Disaster Recovery Process with EMC Data Domain® and IBM Tivoli Storage Manager®

Abstract
This white paper explains the process to use for recovery of IBM Tivoli Storage Manager® and its client data in a disaster site when using EMC Data Domain® via NFS or CIFS.

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Executive summary

This document outlines the process to use for recovery of IBM Tivoli Storage Manager® (TSM) and its client data in a disaster site when using Data Domain via NFS or CIFS.

Audience

This white paper is intended for TSM administrators that are responsible for the recovery of their TSM environment and related client data.
Technical overview

Our environment has two virtual Data Domains running V5.1 and replication is uni-directional. In each site, we have a TSM V6.3.3 on Windows/2008 R2 attached to the Data Domain via CIFS. A diskpool has been defined on this mount point. An additional mount point has been defined for the TSM database backup. This allows for the DB backup to be easily found and replicated offsite.

In addition, on the primary TSM server, a CIFS mapped network drive has been created to the DR TSM server. This was done to provide an ability to copy all the pertinent files from the TSM Primary server directory to the DR TSM server. (ie. Volhist) TSM1 is primary and TSM2 is DR.

Data Domain IP replication in the TSM environment

Data Domain's IP replication functionality provides a powerful tool enabling users to design robust disaster recovery architecture that eliminates the need for a copypool.

Figure 1 describes our environment.

TSM database replication

A backup of the TSM database is of utmost importance. Using Data Domain to replicate the TSM Database over to the DR site is a quick and easy way of moving this important piece of your recovery, offsite. We will be using a CIFS mount to the Data Domain defined as a sequential file device. This allows TSM to create a backup on disk, thinking it is tape.
Disaster Recovery Process

Here is the process in which you would recover the TSM server in the DR site.

The environment that was used for this recovery:
- TSM versions have to be exactly the same.
- V6.3.3 on both - the version of TSM must be exactly the same otherwise the restore will not work.
- V6.3.3 TSM Client with api - same on both DR and Primary TSM server
- Data Domain V5.1 in primary and secondary site
- Disk pools defined on CIF mounts (Site A `\dd530a.se.local\backup`, Site B `\dd530b.se.local\backup`)
- Backup DB to Data Domain and replicate to DR site
- Replication will happen simultaneously once sequential file is closed.
- Sequential file will be 1GB in this example
- In production, recommended to be 50 to 100GB for flat file or 400 to 500GB for DB.
- This allows for a quicker replication point.
- TSM Primary (TSM1) 10.25.203.180 and TSM DR (TSM2) 10.25.203.181
- Command Line interface for TSM can be found in the `c:\program files\tivoli\tsm\baclient\dsmadmc.exe`

Initial Environment Setup

1. Install TSM code
2. Create one CIFs connection to each TSM server
   a. One on the local DD and one on the remote DD
   b. Sign onto the DD GUI at [http://10.25.201.7/ddem/](http://10.25.201.7/ddem/)
   c. To create the MTree:
      i. Click on DD530a
      ii. Click on Data management tab
      iii. And then MTree – create a MTree called `/data/col1/backup`
      iv. Now click on CIFS and then Shares.
      v. Give it a name of backup and the mount point of `/backup`. As well give all client access by putting in an “*”.
d. Now go to the TSM server and see if you can see this mount point.
e. You will have to put in a password for security access to the CIFS mount on the DD. It will have a red X instead of the green connection icon below. Just click on the mount point and enter your password.
   i. For example: Data Domain System Access: sysadmin, B1gD@ta

ii. Remember these mounts points because you will need them when you define TSM storage pools and device classes.

   Site A \dd530a.se.local\backup, Site B \dd530b.se.local\TSM_DR

f. On the CIFS mount, make 2 directories, one for the backup storage pool and one for the TSM DB backup. (If you avoid blanks in the name, you then don’t have to worry about quotes around the name when configuring TSM)

   This is seen on Z:\TSM_backup drive on the Windows server and as \dd530a.se.local\backup on the DD.
3. Now configure TSM on Primary.

   a. Using the Installation Wizard that is provided for TSM on Windows:
      i. Keep the defaults (Server1 for example for instance name).
      ii. Make directories for DB area

         mkdir "c:\tsmdb\db1"
         mkdir "c:\tsmdb\db2"
         mkdir "c:\tsmdb\db3"
         mkdir "c:\tsmdb\db4"

      iii. Make directories for Archive logs

         ARCHLOGDirectory  c:\tsmdb\archivelog
         ACTIVELOGDirectory c:\tsmdb\activelog

   iv. Click and complete the installation

   b. Start dsmadmc (C:\Program Files\Tivoli\TSM\server\tsmdiag\dsmadmc.exe) and change idletimeout on Administrator userid so that the screen doesn’t close up too quickly.

      i. setopt adminidletimeout 999

   c. Open up TIP (https://10.25.203.180:16311/ibm/console/secure/securelogon.do)

      i. Have to use IE, not Firefox
d. On the TSM server create two Device Classes – sequential file type (make sure you use the UNC name (required for Windows) – which is the full name from the DD GUI)
   i. TSM_backup will be for the client data called DD_CIFS_DC
   ii. TSM_DB_backup will be for the TSM Database backup called DB_BACKUP
   iii. The naming convention makes it each to understand where the data is when you replicate it.

```
tsm: TSM1> DEFINE DEVCLASS DD_CIFS_DC devtype=file
dir=\dd530a.se.local\backup\TSM_backup mountlimit=20 maxcap=2M shared=no
ANR2203I Device class DD_CIFS_DC defined.

 ANR2203I Device class DD_CIFS_DC defined.
```

```
tsm: TSM1> DEFINE DEVCLASS DB_BACKUP devtype=file
dir=\dd530a.se.local\backup\TSM_DB_backup mountlimit=20 maxcap=5G shared=no
ANR2203I Device class DB_BACKUP defined.
```

e. If this is a new TSM installation you have to do the set DBRECOVERY command.

```
tsm: TSM1> set dbrecovery DB_BACKUP_dc nums=1
ANR2782I SET DBRECOVERY completed successfully and device class for automatic DB backup is set to DB_BACKUP.
```

f. Define a storage pool using the TSM_backup device class DD_CIFS_DC.

```
tsm: TSM1>define stgpool DDpool DD_CIFS_DC pooltype=primary collocate=no
maxscratch=9999 reusedelay=0
ANR2200I Storage pool DDPOOL defined (device class DD_CIFS_DC).
```

g. Update the nextstoragepool on the Backuppool storage pool so that the data migrates to the DD directly.

```
tsm: TSM1> update stgpool backuppool next=ddpool
ANR2202I Storage pool BACKUPPOOL updated.
```

h. Your storagepools should look like:

```
tsm: TSM1>q stg

                       Storage Pool Name  Device Name  Capacity  Estimated  Pct  Pct  Pct  High  Low  Next Storage Pool
                       -----------  ----------  ----------  ---------  -----  ----  ---  ----  ---  -----------
ARCHIVEPOOL          DISK             0.0 M    0.0 M  0.0  90   70
BACKUPPOOL           DISK             0.0 M    0.0 M  0.0  90   70  DDPOOL
DDPOOL               DD_CIFS_DC       0.0 M    0.0 M  100.0 90   70
SPACEMGPOOL          DISK             0.0 M    0.0 M  0.0  90   70
```

4. Take a backup of the TSM database to check if your definitions are all working.

   tsm: TSM1>backup db devclass=db_backup type=full
   ANR2280I Full database backup started as process 3.
   ANS8003I Process number 3 started.

   ANR2017I Administrator ADMINISTRATOR issued command: BACKUP DB
   devclass=db_backup type=full
   ANR8340I FILE volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72191443.DBV mounted.
   ANR5111I Session 1 opened output volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72191443.DBV.
   ANR8360I Output volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72191443.DBV opened
   (sequence number 1).
   ANR0984I Process 3 for Database Backup started in the BACKGROUND at 13:17:23.
   ANR4559I Backup DB is in progress.
   ANR2280I Full database backup started as process 3.
   ANR4626I Database backup will use 1 streams for processing with the number originally requested 1.
   ANR0406I Session 18 started for node $$_TSMDBMGR_$$ (DB2/NT64) (Tcp/Ip tsm1(51439)).
   ANR0403I Session 18 ended for node $$_TSMDBMGR_$$ (DB2/NT64).
   ANR0406I Session 19 started for node $$_TSMDBMGR_$$ (DB2/NT64) (Tcp/Ip tsm1(51440)).
   ANR1361I Output volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72191443.DBV closed.
   ANR0514I Session 19 closed volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72191443.DBV.
   ANR0403I Session 19 ended for node $$_TSMDBMGR_$$ (DB2/NT64).
   ANR4550I Full database backup (process 3) completed.

5. On the Windows server mount point, you will see:

   ![Backup directory screenshot]

6. Do a Backup from the Client on the TSM server
   a. Make sure you have defined this client on TSM first.
   b. And run the wizard on the client to initialize it to TSM1.
   c. You will see the following in the /backup/TSM_backup mount point once the client has finished its backup:
7. You are now all set to setup replication on the DD.
8. From the DD GUI:
   a. Click on Replication.
   b. And then Create Pair button.
      • Source is dd530a.se.local
      • Target is dd530b.se.local
   c. Source path is /backup
   d. Target path is /TSM2_DIR
      i. Another path was chosen to clearly show that this is a replicated mount point on TSM2. It will require you to update the devconf.dat file on TSM2 and this is shown later in the document.
   e. The connection available to DD5530b will be tested and the directory will be created. It can’t exist on the DD in the DR site already.

9. The data that has been create under the /backup mount point, will be replicated over to the dd530b.se.local Data Domain.

10. Run a Prepare on the TSM server for the DR plan:
    a. From TSM CLI type: `prepare`
       i. In a DR setup this “prepare command” is done via an administrative schedule and performed automatically. These files are found in the `c:\program files\tivoli\tsm\server1` directory on the primary TSM server (TSM1).
ii. I created a share to TSM2 called “TSM1 DR Files” (C: drive). This is where the important files were copied to, be used for recovery of TSM1 on TSM2.

iii. All the data you need to recovery the server is found in the DR plan which is named 20130625.140213 (as seen in the directory above).

Database Requirements Summary:

<table>
<thead>
<tr>
<th>Database Name</th>
<th>Total Size of File System (MB)</th>
<th>Space Used by Database (MB)</th>
<th>Free Space Available (MB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSMDB1</td>
<td>81,817</td>
<td>576</td>
<td>186,746</td>
</tr>
<tr>
<td></td>
<td>Total Pages: 45,072</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Used Pages: 44,272</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Free Pages: 12,396</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Full Device Class Name: DB_BACKUP

Location: c:\tsmdb\db1
- Total Size of File System (MB): 81,817
- Space Used on File System (MB): 34,939
- Free Space Available (MB): 46,686

Location: c:\tsmdb\db2
- Total Size of File System (MB): 81,817
- Space Used on File System (MB): 34,939
- Free Space Available (MB): 46,686

Location: c:\tsmdb\db3
- Total Size of File System (MB): 81,817
- Space Used on File System (MB): 34,939
- Free Space Available (MB): 46,686

Location: c:\tsmdb\db4
- Total Size of File System (MB): 81,817
- Space Used on File System (MB): 34,939
- Free Space Available (MB): 46,686

Recovery Log Requirements Summary:

<table>
<thead>
<tr>
<th>Assigned Capacity (MB)</th>
<th>Used Space (MB)</th>
<th>Free Space (MB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,048</td>
<td>2,027</td>
<td>2,027</td>
</tr>
</tbody>
</table>

Active Log Directory: c:\tsmdb\activelog
Mirror Log Directory:
Archive Failover Log Directory:
Archive Log Directory: c:\tsmdb\archivelog

iv. You need to recreate the environment on the DR server exactly so that it is an easy restore.

v. The DB cartridge is identified in the DR Plan:

```
begin RECOVERY.VOLUMES.REQUIRED

Volumes required for data base restore
Volumes required for data base restore

Location = Device Class = DB_BACKUP
Volume Name =
```
11. Let us see how you know these volumes are available on TSM2 in your DR site.

How to determine what is available for restore at the DR site

a. Check the Data Domain GUI on DR site to see if the /backup MTree is in sync between the two Data Domains.

b. Click on dd530b and Replication tab.

c. You can also sign onto TSM2 and check the TSM_DR directory is there and populated.

12. To continue the recovery process:

Updating devconf.dat

13. The TSM server on TSM2 was installed exactly the same way as on TSM1.

14. It is necessary to update the devconf.dat so that all devices will be identified correctly and TSM2 will be able to discover the sequential file device class on the DR Data Domain correctly.

15. Update devconf.dat found on the CIFS share (“TSM1 DR Files” (C: drive) found on the DR TSM server called TSM2. This is typically done once if your device classes do not change on the Data Domain.

   • Refer to point 3.d (page 8) for the device class creation.

```c
/* Device Configuration */
DEFINE DEVCLASS DB_BACKUP DEVT=FILE FORMAT=DRIVE MAXCAP=5242880K MOUNTL=20
DIR="\DD530A.SE.LOCAL\TSM2_DR\TSM_DB_BACKUP" SHARE=NO
DEFINE DEVCLASS DD_CIFS_DC DEVT=FILE FORMAT=DRIVE MAXCAP=2048K MOUNTL=20
DIR="\DD530A.SE.LOCAL\TSM2_DR\TSM_BACKUP" SHARE=NO
SET SERVERNAME TSM1
SERVERBACKUPNODEID 1
```
16. Copy the devconf.dat from the C:\TSM1 DR Files\ directory and put it in the c:\program files\Tivoli\TSM\Server1 directory. It is probably wise to rename the one that is there to devconf.tsm2.

17. Copy the volhist from the C:\TSM1 DR Files\ directory and put in the c:\program files\Tivoli\TSM\Server1 directory.

18. Ensure the DB area is the same as shown in the Recovery Plan as shown in point 10 (page 10).

19. Make sure the TSM2 process is not running. This can be done with the following command in a DOS window or via the Services Window.

   C:\Users\Administrator>net stop "TSM Server1
   The TSM Server1 service was stopped successfully.

**Creating TSM DB area**

20. Since TSM2 is a mirror image of TSM1, the DB directories are in the same location. Typically this isn’t true and it is necessary while doing the restore to create the DB storagepaths during the process. This is done by creating a file called DB.STORAGEPATHS in c:\ directory with the following in it:

   c:\tsmdb\db1
   c:\tsmdb\db2
   c:\tsmdb\db3
   c:\tsmdb\db4

**Creating Log Area**

21. Since TSM2 is a mirror image of TSM1, the archive and active logs are in the same location. But if you needed to confirm, check the dsmserv.opt in the c:\program files\Tivoli\TSM\Server1 on the TSM2 machine and compare against the DRPlan or the dsmserv.opt file on TSM1. In our example, I did not copy the dsmserv.opt file to the TSM2 Tivoli directory because it was not required in this case. I used the default dsmserv.opt without changes.

   **Sample dsmserv.opt**

   * --------------------------------------------------------------- *
   * This file was created by the TSM Instance Configuration Utility *
   * --------------------------------------------------------------- *

   COMMMethod    TCPIP
   TCPPort 1500
   DEVCONFIG     devconf.dat
   VOLUMEHISTORY volhist.dat
   TCPADMINPort 1500

   ARCHLOGDirectory C:\TSMDB\archivelog
22. Make sure the activelog, archivelog and archmeth1 directories are empty of all log files.

   c:\tSMdb\activelog  c:\tSMdb\archivelog and
   C:\tSMdb\archivelog\archmeth1\SERVER1\TSMDB1\NODE0000\C0000000

Enabling DR Mode on Data Domain

✓ Best practice recommendation is to create a snapshot on the target DD for MTree in question and then perform a filesys fastcopy to create secondary copy of the MTree on the target DD. i.e if the replicated MTree on the target DD is /data/col1/tsm1, then create a snapshot and perform a filesys fastcopy on /data/col1/tsm and create a secondary copy, say /data/col1/tsm-drtest . This MTree will be a read/write copy which can be used for testing/restore purpose and can be later deleted once the testing is over.

✓ In this test, the replication pair is being deleted to simulate a true DR situation where the target is gone completely.

✓ In general for testing purposes, it is not a good idea to delete the replication pair. Reason being, even though MTree's uses snapshot based replication, when we delete the replication pair, we are breaking the replication context. This will stop any further replication from the source to the target DD while the DR testing is in progress. All the data being backed-up to the source DD or source MTree during this testing time will not be replicating to the target and the source data will be unprotected. Using the snapshot/fastcopy method, we are not affecting the existing data replication for the source MTree in question and the data is protected.

✓ In order to re-establish replication, you will need to re-create the replication context carefully for the MTree involved and then issue a replication resync. If you plan to use a different target folder other than the one used originally, all the data within the source MTree will now be sent to the target DD. This might take a while especially if there is too much data on the source MTree. If you use directory based replication, this could be a serious issue, since directory
based replication uses a replication log to maintain changes and replication resync needs to replicate each change/modification/delete on the source over to the target folder in addition to pointer comparison. Additionally, many a times, you uses a different network interface port on the DD for replication purpose. This is done by setting up local hosts file and then forcing the replication traffic over a specific interface. If you forget to modify the replication context during re-creation, the traffic might go over an undesired port and cause replication lag issues or the data may not even replicate.

✓ Please be aware of these observations which are relevant if someone wants to use this documentation for testing purposes.

23. Go to the Replication tab on TSM1 Data Domain (dd530a.se.local) and Delete Pair
   a. The MTREE will automatically go RW on TSM2.
   b. To confirm, look at the CIFS share for dd530b.se.local\TSM_DR

24. To resume normal operations after the test, just add back the MTree replication context as was done in point 8 (page 10).
   a. Dd530a - /data/col1/backup → dd530b - /data/col1/TSM2_DR
   b. The systems will resynchronize.

Restoring TSM DB using Data Domain replicated sequential volume

25. From the DR plan, see in C:\TSM1 DR files\20130625.140213, restore the server database to latest version backed up per the volume history file. Run the following command:

   "C:\PROGRAM FILES\TIVOLI\TSM\SERVER\DSMSERV.exe" -k "Server1" restore db
todate=06/25/2013 totime=13:59:12 source=dbb

   **Note:** If the DB directories need to be created due to a change in drive layout in the DR location, you can add to the above command the db.storagepaths file that was created in point 20. The command then would look like:

   "C:\Program Files\Tivoli\TSM\server\dsmserv.exe" -k "Server1" restore db
todate=06/25/2013 totime=13:59:12 source=dbb on='c:\db.storagepaths' activelogdir='c:\tsmdb\activelog'

   This command will look at the latest entry in the volhist and mount the sequential file identified in this entry.
For example:

Operation Date/Time: 2013/06/25 13:59:12

Volume Type: BACKUPFULL
* Location for volume \\DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV is: ''
Volume Name: "\\DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV"
Backup Series: 3
Backup Op: 0
Volume Seq: 10001
Device Class Name: DB_BACKUP

**************************************************

26. And the command output would be:

C:\Program Files\Tivoli\TSM\server>dsmserv.exe -k "Server1" restore db todate=06/25/2013 totime=13:59:12 source=dbb

Tivoli Storage Manager for Windows

Version 6, Release 3, Level 3.000

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ANR0900I Processing options file C:\Program Files\Tivoli\TSM\Server1\dsmserv.opt.
ANR4726I The ICC support module has been loaded.
ANR1636W The server machine GUID changed: old value (), new value (ba.63.84.90.dd.a6.11.e2.88.13.00.50.56.84.00.1c).
ANR7808W Sun Microsystems Library Attach module libacs.dll is not available from the system.
ANR8200I TCP/IP Version 4 driver ready for connection with clients on port 1500.
ANR0152I Database manager successfully started.
ANR4634I Starting point-in-time database restore to date 06/25/2013 13:59:12.
ANR4591I Selected backup series 3 from 06/25/2013 and 13:59:12 as best candidate available for restore database processing.
ANR4592I Restore database backup series 3 includes eligible operation 0 with volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV having sequence 10001 and using device class DB BACKUP.
ANR4598I Validating database backup information for selected backup series 3 and operation 0 using volume \\DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV. having sequence 10001 and using device class DB BACKUP.
ANR8340I FILE volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV mounted.
ANR1363I Input volume \\DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV opened (sequence number 1).
ANR4609I Restore database process found FULL database backup timestamp 20130625135912 from database backup media.
ANR1364I Input volume \\DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV closed.
ANR3008I Database backup was written using client API: 6.4.0.2.
ANR4638I Restore of backup series 3 operation 0 in progress.
ANR4897I Database restore of operation 0 will use device class DB_BACKUP and attempt to use 1 streams.
ANR0406I Session 1 started for node $$ _TSMDBMGR_$$ (DB2/NT64) (Tcp/Ip tsm2(49195)).
ANR8340I FILE volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV mounted.
ANR0510I Session 1 opened input volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV.
ANR1363I Input volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV opened (sequence number 1).
ANR0403I Session 1 ended for node $$ _TSMDBMGR_$$ (DB2/NT64).
ANR0406I Session 2 started for node $$ _TSMDBMGR_$$ (DB2/NT64) (Tcp/Ip tsm2(49197)).
ANR1364I Input volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV closed.
ANR0514I Session 2 closed volume \DD530A.SE.LOCAL\BACKUP\TSM_DB_BACKUP\72193952.DBV.
ANR0403I Session 2 ended for node $$ _TSMDBMGR_$$ (DB2/NT64).
ANR0406I Session 3 started for node $$ _TSMDBMGR_$$ (DB2/NT64) (Tcp/Ip tsm2(49198)).
ANR0403I Session 3 ended for node $$ _TSMDBMGR_$$ (DB2/NT64).
ANR3096I The volumes used to perform this restore operation were successfully recorded in the server volume history.
ANR0369I Stopping the database manager because of a server shutdown.

**Note:** If you try the restore command multiple times and have to correct things like where the DB cartridge is, then you need to clear out the DB and Active log directories and then run the command again. You have to stop the TSM service, delete everything that is in these directories and then restart DB2.

27. Now you can now start TSM.
   - C:\program files\tivoli\tsm\server\dmserv.exe
   - Or via Windows Service Window for TSM Server1
   - Or via CLI net start “TSM Server1

28. To show that all is well, do a restore of a file. Update the dsm.opt or dsm.sys (if unix) and change the nodename to a client that exists on the Primary TSM server, in our case it was TSM1 from the primary side.
   a. Run the TSM client wizard and instead of TSM2 for the client name, change to TSM1.
   b. Leave the TSM server address as TSM2.
   c. You will get a login for TSM1 if the DB restored correctly.
   d. Then bring up the TSM Backup/Archive GUI and restore a file.
If replication has not sync'ed before a disaster occurs, it maybe that incomplete sequential files may occur in the DR site. In this case, the sequential volume must be fixed.

The TSM command would be:

```
# audit volume 0000007c.bfs fix=yes.
```

The audit/fix would need to be performed for every volume that had not been fully replicated when the disaster struck.

**How Does Reclamation Effect Recovery?**

Another important consideration when using Data Domain replication in a TSM environment is Reclamation.

Reclamation is the TSM process that moves expired data off of tapes/volumes and consolidates unexpired data, thus returning space to the sequential pool or returning empty tapes to scratch. All reclamation volume movement is recorded in the TSM DB and it must be replicated to reflect an accurate volume environment in the event of a disaster. If a disaster should occur BEFORE a copy of the TSM DB is sent over to the DR site, there will be inconsistencies in the data on the replicated Data Domain versus what is reflected in the TSM DB.

The use of the parameter **REUSEDDELAY** will reduce the effect of this issue. This parameter specifies the number of days that must elapse before a volume can be reused or returned to scratch. Volumes and all its data will remain in the pending state.

A disaster may force the user to restore the database using a database backup that is not the most recent backup. By having a “reusedelay” on the volumes, the older restore of the TSM DB, allows the user to get access to data that has already expired. The user may be able to use the volumes in pending state to recover data by doing the following:

1. Restore the database to a point-in-time prior to file expiration.
2. Sequential files that were in pending state now become active again within the TSM DB and you are able to restore to a PIT before the reclamation occurred.
3. It is recommended to set **reusedelay** to match the retention of TSM database backup. So if you keep 7 daily copies of the TSM DB, then set reusedelay to 7.