Alphabet Soup

A Cookbook Approach to Solving Common TSM Problems

Does This Look Familiar?

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ANS1304W ANE4987E

ANR0463W

ANS1813A ANS1813E

ANR2579E

ANR9999D ANS1398E

Soup du jour

- **Methodology for problem determination in TSM**
- **Hints and solutions for common TSM problems**
- **References for troubleshooting and more information**

Ingredients for Troubleshooting

- **Server activity log (`QUERY ACTLOG`)**
  - **Each record is time-stamped. Each record also contains the following:**
    - **Message prefix**
      - **ANR= generated by TSM server.**
      - **ANS and ANE = generated by TSM client.**
    - **####—A four-digit message number defined in TSM Messages manual and help (`HELP message-num`)**
    - **I, W, E, S—Error severity indicates whether the message is informational, warning, error, or severe error.**
- **Server summary table**
  `SELECT COLNAME FROM SYSCAT.COLUMNS WHERE TABNAME='SUMMARY'`
- **Client log files**
  - **Dsmsched.log – scheduled client backup activity**
  - **Dsmerror.log – client errors**
  - **Dsierror.log – API errors**
  - **Various log files from TDP clients**

Menu

- ◆ **Starters**
  - ▪ **Common problems with TSM clients**
- ◆ **Entrees**
  - ▪ **Common problems with the TSM Server**
- ◆ **Desserts**
  - ▪ **Common library and tape problems**

Starters

- ◆ **Client backup missed**
- ◆ **Client backup failed**
- ◆ **Client backup is slow**
- ◆ **Client restore is slow**

Client Backup Missed

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Problem: **The client event status shows missed.**

Explanation: **The schedule's startup window has passed and the client has not executed the schedule.**

Solution:

Step 1: **Query the activity log for any messages related to the client.**

```
QUERY ACTLOG BEGINT=schedulestarttime SEARCH=client
```

Server may have reached *maxsessions* or *maxschedsessions* - Increase maxsessions or maxschedsessions

```
QUERY STATUS (to see current settings)
SET MAXSESSIONS new-value
SET MAXSCHEDSESSIONS new-value
```

Client Backup Missed

Step 2: **Check the client scheduler log (dsmsched.log) and scheduler daemon/service.**

- **Scheduler daemon/service may not be running (dsmcad or dsmsched)**
- **Determine why the scheduler daemon/service is not running and restart daemon/service.**
- **Verify that the schedule is picked up by viewing dsmsched.log.**
- **The client password may be invalid and may need to be updated.**
  On the TSM Server:
  `UPDATE NODE node-name new-password`
  On the client:
  `Open the command line or GUI interface.`
  `Respond when prompted for new password.`
  `Stop and restart the scheduler daemon/service.`

Client Backup Failed

Problem: The client event status shows failed.

Explanation: The client reported a failure in executing the scheduled operation and successive retries have also failed.

Solution:

Step 1: Query the activity log for any messages related to the client.

```
QUERY ACTLOG BEGINT=schedstartime SEARCH=client
```

Look for error message near the end session statistics.

```
QUERY ACTLOG BEGIND=-1 SEARCH=STORDEV
```

```
09/07/2005 22:10:51  ANR2579E Schedule DAILY_INCR in
domain PRODUCTON for node STORDEV failed (return code
12). (SESSION: 2051)
```

Client Backup Failed

Step 2: If the cause of failure is still undetermined (as above) view the client scheduler and error log files (dsmsched.log, dsmerror.log) that reside in the clients baclient installation directory (by default).

```
9/07/2005 22:18:57 ANS1228E Sending of object
'\\stordev\c$\WINNT\Microsoft.NET\Framework\v1.1.4322\
CONFIG\enterprisesec.config.cch.3228.1187706796'
failed
09/07/2005 22:18:57 ANS1448E An error occurred
accessing NTFS security information
09/07/2005 22:18:58 ANS1228E Sending of object
'\\stordev\c$\WINNT\Microsoft.NET\Framework\v1.1.4322\
CONFIG\security.config.cch.3228.1187706796' failed
09/07/2005 22:18:58 ANS1448E An error occurred
accessing NTFS security information
```

Client Backup Failed

- **Search the IBM Knowledge Base, ADSM.ORG and Tivoli Information Center for more information. Test a manual backup.**

  - **From the IBM Knowledge Base:**

  IC36305: MESSAGE "ANS1448E AN ERROR OCCURRED ACCESSING NTFS SECURITY INFORMATION" CAUSES RC 12 WHEN IT SHOULD BE RC 4
  (Fixed in 5.2.0)

  - **From ADSM.ORG**

    Discussion of RC's and behavior (THANKS ANDY!), also a pointer to the above APAR

Client Backup is Slow

Problem: The client backup performance seems slow.

Explanation: Separate *perceived* performance problems from *actual* performance problems. Have a benchmark before you start. Don't expect more than the system can produce.

Solution:

Step 1: Collect data from the client and server

   View the clients end session statistics

Client Backup is Slow

```
09/07/2005 22:19:16 --- SCHEDULEREC STATUS BEGIN
09/07/2005 22:19:16 Total number of objects inspected:  117,736
09/07/2005 22:19:16 Total number of objects backed up:    2,436
09/07/2005 22:19:16 Total number of objects updated:          0
09/07/2005 22:19:16 Total number of objects rebound:          0
09/07/2005 22:19:16 Total number of objects deleted:          0
09/07/2005 22:19:16 Total number of objects expired:      1,146
09/07/2005 22:19:16 Total number of objects failed:          28
09/07/2005 22:19:16 Total number of bytes transferred: 510.10 MB
09/07/2005 22:19:16 Data transfer time:                  33.00 sec
09/07/2005 22:19:16 Network data transfer rate:      15,824.24 KB/sec
09/07/2005 22:19:16 Aggregate data transfer rate:       578.39 KB/sec
09/07/2005 22:19:16 Objects compressed by:                   0%
09/07/2005 22:19:16 Elapsed processing time:          00:15:03
```

Client Backup is Slow

- *Network data rate* = raw speed of data sent on the network layer
  - If lower than anticipated network speeds, network configuration or hardware problems may exist
    - Check duplex mismatch (i.e. auto-negotiate vs. 100 full)
    - Try FTP in binary mode to and from TSM server
- *Aggregate data transfer* = total bytes sent divided by "wall clock" time for entire operation. Includes file I/O, overhead for sessions, transactions, compression, computations, etc.
  - Can be high when there are lots of files to inspect vs. back up
    - Consider using journaling on Windows clients
    - Refine exclude lists
  - Compression on client can increase aggregate transfer rate
- May want to enable client tracing for more information

Client Restore is Slow

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Problem: **The client restore performance seems slow.**

Explanation: **As in backup performance troubleshooting, separate *perceived* performance problems from *actual* performance problems. Be realistic with expectations and system limitations.**

Solution:

Step 1: **Plan your backups for fast restores.**

- **Use collocated tape storage pools**
- **Use sequential access disk storage pools as primary storage for critical clients**
- **Create a sequential access disk storage pool for storing directory files**
  - **By default TSM binds directory files to the management class with the highest retain only (retonly) value. Use the DIRMC option in the client option file to bind directory files to a management class that has the destination storage pool in the backup copy group defined as a sequential access disk storage pool. Set the retonly value to nolimit. This will save LOTS of time during restores of large file servers with many directories and files.**

Client Restore is Slow

Step 2: Optimize the restore operation

- **Use multi-threaded restores especially when restoring clients that are not in collocated tape storage pools**
  - **Be sure to set the client option RESOURCEUTILIZATION equal to or greater than the number of restore threads desired**
  - **Be sure to set the MAXNUMMP on the client node definition equal to or greater than the number of restore threads**
- **Run a restore for each filespace instead of for entire node**
- **Check network settings to be sure they are set for maximum bandwidth**
- **Check for mismatched network duplex settings**
- **Use a no query restore**

"The fastest restore is the one you don't have to do."
Bill Smoldt, STORServer, Inc.

Entrees

- ◆ **Daily administrative processes are failing or performing poorly**
  - ▪ **Migration**
  - ▪ **Storage pool backup**
  - ▪ **DB Backup**
  - ▪ **Reclamation**
  - ▪ **Reporting**
- ◆ **Recovery log is full**
- ◆ **Database is nearly full**

Migration is Slow

Problem: Storage pool migration process takes a very long time to finish.

Explanation: Storage pool migration performance can be dependent on the number of mount points (tape drives) available in the library.

Solution:

Step 1: Query the drive and path definitions to see how many are available for migration

```
QUERY DRIVE
QUERY PATH
```

- See the next section (Desserts) for steps to take if drives our paths are offline or unavailable.

Migration is Slow

Step 2: **Query the storage pool attributes to determine how many migration processes are configured.**

```
QUERY STGPOOL stgpool-name F=D
```

Increase the migration processes equal to or less than the total available drives.

```
UPDATE STGPOOL stgpool-name MIGPROC=x
```

Note: **Increasing the migration processes will consume more scratch volumes during migration processing.**

Step 3: **Avoid migration during backup if possible.**

Create a disk storage pool large enough to contain one full cycle of backup. If you can't do that, then reduce the high and low migration values.

Migration Fails

Problem: Storage pool migration process fails.

Explanation: Storage pool migration typically fails because there are either no mount points available or no scratch volumes available.

Solution:

Step 1: Query the activity log to locate the error message stating why the process failed.

```
QUERY ACTLOG BEGIND=-1 SEARCH=MIGRATION
```

- If you see the error ANR1134W it indicates that you may have drives offline or unavailable. It may also mean that your drives are already allocated to a client restore. See the next section (Desserts) for solving problems with drives/paths offline.

Migration Fails

- **If you see the following error message, you must check in some empty volumes coming back from the vault or initialize and checkin some new volumes.**

    ```
    ANR1405W Scratch volume mount request denied - no
    scratch volume available
    ```

- **If you see the following error message, you must increase the value of maxscratch in your tape storage pool**

    ```
    ANR1025W Migration process terminated for storage
    pool - insufficient space in subordinate storage
    pool.
    ```

- **To increase maxscratch**

    ```
    UPDATE STGPOOL stgpool-name MAXSCRATCH=x
    ```

Storage Pool Backup is Slow

Problem: **Storage pool backup process takes a very long time to finish.**

Explanation: **Storage pool backup performance can be dependent on the number of mount points available in the library or selected on the backup command.**

Solution:

Step 1: **Query the drive and path definitions to see how many are available for migration**

```
QUERY DRIVE
QUERY PATH
```

- **See the next section (Desserts) for steps to take if drives our paths are offline or unavailable.**

Storage Pool Backup is Slow

Step 2: Increase the number of parallel processes to execute during the storage pool backup. Note: Increasing the number of processes will consume more scratch volumes during the operation.

```
BACKUP STGPOOL primary-stgpool copy-stgpool MAXPROC=X
```

Storage Pool Backup Fails

Problem: **Storage pool backup process fails.**

Explanation: **Storage pool backup processes typically fail because there are either no tape drives available or no scratch volumes available.**

Solution:

Step 1: **Query the activity log to locate the error message stating why the process failed.**

```
QUERY ACTLOG BEGIND=-1 SEARCH="BACKUP STGPOOL"
```

- **If you see the error ANR1217E it indicates that you may have drives offline or unavailable. It may also mean that your drives are already allocated to a client restore. See the next section (Desserts) for solving problems with drives/paths offline.**

Storage Pool Backup Fails

- **If you see the following error message, you must check in some empty volumes coming back from the vault or initialize and checkin some new volumes.**

  `ANR1405W Scratch volume mount request denied – no scratch volume available`

- **If you see the following error message, you must increase the value of maxscratch in your copy storage pool**

  `ANR1221E BACKUP STGPOOL: Process 58 terminated - insufficient space in target copy storage pool.`

- **To increase maxscratch**

  `UPDATE STGPOOL copystgpool-name MAXSCRATCH=x`

DB Backup Fails

Problem: TSM Server Database Backup process fails.

Explanation: The TSM database backup process typically fails because there are either no tape drives available or no scratch volumes available.

Solution:

Step 1: Query the activity log to locate the error message stating why the process failed.

```
QUERY ACTLOG BEGIND=-1 SEARCH="BACKUP DB"
```

- If you see the error ANR4571E it indicates that you may have drives offline or unavailable. See the next section (Desserts) regarding unavailable drives/paths.

DB Backup Fails

- **If you see the following error message, you must check in some empty volumes coming back from the vault or initialize and checkin some new volumes.**

  ```
  ANR1405W Scratch volume mount request denied – no
  scratch volume available
  ```

Reclamation Fails

Problem: Reclamation processing fails or doesn't run at all.

Explanation: Reclamation processing is based on the reclamation setting on the storage pool. Expiration processing must run regularly for space to be freed up on tapes. If primary storage pool tapes are UNAVAILABLE, reclamation processing will fail.

Solution:

Step 1: Be sure that expiration processing is scheduled to run either through an administrative schedule or automatically through the expinterval option.

```
QUERY SCHED * TYPE=ADMIN F=D (confirm that there is a
schedule executing the command – expire inventory)
```

OR

```
QUERY OPT (confirm that the option expinterval is a
non zero value)
```

Reclamation Fails

Step 2: **Be sure that reclamation is configured to run on the storage pool either through a schedule which sets the threshold or by having the threshold always set (60% or less).**

```
QUERY SCHED * TYPE=ADMIN F=D (confirm that there is a
schedule executing the command – update stgpool
reclam=60 and another which sets it to 100)

QUERY STGPOOL (confirm that the setting reclamation
threshold is 60 or less - unless being controlled by
an admin schedule.)
```

Note: Increasing the value of reclamation processes can increase reclamation performance. You must consider the number of tape drives available and the number of storage pools being reclaimed simultaneously when setting this value.

Reclamation Fails

Step 3: If your reclamation processing is failing, check the activity log to determine the errors received during the processing. Typically, reclamation fails because a primary stgpool volume is "UNAVAILABLE". See the next section for the topic regarding unavailable volumes.

```
QUERY ACTLOG SEARCH=RECLAIM
```

TSM Operational Reporting Problems

Problem: TSM Daily reports aren't running or aren't being mailed.

Explanation: Problems with the operational reporting often times is related to email problems or TSM admin account problems. The TSM Daily report must have a valid TSM admin account, SMTP server address and email address.

Solution:

Step 1: If you changed the admin password that the reporting tool uses, you may need to update the password in the operational reporting menus. To change the Account or Password that TSM Operational Reporting uses:

- `Open TSM Management Console`
- `Expand Tivoli Storage Manager`
- `Expand <ServerName>`
- `Right Click on Server Instance (i.e., Server1) and select properties`
- `Highlight the server instance and select account`
- `Change the account and password and select ok`
- `Select OK to Close the properties window`

TSM Operational Reporting Problems

Step 2: If you aren't receiving reports in email, set an SMTP account and recipients list

- `Open TSM Management Console`
- `Right click on Tivoli Storage Manager`
- `Click on TSM Operational Reporting`
- `Click on Email Account Tab`
- `Fill in the From name, From e-mail address, SMTP Server fields appropriately`
- `Send a test message to confirm`
- `Click OK`

Step 3: Set-up email delivery for a specific report

- `Open TSM Management Console`
- `Expand Tivoli Storage Manager`
- `Expand <ServerName>`
- `Expand Server Instance (i.e., Server1)`
- `Expand Operational Reports`
- `Highligh the report you want mailed`
- `Right click, select Properties`
- `Select the E-mail Recipients tab in the Properties window`
- `Add recipients`
- `Click OK`

TSM Operational Reporting

Step 4: **Test the generation and email delivery of the report**

- Open TSM Management Console
- Expand Tivoli Storage Manager
- Expand <ServerName>
- Expand Server Instance (i.e., Server1)
- Expand Operational Reports
- Highlight the report you want mailed
- Right click, select refresh using current time
- Select the E-mail Recipients tab in the Properties window
- Add recipients
- Click OK (this configures daily email)
- Highlight the report again
- Select send e-mail
- Add recipients
- Click send (this will send a copy now)

TSM Database is Nearly Full

Problem: The TSM database is nearly full.

Solution:

Step 1: There may be some reserved space to extend the database while you add new storage and/or create a new db volume. Extend the database to it's fullest capacity. Issue the following command to see how much is available for extension:

```
QUERY DB F=D
```

Extend the db

```
EXTEND DB xx
```

TSM Database is Nearly Full

Step 2: Create another db volume and extend into it:

```
DEFINE DBVOLUME volume-name FORMATSIZE=5000
```

Extend the db

```
EXTEND DB 5000
```

The database is now 5GB larger

TSM Recovery Log is Full

Problem: If the recovery log runs out of space, you may not be able to start the server for normal operation.

Solution:

You can define an additional recovery log volume while the server is not running using the dsmfmt utility which is found in the directory structure where the server is installed.

For example, to create a 1000MB volume, issue the following commands:

```
DSMFMT -LOG logvolume-name 1000

DSMSERV EXTEND LOG logvolume-name 1000
```

You should now be able to start the server and resume normal operations.

Desserts

- ◆ **Library is full**
- ◆ **Tapes volumes are unavailable**
- ◆ **Drives/paths offline**

Library is Full

Problem: **The library is full of private volumes. There is no more room to checkin scratch volumes for daily processing.**

Solution:

Step 1: **Verify that all DR volumes have been checked out.**

```
QUERY DRMEDIA * WHERESTATE=MOUNTABLE
```

Step 2: **Verify that all volumes that have space to be reclaimed are reclaimed, use *move data* if necessary to consolidate tapes.**

```
SELECT VOLUME_NAME,STGPOOL_NAME,PCT_RECLAIM,PCT_UTILIZED
FROM VOLUMES WHERE ACCESS='READWRITE' OR ACCESS='READONLY'
```

Library is Full

Step 3: Check out full primary storage pools tapes to make room for scratch tapes. This makes reclamation very difficult as these tapes would need to be checked back in for reclamation which call on them to complete.

Step 4: Consider reducing your data retention times.

Step 5: Refine your exclude lists.

Step 6: Time to buy a new library.

Volumes Unavailable

Problem: **Tapes are marked UNAVAILABLE and READONLY causing processes to fail.**

Explanation: **TSM changes the access status of a storage pool volume based on what happens when the server attempts to access that volume. When it cannot read files on a storage pool volume, the TSM server changes the volume's access status to UNAVAILABLE. When the server cannot write files to a volume, it changes the access to READONLY.**

Solution:

Step 1: Check the number of read and write errors for that volume:

```
QUERY VOLUME volume_number f=d
```

Volumes Unavailble

Step 2: **If there very few errors (less than 5, for example), the media may be okay. Change the volume's access status back to READWRITE.**

```
UPDATE VOLUME volume_number ACCESS=READWRITE
```

Step 3: **If there are several errors (5 or more, for example), the media may need to be replaced or if TSM changes the access mode back to UNAVAILABLE the next time it mounts it, restore the volume.**

Update the access mode of the volume to DESTROYED.

```
UPDATE VOLUME volume_name ACCESS=DESTROYED
```

Identify the copy storage pool volumes required for the restore:

```
RESTORE VOLUME volume_number PREVIEW=YES
```

Check the volumes in to the library then enter the RESTORE VOLUME command again (without the PREVIEW parameter) to restore the data.

Drives/Paths Offline

Problem: **Processes that require tape drives are failing and the following message appears in the TSM activity log:**

Insufficient number of mount points available for removable media

Explanation: **This message typically indicates that one or more tape drives or paths are offline.**

Solution:

Step 1: **To check the status of the drives and paths:**

```
QUERY DRIVE

QUERY PATH
```

Drive/Paths Offline

Step 2: **If one or more drives are offline, update their status using the following commands:**

```
UPDATE DRIVE library_name drive_name ONLINE=NO
UPDATE DRIVE library_name drive_name ONLINE=YES
```

NOTE: It is recommended that you use BOTH commands, even if the drive status indicates that the drive is offline. Some states (POLLING, for example) require that you change the drive status to offline (ONLINE=NO) before changing it to online.

Step 3: **If a path is offline, update the path status using this command:**

```
UPDATE PATH source_name destination_name
SRCTYPE=SERVER DESTTYPE=DRIVE
LIBRARY=library_name ONLINE=YES
```

Tools of the Trade

- ◆ **ADSM.ORG monthly FAQ (search TSM monthly FAQ)**
  http://www.adsm.org
- ◆ **Richard Sims (Boston University) very useful quickfacts (thanks Richard!)**
  http://people.bu.edu/rbs/ADSM.QuickFacts
- ◆ **IBM TSM Knowledge Base**
  http://www-306.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html
- ◆ **IBM Tivoli Information Center (Online Documentation)**
  http://publib.boulder.ibm.com/infocenter/tivihelp/v1r1/index.jsp?toc=/com.ibm.itstorage.doc/toc.xml
- ◆ **IBM Redbooks**
- ◆ **STORServer Customers:**
  - ▪ **STORServer Knowledge Base and online support**
    http://support.storserver.com/MRcgi/MRentrancePage.pl

Après

- ◆ **Define the problem**
- ◆ **Collect information and messages**
- ◆ **Check known sources**
- ◆ **Go for help!**
- ◆ **Next time – Chicken Soup for the TSM Lover's Soul**