :13:10 PM - begin w	ing LT0401 to file 1 ed LT0401; position t riting	ime: 00:00:	01	Ē						
Current kiloby	tes written: 95550	84									
Current files v	nitten: 0										
Current file											
Current file:				Iroubleshoo	oter						
Current file:	ercent Complete:			Iroubleshoo	oter						
Current file:	ercent Complete:				oter						

4. Monitor progress of backup; it will eventually complete.

# 2.8 NDMP RESTORE

In this chapter we provide the steps involved in NDMP restore on "Backup, Archive, and Restore NetBackup client."

👪 Backup, Archive, and Restore - NetBackup 📃	
Eile View Actions Help	
Select Files and Folders to Backup	
NetBackup Client Properties	
Specify NetBackup Machines and Policy Type	
鍒 Login as New User	
View Status	
NetBackup Explorer Extensions	
E≚it	
Specify the machines to use and policy type for the backup or restore.	

1. Select "Specify NetBackup machines and Policy Type" in "Backup, Archive, and Restore" under File menu.

Specify NetBackup M	1achines and Policy	у Туре	×							
Server to use for back	sups and restores:									
win2k3nbu		•	Edi <u>t</u> Server List							
Source client for restores (or virtual client for backups):										
		•	Edit Client List							
Destination client for r	restores:									
		•								
Policy type for restore	es:									
NDMP		•								
	ок	Cancel	Help							

2. Select source and destination for restore. If the backed-up NetApp storage does not appear in the drop-down list, add it by clicking **Edit Client List**. Click **OK** to continue.

Edit Clien	t List			×
<u>E</u> nter names	to add to list	: (separated by comn	nas):	
filername_c	or_IP			
			Add Name(s)	
<u>⊂</u> lient list:				
Name				
win2k3nbu				
,			Remove Selected	
	ок	Cancel	Help	
				//

3. Type IP address or NetApp storage name and click Add Name.

Edit Client List	×
Enter names to add to list (separated by	commas):
1	
	Add Name(s)
⊆lient list:	
Name	
win2k3nbu	
NetApp_Storage	
	Remove Selected
	Femore pelected
OK Cancel	Help

4. Click OK.

Specify NetBackup Machines and Policy Type	×									
Server to use for backups and restores:										
win2k3nbu Edit Server List										
Source client for restores (or virtual client for backups):										
NetApp_Storage	Edit Client <u>L</u> ist									
Destination client for restores:										
NetApp_Storage										
Policy type for restores:										
NDMP										
OK Cancel	Help									

5. Select source client, destination client, and policy type as NDMP and click **OK**.

🔣 Backup, Archive, and Restore - NetBackup	_ 🗆 🗵
<u>Eile View Actions Help</u>	
🔜 Select for Backup 🛛 💐 Select for Restore 👻 🎼 View Status 🛛 😰 😻 🥔	
Select Files and Folders to Restore	
Open a New Restore Window	

6. Click "Select for Restore."

🔁 Eile Edit View Actions Window Help	<u>_ 8 ×</u>
🔜 Select for Backup 🛛 💐 Select for Restore 🔹 🎼 View Status 🛛 🐼 😻	
NetBackup History	
2009	-
Oct 20 10 18 17 16	
Ž	•
All Folders Contents of '10.73.69.81'	
Name Time Backed Up	
□ Vol	

7. Select volume to be restored.

🚮 B	ackup,	Ar	chive,	and	Res	tore	- Ne	tBack	(up ·	- [R	esto	ore:	Ser	ver:	winź	2k3n	bu	Source Client: 10.73.6	🗆 🗡
💁 !	<u>File E</u> d	lit	⊻iew	Act	ions	<u>W</u> ind	dow	<u>H</u> elp											_ 8 ×
	Select f	or E	Backup	Ħ	Sear	rch <u>B</u> a	ckup:	s			🖹 Vie	ew S	tatus	;	Ø	%	۲	3	
<b>85</b>	NetBa	:kup	) Histo	2	<u>P</u> rev	iew M	ledia												
	20	009			<u>R</u> est	ore													<b>_</b>
<b>.</b>	0	ct D	19		Sele	ct Res	store	Туре	۲										
8		2	۲		Adm	inistei	r Dat	abase	T≹er										
<b></b>		2	2			2	9												
2		5	3			3	š												
-9	(	•	õ			2	0												
							8												
							õ												
	<u> </u>						۲												<u> </u>
	All Fold	ders														Conte	ints	of '10.73.69.81'	
	🗾	2	NetA	pp_S	toraç	je										Name		Time Backed Up	
		··· 🗹		ol Di de	vol										[		€vol	10/20/2009 5:19:04 PM	
					//01														
Previe	i ew Medi	a R	equire	d for	Rest	ore													11.

8. Click "Preview Media" under Actions menu.

🥅 Media Red	quired			×
These objects	s were selected for restore	:		
Name	Time Backed Up	Time Modified		
vol:\dbvol\	10/20/2009 5:19:04 PM			
The following	media were used during th	e time in which the sele	ected objects were back ,	ed up:
Media ID				
			Close	Help

9. Above screen displays the media that are required for restore. Click **Close**.

🚮 Back	up, Ar	chive,	and R	estore -	NetBackuj	- [Restore:	Server: wi	n2k3nl	bu 🤉	5ource Client: 10.73.69.81	🗆 ×
🔁 Eile	<u>E</u> dit	⊻iew	Action	s <u>W</u> indo	w <u>H</u> elp						_ 8 ×
風 Sele	ct for I	Backup	🛱 Se	arch <u>B</u> ack	ups	View S	itatus 🕴 🛃	) 🗞	۲		
Ren Nel	tBacku	p Histo	🚔 Br	eview Mec	dia						
	2009	)	R	store							<b></b>
	Oct	20	Se	lect Resta	ore Type 🕨						
:8::		20	Ac	minister D	atabase <u>T</u> e	ſ					
		9	0	\$	2 0	-					
2		8	8	2							
-94		- 2	- 5		5 5						
					2						
					2			_			<u> </u>
All	Folder	s						Conte	nts o	f 'vol:\dbvol'	
<b>E</b> .		NetA	App_Sto	age				Name		Time Backed Up	
	 i	┉╻╱	oi 🗟 dbyo	1				I			
				•				I			
								L			
								I			
								L			
								I			
Shave Dave		Maulua	d Eilan					I			
Start Res	tore or	marke	u riles								

10. Click **Restore** under Actions menu.

Restor	e Marked Fi	iles									X
Gene	ral										
Re	store Destina	tion Choices-									_
•	Restore ever	ything to its <u>o</u> r	iginal loo	catio	n						
0	Restore ever	ything to a di <u>f</u> f	erent lo	catio	in (ma	aintaini	ng ex	isting :	structu	re):	
	Destination:										
	vol:\dbvol\								B	rowse	
0	<u>R</u> estore indiv	idual folders a	nd files I	to di	fferen	it locat	tions	(double	e-click	to modify):	
	Source	Destination	Time B	Back	ed U	р					$\exists \mid \mid$
	vol:\dbvol\		10/20/	/200	9 5:19	3:04 P	M 1	0/20/	2009 5	5:19:04 PM	1
	•										
Re	store Options										
	Restore with	out access-co	ntrol attr	ribute	es (W	indow	s clier	nts onl <u>i</u>	y)		
If th	e destination	file already exi	sts:								
	U <u>v</u> erwrite exi: Dootoro the G	sting files In union of them		I							
ŏ	Do <u>n</u> ot restor	e using a <u>t</u> em e the file	porary n	ieria	me						
		St <u>a</u> rt Resto	ore		Cano	cel				Hel	р

11. To restore data to original location, select "Restore everything to its original location" and click **Start Restore** to initiate restore.

store Marked Files	
General	
Restore Destination Choices Restore everything to its griginal location	
<ul> <li>Restore everything to a different location (maintaining exi Destination:</li> </ul>	isting structure):
vol:\dbrestore\	Browse
O Restore individual folders and files to different locations (o	double-click to modify):
Source Destination Time Backed Up vol:\dbvol\ 10/20/2009 5:19:04 PM 10	0/20/2009 5:19:04 PM
Source Destination Time Backed Up vol:\dbvol\ 10/20/2009 5:19:04 PM 10	0/20/2009 5:19:04 PM
Source Destination Time Backed Up vol:\dbvol\ 10/20/2009 5:19:04 PM 10	0/20/2009 5:19:04 PM
Source Destination Time Backed Up vol:\dbvol\ 10/20/2009 5:19:04 PM 10  Restore Options	0/20/2009 5:19:04 PM
Source       Destination       Time Backed Up         vol:\dbvol\       10/20/2009 5:19:04 PM 10         Image: Source Options       Image: Source Options         Image: Restore Options       Image: Source Options         Image: Restore without access-control attributes (Windows clien)         Image: Note that the source of	0/20/2009 5:19:04 PM
Source       Destination       Time Backed Up         vol:\dbvol\       10/20/2009 5:19:04 PM 10         Image: state sta	0/20/2009 5:19:04 PM
Source       Destination       Time Backed Up         vol:\dbvol\       10/20/2009 5:19:04 PM 10         Image: Source Options       Image: Source Options         Image: Restore Options       Image: Source Options         Image: Source Options       Image: Source Options </td <td>0/20/2009 5:19:04 PM</td>	0/20/2009 5:19:04 PM
Source       Destination       Time Backed Up         vol:\dbvol\       10/20/2009 5: 19:04 PM 10         Image: state of the	0/20/2009 5:19:04 PM
Source       Destination       Time Backed Up         vol:\dbvol\       10/20/2009 5:19:04 PM 10         Image: Source Options       Image: Source Options         Image: Restore Options       Image: Source Options         Image: Source Without access-control attributes (Windows clients)         If the destination file already exists:         Image: Option Option File Interview (Windows clients)         Image: Source Without access-control attributes (Windows clients) <td>0/20/2009 5:19:04 PM  Its only)</td>	0/20/2009 5:19:04 PM  Its only)

12. To restore data to a different location, select "Restore everything to a different location" and click **Start Restore** to initiate restore.

NetBacku	ip Message 📃 🔊	ς.
2	The restore was successfully initiated.	
~	Do you want to view the progress of the restore?	
	Yes <u>N</u> o	

13. Click **Yes** to view the progress of the restore job. The job status can also be viewed from the Job screen, similar to backup jobs details.

Job Details:275			×
Job ID: 275		Job State: Active	4
Job Overview	Detailed Status		-
Job type: Sub type: Client: Master server: Policy:	Restore NetApp_Storage win2k3nbu	Started (queued): Elapsed: Ended: Retention: File list:	10/21/2009 4:13:39 PM 00:01:19
Policy type: Schedule: Schedule type:		/vol/dbvol/	<u> </u>
Priority: Owner: Group: Compression: Data movement	root root		
Ult-host:		1	
Per	cent Complete:		
Print		H	felp Close

Job details screen.

Job Details:275					x
Job ID: 275	J	lob State: Active		4	
Job Overview Detailed S	itatus			4	۲
Job PID: Storage un Media serv Transport T Status:	3112 it: er: win2k3nbu ype:	Started: Elapsed: Ended: KB/Sec:	10/21/2009 00:00:56	9 4:13:39 PM	
10/21/2009 4:13:39 PM 10/21/2009 4:13:40 PM 10/21/2009 4:13:40 PM 10/21/2009 4:13:40 PM 10/21/2009 4:13:40 PM 10/21/2009 4:13:40 PM 10/21/2009 4:13:42 PM 10/21/2009 4:13:42 PM 10/21/2009 4:13:40 PM	begin Restore     media LT0501 require:     restoring image 10.73.6     connecting     connected; connect tir     started process bptm (2     started process bptm (2     mounting LT0501     requesting resource LT	d 59.81_125603934 ne: 00:00:00 2176) 2176) 70501	14	• • •	
Current kilobytes written: Current files written: Current file:	0 0 /vol/dbvol/	Estimated Files	: 1	Iroubleshooter	
Percent Com	plete:				
<u>P</u> rint		н	elp	Close	

Monitor job restore status.

Job ID: 275		J	ob State: Done	(Successful)	1
ob Overview	Detailed Status				
	Job PID: Storage upit:	3112	Started: Flansed	10/21/2009 4:13:39 PM	
i	Media server:	win2k3nbu	Ended	10/21/2009 4:20:45 PM	
	Transport Type:	LAN	KB/Sec:	141158	
Status:					
10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4	1:13:58 PM - posit 1:13:58 PM - begi 1:20:40 PM - end 1:20:45 PM - resto	ioned LT0501; po n reading reading; read time: red image 10.73.6 Reaters of the second	sition time: 00:0 00:06:42 9.81_12560393	0:01 144 - (the requested operatio	2
10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 the requested	1:13:58 PM - post 1:13:58 PM - begi 1:20:40 PM - end 1:20:45 PM - resto 1:20:45 PM - end 1 operation was su	ioned LT0501; po: n reading reading; read time: red image 10.73.6 Restore; elapsed ti iccessfully complet	sition time: 00:0 00:06:42 9.81_12560393 me: 00:07:06 ed[0]	0:01 44 - (the requested operatio	
10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 the requested	1:13:58 PM - post 1:13:58 PM - begi 1:20:40 PM - end 1:20:45 PM - resto 2:20:45 PM - end 1 operation was su es written: 5097	ioned LT0501; po: n reading reading; read time; red image 10.73.6 Restore; elapsed ti cccessfully complet	sition time: 00:0 00:06:42 9.81_12560393 me: 00:07:06 ed[0]	0:01 44 - (the requested operatio 	·
10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 the requested Current kilobytic Current files with	(13:58 PM - posit (13:58 PM - begin (20:45 PM - end (20:45 PM - resto (20:45 PM - end operation was su es written: 5097 ritten: 0	ioned LT0501; po: n reading reading; read time: red image 10.73.6; Restore; elapsed ti iccessfully complet /5232	sition time: 00:0 00:06:42 9:81_12560393 me: 00:07:06 ed[0]	0:01 44 - (the requested operatio	ļ
10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 the requested Current kilobyb Current files we Current file:	1:13:58 PM - posis 1:13:58 PM - begin 1:20:45 PM - resto 1:20:45 PM - resto 1:20:45 PM - resto 1:20:45 PM - end 1 operation was su es written: 5097 ritten: 0 /vol/	ioned LT0501; po: n reading reading: read time: red image 10.73.6 Restore; elapsed ti iccessfully complet 5232	sition time: 00:0 00:06:42 9:81_12560393 me: 00:07:06 ed[0]	0:01 144 - (the requested operatio	ļ
10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 the requested Current kilobyb Current files we Current file:	1:13:58 PM - posit 1:13:58 PM - begin 1:20:45 PM - restd 1:20:45 PM - restd 1:20:45 PM - end 1:0peration was su es written: 5097 ritten: 0 /vol/	ioned LT0501; po: n reading reading; read time: red image 10.73.6 Restore; elapsed ti iccessfully complet 15232 /dbvol/	sition time: 00:0 00:06:42 3.81_12560393 me: 00:07:06 ed[0]	0:01 44 - (the requested operatio 	, , , , , , , , , , , , , , , , , , ,
10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 10/21/2009 4 the requested 10/21/2009 4 the requested 10/21/2009 4 Current kilobyto Current file: Percent	(13:58 PM - posis (13:58 PM - begin (20:45 PM - reston (20:45 P	ioned LT0501; po: n reading reading: read time: red image 10.73.6 Restore; elapsed ti iccessfully complet 15232 /dbvol/	sition time: 00:0 00:06:42 9:81_12:560393 me: 00:07:06 ed[0]	0:01 44 - (the requested operatio <u>Iroubleshoo</u> 0 minutes remaining	) 

Data restored successfully to the required location.

# **3 SMTAPE POLICY**

SMTape is an image-based data protection solution to tape. SMTape is designed to provide high-performance tape copies. SMTape is available in Data ONTAP release 8.0 (7-Mode only). SMTape performs the same function as SM2T. SMTape is an open feature available to all customers, whereas SM2T requires PVR approval. SM2T is available on Data ONTAP 7G versions and is replaced by SMTape in Data ONTAP version 8.0 7-Mode.

Creation of smtape policy is similar to that of an NDMP policy. Create an NDMP backup policy and add "set type =smtape" in the backup selection menu. Addition of "set type=smtape" would initiate smtape backups instead of the normal NDMP dump backups.

Note: The backup policy creation for SM2T is identical to that of SMTape.

# 3.1 CREATION OF SMTAPE POLICY

inge Policy - SMTape_Policy				
🗐 Attributes 🕅 🤀 Schedules 🗌	🗐 Clients 🛛 🔁	Backup Selections	:	
Backup Selections				
🖙 set type = smtape				
🚞 /vol/backup				
<b>米</b>				
<u>N</u> ew.	<u>D</u> elete	<u>R</u> ename	<u>Ш</u> р	Do <u>w</u> n
		ОК	Cancel	Help

Add "set type=smtape" in Backup selections and type the name of the volume to be backed up.



Right click the SMTape Policy under policies and select Manual backup to initiate the backup.

Job D	Details:277				×
	Job ID: 277		Job State: Active		<u></u>
Job	D Overview D	etailed Status			_₽
Jo Su	ib type: ib type:	Backup Immediate	Started (queued): Elapsed:	10/21/2009 7:03:25 PM 00:00:10	
Cli Ma	ient: aster server:	NetApp_Storage win2k3nbu	Ended: Retention:	2 weeks	
Po Po So So	blicy: blicy type: chedule: chedule type:	SMTape_Policy NDMP Full Full Backup	File list: set type = smtap /vol/dbvol	e	
Pri Ov Gr Cc D∂ Of	iority: oup: ompression: ata movement: f-host:	0 root No Standard	×	Þ	T
	Perce	ent Complete:			
	<u>P</u> rint	]	H	Help Close	

Job details screen.

Job Details:27	7					X
Job ID: 2	77	Job S	tate: Active			
Job Overview	Detailed Status					ᡛ
	Job PID: Storage unit: Media server: Transport Type:	776 win2k3nbu-hcart-ro win2k3nbu	Started: Elapsed: Ended: KB/Sec:	10/21/2009 00:00:20	7:03:25 PM	
10/21/2009 10/21/2009 10/21/2009 10/21/2009 10/21/2009 10/21/2009 10/21/2009 10/21/2009	7:03:25 PM - reques 7:03:25 PM - reques 7:03:25 PM - reques 7:03:25 PM - grante 7:03:25 PM - grante 7:03:25 PM - grante 7:03:25 PM - grante 7:03:25 PM - grante 7:03:26 PM - estimal	ting resource Any ting resource win2k3 ting resource win2k3nbi d resource win2k3nbi d resource LT0501 d resource LT0501 d resource IBM.ULTF d resource win2k3nbi ted 0 kbytes needed	nbu.NBU_C nbu.NBU_P u.NBU_CLIE u.NBU_POL 3IUM-TD4.0 u-hcart-robo	LIENT.MAXJI OLICY.MAXJI INT.MAXJOB ICY.MAXJOB 03 040-0-10.73.6	DBS.10.73.65 DBS.SMTape S.10.73.69.8 S.SMTape_F 9.81	
Current kiloby Current files w Current file:	tes written: 0 vritten: 0					
P	'ercent Complete:					
<u>P</u> rint			H	lelp	Close	

Monitor progress of SMTape backup.

Job Details:277					×
Job ID: 277	Job S	tate: Done (	Successful)		¢
Job Overview Detailed Status					❖
Job PID: Storage unit: Media server: Transport Type: Status:	776 win2k3nbu-hcart-ro win2k3nbu	Started: Elapsed: Ended: KB/Sec:	10/21/2009 00:11:20 10/21/2009 82792	7:03:25 PM 7:14:45 PM	
10/21/2009 7:03:26 PM - connet 10/21/2009 7:03:26 PM - connet 10/21/2009 7:03:28 PM - mounti 10/21/2009 7:03:44 PM - mounti 10/21/2009 7:03:45 PM - position 10/21/2009 7:03:46 PM - begin t 10/21/2009 7:03:46 PM - begin t 10/21/2009 7:14:37 PM - end wr the requested operation was succ	cting cted; connect time: 0 ng LT0501 ed; mount time: 00:00 ning LT0501 to file 7 ned LT0501; positior writing iting; write time: 00:11 cessfully completed(0	0:00:00 1:16 h time: 00:00: 0:51 )	.01	-	
Current kilobytes written: 530299 Current files written: 1 Current file:	320		[	Iroubleshoot	er
Percent Complete: 100%		(	) minutes rem	aining	
Print		Н	elp	Close	

The progress can be tracked using the "snapmirror status" command in the NetApp storage:

STORAGE> snapmirror status STORAGE:dbvol STORAGE:nrst3a

Source - Transferring (13 GB done)

### 3.2 SUPPORTED SMTAPE NDMP VARIABLES

Data ONTAP supports a set of environment variables in SMTape. These variables are used to communicate information about SMTape backup or restore operations between an NDMP-enabled backup application and the storage system.

The following list provides details of environment variables supported by Data ONTAP for SMTape as well as their valid values, default values, and a brief description.

#### SMTAPE\_SNAPSHOT\_NAME

When the SMTAPE\_SNAPSHOT\_NAME is set to a Snapshot<sup>™</sup> copy, all Snapshot copies including and older than the specified Snapshot copy are backed up to tape. This variable is available only in the SMTape context.

Valid values: Any valid Snapshot copy that is available in the volume Default value: Invalid Note: This is the default base Snapshot copy created for the backup.

#### SMTAPE\_DELETE\_SNAPSHOT

SMTape creates Snapshot copies such as "snapshot\_for\_smtape.xxxx (snapmirror)" to establish a relationship between SnapMirror® destinations. When the SMTAPE\_DELETE\_SNAPSHOT variable is set to Y, SMTape deletes the Snapshot copy used by the backup.

Valid values: Y or N Default value: N

#### SMTAPE\_BREAK\_MIRROR

When the SMTAPE\_BREAK\_MIRROR is set to Y, it breaks all SnapMirror relationships after the restore operation completes. This variable is available only in the SMTape restore context.

Note: After a successful restore, the restored volume is in the restricted state and does not become writable unless the SMTAPE\_BREAK\_MIRROR variable is set to Y.

Valid values: Y or N Default value: N

#### 3.3 SMTAPE AND LIMITATIONS

There are certain limitations when using SMTape to back up data:

- SMTape and VSM transfers cannot run together while backing up a VSM destination.
- Volumes from different aggregate types cannot be restored.
- SMTape does not support single file restore, incremental and differential backups.
- To perform an SMTape restore, the destination volume needs to be in a restricted state.
- Remote tape is not supported on the command-line interface.
- Storage systems support only 32 concurrent backup and restore sessions.

The following volume types are currently not supported by SMTape:

SnapLock<sup>®</sup> volumes FlexCache<sup>®</sup> volumes Compressed volumes

Sparse volumes

For more detailed information, refer to SMTape FAQ.

# SMTAPE RESTORE

SMTape restore does not support granularity. Only full volume restores are supported. SMTape restore overwrites the destination volume; hence, it is recommended to exercise caution before restoring to a critical data volume.

🚮 Backup, Archive, and Restore - NetBackup -	[Restore: Server:	win2k3nbu Source Cl	ient:	10.73.69.81	Destinat 💶 🗖 🗙
🔁 Eile Edit View Actions Window Help					_ & ×
🔜 Select for Backup 🛛 💐 Select for Restore 🕞	View Status	12 💐 🧶			
ALS NetBackup History					
2009					<b></b>
Oct					
21 20 19 18 17 16					
<u> </u>					
Full Backup on 10/20/2009 5:19:04	PM				
<i>a a a a</i>					
					-
All Folders	Contents of 'vol:\d	bvoľ			
	Name	Time Backed Up	A	Size	Time Modified
E	∏ , jinist 0 0	10/20/2009 5:19:04 PM	-5	5335042KB	4/1/2009 5:57:02 Pf
🗁 dbvol	□ = icust1 1 1	10/20/2009 5:19:04 PM	-5	4194320KB	4/1/2009 9:41:36 Pf
	□ 🚽 icust2_0_0	10/20/2009 5:19:04 PM	-5	3624962KB	4/1/2009 9:44:22 Pf
	🔲 🚽 icust2_1_1	10/20/2009 5:19:04 PM	-5	4194306KB	4/1/2009 9:47:34 Pf
	🔲 로 istok_0_0	10/20/2009 5:19:04 PM	-5	4290576KB	4/1/2009 6:59:06 Pf
	🔲 🚽 item_1_1	10/20/2009 5:19:04 PM	-5	4194306KB	4/1/2009 7:00:42 Pf
	🔲 🖻 log_1_1	10/20/2009 5:19:04 PM	-5	3749888KB	4/1/2009 6:51:29 Pf
	□ <u>=</u> log_1_2	10/20/2009 5:19:04 PM	-5	3749888KB	4/1/2009 6:50:00 Pf
	□	10/20/2009 5:19:04 PM	-5	723519488	4/1/2009 9:38:24 Pf
	roll1	10/20/2009 5:19:04 PM	-5	4096008KB	4/1/2009 5:54:33 Pr
	stok_0_0	10/20/2009 5:19:04 PM	-5	7649282KB	4/1/2009 5:40:25 Pf
	□	10/20/2009 5:19:04 PM	-5	419432448	4/1/2009 9:28:56 Pf
		10/20/2009 5:19:04 PM	-5	5355/62KB	4)1/2009 9:32:37 PF
		10/20/2009 5:19:04 PM	-5	2007/02KD	4/1/2009 9:35:34 Pl
		10/20/2009 3.19.04 PM	- 3	20970000	-1/1/2009 10:02:07 f ▼
	•				

Restore menu of NDMP dump backup, which lists all available files in the left pane.

<u>55</u> I	Back	up, Ar	rchive,	and Re	store	- Nel	tBack	up -	[Restore: Serv	er: win	2k3nl	bu	Source Client: 10.73.69.81	<u>- D ×</u>
	<u>F</u> ile	<u>E</u> dit	⊻iew	Actions	<u>W</u> ine	dow	Help							_ 8 ×
	Sele	ct for I	Backup	🔩 s	ielect f	for Re	store	•	🐚 View Status	🐼	*	0	3	
Ħ	Net	:Backu	ıp Histor	ry										
		2009 Oct	÷											-
2000 		21	20	19	18	17	16							
150 150		2		2		8	2							
			2	2		õ								
-0			8	2		8	8							
- <u>-</u> %	1		-	•			ē							
1.20							2							
														-
	All	Folder	s								Conte	nts (	of 'vol:\dbvol'	
			NetA	pp_Stora	ige						Name	;	Time Backed Up	
		<u>-</u>	j 💷 🕫 B- 🔽 🔓	oi 📑 dbvol										
														11.

Restore menu of SMTape backup would not list any files under an SMTape backed-up volume. Select the full volume from the left pane for restore and make sure that the destination volume is restricted.

🚮 Ba	ackup, Archive	, and Restore	- NetBackup	o - [Restore: Server: win2k3nbu Source Client: 10.73.69.81	🗆 🗡
🔂 E	<u>File E</u> dit <u>V</u> iew	Actions Wind	low <u>H</u> elp		_ 8 ×
	Select for Backup	, 🃅 Search <u>B</u> a	ckups	🔯 View Status 🛛 🙆 😻 🛷	
<b>A</b>	NetBackup Histo	🚔 Preview M	edia		
	2009	Restore			<b>_</b>
. 🔜	Oct	Select Res	tore Type 🕨		
ا	21 20	Administer	Database Ter	- r	
	I 🖱 🏅			2	
. 🔤	. õ	õ	õ õ		
	🤶	2	<u> </u>		
<u>*</u>		<b>S</b>	× 8		
1					
			<u></u>		
-	] [		<u> </u>		
-	All Folders			Contents of 'vol:\dbvol'	
		.pp_storage .ol		Name Time Backed Up	
		dbvol			
	_				
-					
:					
-					
1					
-					
·					
Start	Restore of Marke	d Files			1.

Select "**Restore**" from "Actions" menu.

eral estore Destination Choices Restore everything to its griginal location Restore everything to a different location (maintaining existing structure): Destination: vol:\dbrestore Browse Bestore individual folders and files to different locations (double-click to modify): Source Destination Time Backed Up vol:\dbvol\ 10/21/2009 7:03:25 PM ~ 10/21/2009 7:03:25 PM	]
estore Destination Choices         Restore everything to its griginal location         Restore everything to a different location (maintaining existing structure):         Destination:         vol:\dbrestore         Browse         Bestore individual folders and files to different locations (double-click to modify):         Source       Destination         vol:\dbvol\       10/21/2009 7:03:25 PM 10/21/2009 7:03:25 PM	
Hestore everything to its original location         Restore everything to a different location (maintaining existing structure):         Destination:         vol:\dbrestore         Browse         Bestore individual folders and files to different locations (double-click to modify):         Source       Destination         Time Backed Up         vol:\dbvol\       10/21/2009 7:03:25 PM 10/21/2009 7:03:25 PM	
Restore everything to a different location (maintaining existing structure):         Destination:         vol:\dbrestore         Browse         Restore individual folders and files to different locations (double-click to modify):         Source       Destination         Time Backed Up         vol:\dbvol\       10/21/2009 7:03:25 PM 10/21/2009 7:03:25 PM	
Destination:         vol:\dbrestore         Bestore individual folders and files to different locations (double-click to modify):         Source       Destination         Time Backed Up         vol:\dbvol\       10/21/2009 7:03:25 PM 10/21/2009 7:03:25 PM	
Bestore individual folders and files to different locations (double-click to modify):           Source         Destination         Time Backed Up           vol:\dbvol\         10/21/2009 7:03:25 PM 10/21/2009 7:03:25 PM	
Source         Destination         Time Backed Up           vol:\\dbvol\         10/21/2009 7:03:25 PM 10/21/2009 7:03:25 PM	1
vol:\dbvol\ 10/21/2009 7:03:25 PM 10/21/2009 7:03:25 PM	1
	_
estore Options	
Hestore without access-control attributes [Windows clients only]	
le desurration file already exists. Overwrite existing files	
Restore the file using a temporary filename	
Do <u>n</u> ot restore the file	
Start Restore Cancel Hel	_

Select "Restore everything to a different location" and type a new destination volume name in it.

Press "Start Restore" button to start restore.

Job Details:281					×
Job ID: 281	յ	ob State: Active			أ
Job Overview Detailed S	tatus				❖
Job PID: Storage unil Media serve Transcent T	3324 : r: win2k3nbu	Started: Elapsed: Ended:	10/21/2009 00:02:55	97:44:17 PM	
Status:	ype.	ND/SEC.	120033		
10/21/2009 7:44:18 PM 10/21/2009 7:44:18 PM 10/21/2009 7:44:22 PM 10/21/2009 7:44:22 PM 10/21/2009 7:44:23 PM 10/21/2009 7:44:23 PM 10/21/2009 7:44:18 PM 10/21/2009 7:44:19 PM 10/21/2009 7:44:19 PM	connected; connect tirr started process bptm (3 - mounted - positioning LT0501 to f - positioned LT0501; pos - begin reading - requesting resource LT1 - granted resource LT05 - granted resource IBM.L	e: 00:00:00 080) ition time: 00:00 0501 01 LTRIUM-TD4.0	:01	-	
Current kilobytes written: Current files written: Current file:	17181620 0 /vol/dbvol/	Estimated Files	ε 1	Iroubleshoot	er
Percent Comp	lete:				
Print		H	lelp	Close	

Check the restore status by running "snapmirror status" command in Data ONTAP 7.X.X and "smtape status" command in Data ONTAP 8.0 7-Mode CLI.

STORAGE> snapmirror status Snapmirror is on. Source Destination State Lag Status STORAGE:nrst0a STORAGE:dbrestore Unknown - Transferring (9906 MB done)

You would receive the following message in console after successful smtape restore.

STORAGE> Wed Oct 21 14:20:27 GMT [snapmirror.retrieve.success:notice]: SnapMirror retrieve from tape to dbrestore was successful. 51682 MB in 6:24 minutes.

Job Details:28	1				×			
Job ID: 2	81	J	ob State: Done (	(Successful)	4			
Job Overview	Detailed Status				- ♥			
Status	Job PID: Storage unit: Media server: Transport Type:	3324 win2k3nbu LAN	Started: Elapsed: Ended: KB/Sec:	10/21/2009 7:44:17 PM 00:06:40 10/21/2009 7:50:57 PM 145271				
10/21/2009 7:44:23 PM - positioned LT0501; position time: 00:00:01 10/21/2009 7:44:23 PM - begin reading 10/21/2009 7:44:18 PM - requesting resource LT0501 10/21/2009 7:44:19 PM - granted resource LT0501 10/21/2009 7:50:52 PM - end reading; read time: 00:06:29 10/21/2009 7:50:57 PM - restored image 10.73.69.81_1256132005 - (the requested operatio 10/21/2009 7:50:57 PM - end Restore; elapsed time: 00:06:40 the requested operation was successfully completed(0)								
Current kiloby	tes written: 4746	0352		<u>)</u>				
Current files w Current file:	vritten: 0 /vol/	dbvol/						
				Iroubleshoo	ter			
Percent	t Complete: 100% l			0 minutes remaining				
Print			H	lelp Close				

Data restored successfully.

STORAGE> vol st	atus			
Volume	State	Status	Options	
dbrestore	online	raid_dp, flex snapmirrored read-only	<pre>snapmirrored=on, maxdirsize=31457 fs_size_fixed=on</pre>	,
STORAGE> snapmi Snapmirror is o	rror status n.			
Source		Destination		State
Lag	Status			
snapmirror_tape 00:53:26 Idle	_10_21_09_13:33:2	6 STORAGE:dbrest	ore	Snapmirrored

By default, SMTape restored volume status would be snapmirrored=on, which means that the SnapMirror relationship can be reestablished.

If the SnapMirror relationship needs to be broken, use the following command in the Data ONTAP CLI.

STORAGE> snapmirror break STORAGE:dbrestore snapmirror break: Destination dbrestore is now writable. Volume size is being retained for potential snapmirror resync. If you would like to grow the volume and do not expect to resync, set vol option fs\_size\_fixed to off.

# 4 IMPORTANT TUNING PARAMETERS AND BEST PRACTICE TIPS

Backup applications need tuning to achieve best performance; as default configuration might not fulfill the customer's expectation, there are few things to be kept in mind before tuning:

- Tape block size should be tuned according to tape drive model and NDMP support.
- Backup server should be running latest version of operating system on latest hardware.
- NetApp storage should be configured with recommended best practices.

# 4.1 TAPE BLOCK SIZE TUNING IN NETBACKUP

To get maximum speed of Tape drives, Tape block size tuning is required in NetBackup.

For NetApp storage, a maximum tape record size of 256K could be set. The NDMP dump default value is 63k and SMTape default record size is 240k.

Changing this parameter increases the throughput if we use latest tape drives.

Create a file called "SIZE\_DATA\_BUFFERS\_NDMP" and set the block size as 262144 under "(NetBackup application installed directory)\NetBackup\db\config\."

To verify the SIZE\_DATA\_BUFFERS\_NDMP changes, run ndmpd probe command in NetApp storage CLI and find the output of "mover.recordSize" parameter. This value needs to be same as SIZE\_DATA\_BUFFERS\_NDMP value.

```
Storage>ndmpd probe
mover.recordSize: 262144
```

# 4.2 NETAPP STORAGE CONFIGURATION PARAMETER TUNING

Following are few best practices related to NetApp storage configuration:

- Create an aggregate with as many data disks as possible to maximize throughput.
- Create multiple qtrees or create flex volumes and split millions files into multiple qtrees or folders.
- Create a zone for FC tapes and NetApp storage devices and do not configure multiple tape drives to single FC port in NetApp storage,
- Schedule your backup window when the I/O access is at its least.

#### 4.3 NETBACKUP NDMP LICENSE REQUIREMENTS

#### **NetBackup License Requirements**

NDMP option license is required to perform NDMP backup and restore of NetApp storage. NetBackup follows a tiered license model. The tier classification is based on the NetApp storage models ranging from Tier 1 to Tier 4. Further details can be obtained from Symantec.

#### NetApp License Requirements: None

For SMTAPE Backup/Restores:

NetApp License Requirements: None. In case of SM2T, PVR is mandatory. NetBackup License Requirements: Same NDMP option holds good.

## 4.4 NETBACKUP GLOBAL ATTRIBUTES



#### NetBackup "Global attributes."

The default value of "Maximum jobs per client" does not support more than one backup job concurrently. This value is changed in accordance to the number of concurrent backups.

#### 4.5 NDMP GLOBAL CREDENTIALS

Ma	ster Server Properti	es: win2k3nbu	×
	Properties	NDMP Global Credentials Defaults	1
	🔚 💮 Global Attribut		-
	- 🖗 Universal Setti		
	📲 Retention Peri	Global credentials are recommended if multiple NDMP bosts are configured to use the	
	🛛 🎯 Data Classifica	same credentials on all media servers. When configuring an NDMP host in	
	🖳 🖳 Fibre Transpor	NetBackup, select to use global credentials to use the username and password	
		specified here.	
		NOTE: Global credentials are not valid on back-level media servers. Credentials on	
	- 🌿 Restore Failov	back-level media servers must be configured individually.	
	— 📑 General Servei		
	💮 🕘 Port Ranges	User name:	
	🚔 Media		
	📲 🌐 Timeouts	Password:	
	Client Attribute	Carling account _	
		Confirm password:	
	🔊 👰 Firewall		
	🛅 Logging		
	Clean-up		
	🕞 SharedDisk		
	🔤 🚰 Access Contro		
-	🕂 📅 Virtual Machine		
	• •		
		OK Cancel Apply Help	

This feature simplifies the NDMP authentication on NetApp storage if we have the same username and password for multiple instances of NetApp storage. Create a common username and password for backup administrator on multiple NDMP hosts and authenticate those credentials in NDMP Global credentials. This would avoid the backup administrator from being prompted for credentials on each NetApp storage instance.

# **5 CONCLUSION**

As service-level demands increase, the limits of the existing backup and recovery environment are being pushed to the maximum. The productivity benefits of combining the proven functionality of NetApp with NetBackup software's management capabilities and its integration with different NetApp options is compelling. NetApp and Symantec offer products that naturally work well together. Industry-leading NetApp storage and NetBackup integration demonstrate the degree of collaboration and synergy the two companies share. These integrated solutions can enhance the administrator's ability to effectively manage the backup and recovery infrastructure.

For more information about NetApp Data ONTAP and Symantec<sup>™</sup> NetBackup configuration, integration, and certification matrix, refer to the following Web sites:

NDMP certification matrix www.netapp.com/us/solutions/a-z/backup-to-tape/backup-to-tape-ndmp.html Best practice for NetBackup NDMP backup http://eval.symantec.com/mktginfo/enterprise/white papers/bwhitepaper best practice for ndmp backup NetBackup 02-2009 20016956.en-us.pdf NetApp supported tape device matrix www.netapp.com/us/solutions/a-z/data-protection-devices.html System Administrator's Guide for Windows, Volume 1 http://seer.entsupport.symantec.com/docs/290203.htm System Administrator's Guide for Windows, Volume 2 http://seer.entsupport.symantec.com/docs/290204.htm Device Configuration Guide for UNIX, Linux, and Windows http://seer.entsupport.symantec.com/docs/290200.htm NDMP Administrator's Guide for UNIX, Linux, and Windows http://seer.entsupport.symantec.com/docs/290205.htm Veritas NetBackup 6.5 Hardware Compatibility List http://seer.entsupport.symantec.com/docs/284599.htm

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