To create catalog database:
We are going to create a oracle database for RMAN catalog database:

```
/oracle@myoracatdb -]$ dbca
```

Database name: CATDB1
Oracle 11g RMAN Database Backup Guidelines using TSM

Here we set all passwords as redhat
Oracle 11g RMAN Database Backup Guidelines using TSM
Oracle 11g RMAN Database Backup Guidelines using TSM

Configure TNS services name:

```
[oracle@myoracatdb ~]$ lsnrctl status
LSNRCTL for Linux: Version 11.2.0.1.0 - Production on 05-DEC-2013 13:15:27
Copyright (c) 1991, 2009, Oracle. All rights reserved.

Connecting to (DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=myoracatdb)(PORT=1521)))
STATUS of the LISTENER

Alias LISTENER
Version TNSLSNR for Linux: Version 11.2.0.1.0 - Production
Start Date 05-DEC-2013 13:12:35
Uptime 0 days 8 hr. 2 min. 56 sec
Trace Level off
Security ON: Local OS Authentication
SNMP OFF
Listener Parameter File /u01/oracle/product/11.2.0/db_1/network/admin/listener.ora
Listener Log File /u01/oracle/diag/tnslsnr/myoracatdb/listener/alert/log.xml
Listening Endpoints Summary...
   (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=myoracatdb)(PORT=1521)))
The listener supports no services
The command completed successfully
[oracle@myoracatdb ~]$`

Oracle 11g RMAN Database Backup Guidelines using TSM

[oracle@myoracatdb ~] tnsping CATDB

To check/enable archive log mode on target database:
[oracle@myoradb ~]$ sqlplus /nolog

SQL*Plus: Release 11.2.0.1.0 Production on Thu Dec 5 13:51:15 2013

Copyright (c) 1982, 2009, Oracle. All rights reserved.

SQL> connect / as sysdba
Connected to an idle instance.

SQL> startup
ORACLE instance started.
Total System Global Area  509411328 bytes
Fixed Size 2214816 bytes
Variable Size 318768224 bytes
Database Buffers 184549376 bytes
Redo Buffers 3878912 bytes
Database mounted.
Database opened.

SQL> archive log list
Database log mode No Archive Mode
Automatic archival Disabled
Archive destination USE_DB_RECOVERY_FILE_DEST
Oldest online log sequence 2
Current log sequence 4

SQL> select name, log_mode from v$database;
NAME LOG_MODE
--------- ------------
TSH1 NOARCHIVELOG
**Oracle 11g RMAN Database Backup Guidelines using TSM**

*SQL*> shutdown immediate  
Database closed.  
Database dismounted.  
ORACLE instance shut down.

*SQL*> startup mount  
ORACLE instance started.  
Total System Global Area  509411328 bytes  
Fixed Size 2214816 bytes  
Variable Size 318768224 bytes  
Database Buffers 184549376 bytes  
Redo Buffers 3878912 bytes  
Database mounted.

*SQL*> alter database archivelog;  
Database altered.

*SQL*> alter database open;  
Database altered.

*SQL*> archive log list;  
Database log mode Archive Mode  
Automatic archival Enabled  
Archive destination USE_DB_RECOVERY_FILE_DEST  
Oldest online log sequence 2  
Next log sequence to archive 4  
Current log sequence 4

*SQL*> mkdir -p /u01/oracle/archivelog

*SQL*> alter system set log_archive_dest_1='location=/u01/oracle/archivelog' scope=both;  
System altered.

*SQL*> archive log list;  
Database log mode Archive Mode  
Automatic archival Enabled  
Archive destination /u01/oracle/archivelog  
Oldest online log sequence 2  
Next log sequence to archive 4  
Current log sequence 4

*SQL*> alter system set log_archive_start=TRUE scope=spfile;  
System altered.
**Oracle 11g RMAN Database Backup Guidelines using TSM**

```sql
SQL> alter system set log_archive_format='arch_%t_%s_%r.arc' SCOPE=spfile;
System altered.

SQL> show parameter log_archive_format
NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
log_archive_format                   string      %t_%s_%r.dbf
```

**To check database login using sys user:**

```
[oracle@myora ~]$ sqlplus /nolog
[oracle@myora ~]$ sqlplus /nolog
SQL*Plus: Release 11.2.0.1.0 Production on Thu Dec 5 15:04:43 2013
Copyright (c) 1982, 2009, Oracle. All rights reserved.
SQL> CONNECT sys/redhat@ISH1 AS SYSDBA
Connected.
```

```
[oracle@myora ~]$ sqlplus /nolog
SQL*Plus: Release 11.2.0.1.0 Production on Thu Dec 5 15:04:43 2013
Copyright (c) 1982, 2009, Oracle. All rights reserved.
SQL> CONNECT sys/redhat@CATDB1 AS SYSDBA
Connected.
```

**Create tablespace & RMAN schema catalog DB:**

```
[oracle@myora ~]$ sqlplus /nolog
SQL*Plus: Release 11.2.0.1.0 Production on Thu Dec 5 14:25:56 2013
Copyright (c) 1982, 2009, Oracle. All rights reserved.
SQL> CONNECT sys/redhat@catdb1 AS SYSDBA
ERROR:
ORA-12541: TNS:no listener
```

```
SQL> !lsnrctl start
LSNRCTL for Linux: Version 11.2.0.1.0 - Production on 05-DEC-2013 14:26:25
Copyright (c) 1991, 2009, Oracle. All rights reserved.
```
Oracle 11g RMAN Database Backup Guidelines using TSM

Starting /u01/oracle/product/11.2.0/db_1/bin/tnslsnr: please wait...

TNSLSNR for Linux: Version 11.2.0.1.0 - Production
System parameter file is /u01/oracle/product/11.2.0/db_1/network/admin/listener.ora
Log messages written to /u01/oracle/diag/tnslsnr/myoracatdb/listener/alert/log.xml
Listening on:

    (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=myoracatdb)(PORT=1521)))

Connecting to

    (DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=myoracatdb)(PORT=1521)))

STATUS of the LISTENER

------------------------

Alias                     LISTENER
Version                   TNSLSNR for Linux: Version 11.2.0.1.0 - Production
Start Date                05-DEC-2013 14:26:25
Uptime                    0 days 0 hr. 0 min. 0 sec
Trace Level               off
Security                  ON: Local OS Authentication
SNMP                      OFF
Listener Parameter File   /u01/oracle/product/11.2.0/db_1/network/admin/listener.ora
Listener Log File         /u01/oracle/diag/tnslsnr/myoracatdb/listener/alert/log.xml

Listening Endpoints Summary...

    (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=myoracatdb)(PORT=1521)))
The listener supports no services
The command completed successfully

SQL> CREATE TABLESPACE RMAN DATAFILE
2  '/u01/oracle/product/11.2.0/db_1/CATDB1/RMAN01.DBF' SIZE 7208K REUSE
3  AUTOEXTEND ON NEXT 64K MAXSIZE 2048M
4  EXTENT MANAGEMENT LOCAL
5  SEGMENT SPACE MANAGEMENT AUTO;

Tablespace created.

SQL> CREATE USER rman IDENTIFIED BY rman
2  TEMPORARY TABLESPACE temp
3  DEFAULT TABLESPACE rman
4  QUOTA UNLIMITED ON rman;

User created.

SQL> GRANT connect, resource, recovery_catalog_owner TO rman;

Grant succeeded.
Oracle 11g RMAN Database Backup Guidelines using TSM

RMAN> create catalog tablespace "RMAN";
recovery catalog created

RMAN> quit
Recovery Manager complete.

To check TSM name of target DB & catalog DB from catalog DB system:

Used TNSNAMES adapter to resolve the alias
Attempting to contact (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = TCP)(HOST = myoradb)(PORT = 1521))) (CONNECT_DATA = (SERVICE_NAME = TSH1)))
OK (0 msec)

Used TNSNAMES adapter to resolve the alias
Attempting to contact (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = TCP)(HOST = myoradb)(PORT = 1521))) (CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME = CATDB1)))
OK (0 msec)
Oracle 11g RMAN Database Backup Guidelines using TSM

To register the target database on catalog database:
[oracle@myoracatdb ~]$ rman catalog=rman/rman@CATDB1 target=sys/redhat@TSH1
RMAN> register database;
RMAN> exit

To test RMAN backup manually:
[oracle@myoracatdb ~]$ rman catalog=rman/rman@CATDB1 target=sys/redhat@TSH1
RMAN> configure retention policy to recovery window of 2 days;
RMAN> configure default device type to disk;
RMAN> configure controlfile autobackup on;
RMAN> configure channel device type disk format
'/u01/oraclebackup/Backup%d_DB_%U_%S_%P';

Note: Backup location path should be in target database system.
Starting backup at 05-DEC-13
current log archived
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=39 device type=DISK
channel ORA_DISK_1: starting archived log backup set
channel ORA_DISK_1: specifying archived log(s) in backup set
input archived log thread=1 sequence=4 RECID=1 STAMP=833384285
input archived log thread=1 sequence=5 RECID=2 STAMP=833384407
Oracle 11g RMAN Database Backup Guidelines using TSM

input archived log thread=1 sequence=6 RECID=3 STAMP=833384542
input archived log thread=1 sequence=7 RECID=4 STAMP=833384590
input archived log thread=1 sequence=8 RECID=5 STAMP=833384890
channel ORA_DISK_1: starting piece 1 at 05-DEC-13
channel ORA_DISK_1: finished piece 1 at 05-DEC-13
piece handle=/u01/oraclebackup/BackupTSH1_DB_05oqosdr_1_1_%S_%P
tag=TAG20131205T154811 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:00:07
Finished backup at 05-DEC-13

Starting backup at 05-DEC-13
using channel ORA_DISK_1
channel ORA_DISK_1: starting full datafile backup set
channel ORA_DISK_1: specifying datafile(s) in backup set
input datafile file number=00001 name=/u01/oracle/oradata/TSH1/system01.dbf
input datafile file number=00002 name=/u01/oracle/oradata/TSH1/sysaux01.dbf
input datafile file number=00003 name=/u01/oracle/oradata/TSH1/undotbs01.dbf
input datafile file number=00004 name=/u01/oracle/oradata/TSH1/users01.dbf
channel ORA_DISK_1: starting piece 1 at 05-DEC-13
channel ORA_DISK_1: finished piece 1 at 05-DEC-13
piece handle=/u01/oraclebackup/BackupTSH1_DB_06oqose2_1_1_%S_%P
tag=TAG20131205T154818 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:02:57
Finished backup at 05-DEC-13

Starting backup at 05-DEC-13
using channel ORA_DISK_1
channel ORA_DISK_1: starting archived log backup set
channel ORA_DISK_1: specifying archived log(s) in backup set
input archived log thread=1 sequence=9 RECID=6 STAMP=833385075
channel ORA_DISK_1: starting piece 1 at 05-DEC-13
channel ORA_DISK_1: finished piece 1 at 05-DEC-13
piece handle=/u01/oraclebackup/BackupTSH1_DB_07oqosjk_1_1_%S_%P
tag=TAG20131205T155116 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:00:01
Finished backup at 05-DEC-13

Starting Control File and SPFILE Autobackup at 05-DEC-13
piece handle=/u01/oracle/flash_recovery_area/TSH1/autobackup/2013_12_05/o1_mf_s_833385078_9b0m4prq_bkp comment=NONE
Finished Control File and SPFILE Autobackup at 05-DEC-13

RMAN retention policy will be applied to the command
RMAN retention policy is set to recovery window of 2 days
Oracle 11g RMAN Database Backup Guidelines using TSM

using channel ORA_DISK_1
no obsolete backups found

To check TDPO Configuration & communication:

[oracle@myoradb ~]$ ls -l $ORACLE_HOME/lib/libobk.so
lrwxrwxrwx 1 oracle oinstall 45 Oct 28  2012 /u01/oracle/product/11.2.0/db_1/lib/libobk.so -> /opt/tivoli/tsm/client/oracle/bin64/libobk.so
[oracle@myoradb ~]$ sbttest test
The sbt function pointers are loaded from libobk.so library.
-- sbtinit succeeded
Return code -1 from sbtinit, bsercoer = 0, bsercerrno = 0
Message 0 not found; product=RDBMS; facility=SBT

To check client session with TSM server from target database server:
[root@myoradb ~]# dsmc QUERY SESSION

IBM Tivoli Storage Manager
Command Line Backup-Archive Client Interface
Client Version 6, Release 2, Level 1.0
Client date/time: 12/06/2013 12:41:39
(c) Copyright by IBM Corporation and other(s) 1990, 2010. All Rights Reserved.

Node Name: MYORADB
Session established with server TSMSERVER: Linux/x86_64
 Server Version 6, Release 2, Level 1.0
 Server date/time: 12/06/2013 12:41:31 Last access: 12/06/2013 12:41:13

TSM Server Connection Information

Server Name...............: TSMSERVER
Server Type...............: Linux/x86_64
Archive Retain Protect...: "No"
Server Version...........: Ver. 6, Rel. 2, Lev. 1.0
Last Access Date.........: 12/06/2013 12:41:13
Delete Backup Files.....: "No"
Delete Archive Files....: "Yes"
Deduplication...........: "Server Only"

Node Name...............: MYORADB
User Name...............: root
To query client information from target database server:
[root@myoradb ~]# dsmc QUERY NODE F=D

IBM Tivoli Storage Manager
Command Line Backup-Archive Client Interface
Client Version 6, Release 2, Level 1.0
Client date/time: 12/06/2013 12:51:31
(c) Copyright by IBM Corporation and other(s) 1990, 2010. All Rights Reserved.

Node Name: MYORADB
Session established with server TSMSERVER: Linux/x86_64
  Server Version 6, Release 2, Level 1.0
  Server date/time: 12/06/2013 12:51:56 Last access: 12/06/2013 12:51:49

Please enter your user id <MYORADB>:
Please enter password for user id "MYORADB":

Session established with server TSMSERVER: Linux/x86_64
  Server Version 6, Release 2, Level 1.0
  Server date/time: 12/06/2013 12:52:00 Last access: 12/06/2013 12:51:56

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Platform</th>
<th>Policy Domain</th>
<th>Days Since Last Access</th>
<th>Days Since Password Set</th>
<th>Locked?</th>
</tr>
</thead>
<tbody>
<tr>
<td>MYORADB</td>
<td>Linux86</td>
<td>LANFREE_DOMAIN</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

IBM Tivoli Storage Manager
Command Line Backup-Archive Client Interface
Client Version 6, Release 2, Level 1.0
Client date/time: 12/06/2013 12:51:31
(c) Copyright by IBM Corporation and other(s) 1990, 2010. All Rights Reserved.

Node Name: MYORADB
Session established with server TSMSERVER: Linux/x86_64
  Server Version 6, Release 2, Level 1.0
  Server date/time: 12/06/2013 12:51:23 Last access: 12/06/2013 12:51:23

Please enter your user id <MYORADB>:
Please enter password for user id "MYORADB": <tsm_node_password>

Session established with server TSMSERVER: Linux/x86_64
  Server Version 6, Release 2, Level 1.0
  Server date/time: 12/06/2013 12:51:43 Last access: 12/06/2013 12:51:26

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Platform</th>
<th>Policy Domain</th>
<th>Days Since Last Access</th>
<th>Days Since Password Set</th>
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</tr>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Oracle 11g RMAN Database Backup Guidelines using TSM

To check client environment information from target database server:
[root@myoradb ~]#/opt/tivoli/tsm/client/oracle/bin64/tdpoconf SHOWENVironment

If there is any Error, like below: ANS1025E
**Oracle 11g RMAN Database Backup Guidelines using TSM**

**RMAN scripts sample:**

```bash
[oracle@myoracatdb scripts]$ cat /u01/rman/scripts/incremental_db_backup.rcv
run {
allocate channel c1 type 'sbt_tape' parms
'ENV=(TDPO_OPTFILE=/opt/tivoli/tsm/client/oracle/bin64/tdpo.opt)';
allocate channel c2 type 'sbt_tape' parms
'ENV=(TDPO_OPTFILE=/opt/tivoli/tsm/client/oracle/bin64/tdpo.opt)';
allocate channel c3 type 'sbt_tape' parms
'ENV=(TDPO_OPTFILE=/opt/tivoli/tsm/client/oracle/bin64/tdpo.opt)';
backup as backupset format 'df_%d_%s_%p'
skip inaccessible
tag db_bk_increment
incremental level 1 cumulative database;
sql 'alter system archive log current';
BACKUP as BACKUPSET FORMAT 'ar_%d_%s_%p' ARCHIVELOG ALL;
BACKUP as BACKUPSET FORMAT 'cf_rm_%d_%s_%p' current controlfile;
crosscheck backup;
release channel c1;
release channel c2;
release channel c3;
}
allocate channel for maintenance device type sbt_tape parms
'ENV=(TDPO_OPTFILE=/opt/tivoli/tsm/client/oracle/bin64/tdpo.opt)';
delete noprompt obsolete;

[oracle@myoracatdb scripts]$ cat /u01/rman/scripts/incremental_db_backup.sh
#!/bin/bash
ORACLE_SID=TSH1; export ORACLE_SID
unset TWO_TASK
NLS_DATE_FORMAT='DD_MON-YYYY:HH24:MI:SS'; export NLS_DATE_FORMAT
NLS_LANG=AMERICAN_AMERICA.US7ASCII; export NLS_LANG
.cd /home/oracle/.bash_profile
cd /u01/rman/scripts/
rman catalog=rman/rman@CATDB1 target=sys/redhat@TSH1 @incremental_db_backup.rcv
.exit;
```
Oracle 11g RMAN Database Backup Guidelines using TSM

**RMAN Script Output:**

```
[oracle@myoracatdb scripts]$ ./incremental_db_backup.sh

Recovery Manager: Release 11.2.0.1.0 - Production on Fri Dec 6 13:31:15 2013
Copyright (c) 1982, 2009, Oracle and/or its affiliates. All rights reserved.

connected to target database: TSH1 (DBID=1309426671)
connected to recovery catalog database

RMAN> run {
2> allocate channel c1 type 'sbt_tape' parms
3> allocate channel c2 type 'sbt_tape' parms
4> allocate channel c3 type 'sbt_tape' parms
5> backup as backupset format 'df_%d_%s_%p'
6> skip inaccessible
7> tag db_bk_increment
8> incremental level 1 cumulative database;
9> sql 'alter system archive log current';
10> BACKUP as BACKUPSET FORMAT 'ar_%d_%s_%p' ARCHIVELOG ALL;
11> BACKUP as BACKUPSET FORMAT 'cf_rm_%d_%s_%p' current controlfile;
12> crosscheck backup;
13> release channel c1;
14> release channel c2;
15> release channel c3;
16> }
17> allocate channel for maintenance device type sbt_tape parms
18> delete noprompt obsolete;
19>
allocated channel: c1
channel c1: SID=28 device type=SBT_TAPE
channel c1: Data Protection for Oracle: version 5.4.1.0

allocated channel: c2
channel c2: SID=1 device type=SBT_TAPE
channel c2: Data Protection for Oracle: version 5.4.1.0

allocated channel: c3
channel c3: SID=43 device type=SBT_TAPE
channel c3: Data Protection for Oracle: version 5.4.1.0
```
Oracle 11g RMAN Database Backup Guidelines using TSM

Starting backup at 06_DEC-2013:13:31:17
channel c1: starting incremental level 1 datafile backup set
channel c1: specifying datafile(s) in backup set
input datafile file number=00001 name=/u01/oracle/oradata/TSH1/system01.dbf
input datafile file number=00004 name=/u01/oracle/oradata/TSH1/users01.dbf
channel c1: starting piece 1 at 06_DEC-2013:13:31:18
channel c2: starting incremental level 1 datafile backup set
channel c2: specifying datafile(s) in backup set
input datafile file number=00002 name=/u01/oracle/oradata/TSH1/sysaux01.dbf
input datafile file number=00003 name=/u01/oracle/oradata/TSH1/undotbs01.dbf
channel c2: starting piece 1 at 06_DEC-2013:13:31:18
channel c2: finished piece 1 at 06_DEC-2013:13:31:25
piece handle=dfs_TSH1_21_1 tag=DB_BK_INCREMENT comment=API Version 2.0,MMS
Version 5.4.1.0
channel c2: backup set complete, elapsed time: 00:00:07
channel c1: finished piece 1 at 06_DEC-2013:13:31:33
piece handle=dfs_TSH1_20_1 tag=DB_BK_INCREMENT comment=API Version 2.0,MMS
Version 5.4.1.0
channel c1: backup set complete, elapsed time: 00:00:15
Finished backup at 06_DEC-2013:13:31:33

Starting Control File and SPFILE Autobackup at 06_DEC-2013:13:31:33
piece handle=c-1309426671-20131206-02 comment=API Version 2.0,MMS Version 5.4.1.0
Finished Control File and SPFILE Autobackup at 06_DEC-2013:13:31:37

sql statement: alter system archive log current

Starting backup at 06_DEC-2013:13:31:40
current log archived
channel c1: starting archived log backup set
channel c1: specifying archived log(s) in backup set
input archived log thread=1 sequence=4 RECID=1 STAMP=833384285
channel c1: starting piece 1 at 06_DEC-2013:13:31:41
channel c2: starting archived log backup set
channel c2: specifying archived log(s) in backup set
input archived log thread=1 sequence=5 RECID=2 STAMP=833384407
input archived log thread=1 sequence=6 RECID=3 STAMP=833384542
input archived log thread=1 sequence=7 RECID=4 STAMP=833384590
input archived log thread=1 sequence=8 RECID=5 STAMP=833384890
channel c2: starting piece 1 at 06_DEC-2013:13:31:41
channel c3: starting archived log backup set
channel c3: specifying archived log(s) in backup set
input archived log thread=1 sequence=9 RECID=6 STAMP=833385075
input archived log thread=1 sequence=10 RECID=7 STAMP=833459271
input archived log thread=1 sequence=11 RECID=8 STAMP=833462476
input archived log thread=1 sequence=12 RECID=9 STAMP=833462477
Oracle 11g RMAN Database Backup Guidelines using TSM

channel c3: starting piece 1 at 06_DEC-2013:13:31:41
channel c1: finished piece 1 at 06_DEC-2013:13:31:48
piece handle=ar_TSH1_23_1 tag=TAG20131206T133141 comment=API Version 2.0,MMS Version 5.4.1.0
channel c1: backup set complete, elapsed time: 00:00:07
channel c1: starting archived log backup set
channel c1: specifying archived log(s) in backup set
input archived log thread=1 sequence=13 RECID=10 STAMP=833463099
input archived log thread=1 sequence=14 RECID=11 STAMP=833463100
channel c1: starting piece 1 at 06_DEC-2013:13:31:48
channel c2: finished piece 1 at 06_DEC-2013:13:31:48
piece handle=ar_TSH1_24_1 tag=TAG20131206T133141 comment=API Version 2.0,MMS Version 5.4.1.0
channel c1: backup set complete, elapsed time: 00:00:07
channel c1: starting full datafile backup set
channel c1: specifying datafile(s) in backup set
including current control file in backup set
channel c1: starting piece 1 at 06_DEC-2013:13:32:08
channel c3: finished piece 1 at 06_DEC-2013:13:32:03
piece handle=ar_TSH1_25_1 tag=TAG20131206T133141 comment=API Version 2.0,MMS Version 5.4.1.0
channel c3: backup set complete, elapsed time: 00:00:22
Finished backup at 06_DEC-2013:13:32:03

Starting backup at 06_DEC-2013:13:32:05
channel c1: starting full datafile backup set
channel c1: specifying datafile(s) in backup set
including current control file in backup set
channel c1: starting piece 1 at 06_DEC-2013:13:32:08
channel c1: finished piece 1 at 06_DEC-2013:13:32:09
piece handle=cf_rm_TSH1_27_1 tag=TAG20131206T133205 comment=API Version 2.0,MMS Version 5.4.1.0
channel c1: backup set complete, elapsed time: 00:00:01
Finished backup at 06_DEC-2013:13:32:09

Starting Control File and SPFILE Autobackup at 06_DEC-2013:13:32:09
piece handle=c-1309426671-20131206-03 comment=API Version 2.0,MMS Version 5.4.1.0
Finished Control File and SPFILE Autobackup at 06_DEC-2013:13:32:13

crosschecked backup piece: found to be 'AVAILABLE'
backup piece handle=/u01/oraclebackup/BackupTSH1_DB_05oqosdr_1_1_%S_%P RECID=1 STAMP=833384891
crosschecked backup piece: found to be 'AVAILABLE'
backup piece handle=/u01/oraclebackup/BackupTSH1_DB_06oqose2_1_1_%S_%P RECID=2 STAMP=833384899
crosschecked backup piece: found to be 'AVAILABLE'
Oracle 11g RMAN Database Backup Guidelines using TSM

backup piece handle=/u01/oraclebackup/BackupTSH1_DB_07oqosjk_1_1_%S_%P RECID=3 STAMP=833385076
crosschecked backup piece: found to be 'AVAILABLE'
backup piece handle=/u01/oraclebackup/BackupTSH1_DB_07oqosjk_1_1_%S_%P RECID=4 STAMP=833385078
Crosschecked 4 objects

cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=df_TSH1_12_1 RECID=5 STAMP=833462176
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=df_TSH1_15_1 RECID=6 STAMP=833462357
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=c-1309426671-20131206-00 RECID=7 STAMP=833462467
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=ar_TSH1_17_1 RECID=8 STAMP=833462479
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=cf_rm_TSH1_18_1 RECID=9 STAMP=833462508
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=c-1309426671-20131206-01 RECID=10 STAMP=833462511
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=df_TSH1_21_1 RECID=11 STAMP=833463078
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=df_TSH1_20_1 RECID=12 STAMP=833463078
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=c-1309426671-20131206-02 RECID=13 STAMP=833463094
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=ar_TSH1_24_1 RECID=14 STAMP=833463101
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=ar_TSH1_23_1 RECID=15 STAMP=833463101
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=ar_TSH1_26_1 RECID=16 STAMP=833463108
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=ar_TSH1_25_1 RECID=17 STAMP=833463101
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=cf_rm_TSH1_27_1 RECID=18 STAMP=833463128
cross checked backup piece: found to be 'AVAILABLE'
backup piece handle=c-1309426671-20131206-03 RECID=19 STAMP=833463131
Crosschecked 15 objects

released channel: c1
released channel: c2
released channel: c3

allocated channel: ORA_MAINT_SBT_TAPE_1
channel ORA_MAINT_SBT_TAPE_1: SID=28 device type=SBT_TAPE
Oracle 11g RMAN Database Backup Guidelines using TSM

channel ORA_MAINT_SBT_TAPE_1: Data Protection for Oracle: version 5.4.1.0

RMAN retention policy will be applied to the command
RMAN retention policy is set to recovery window of 2 days
no obsolete backups found

Recovery Manager complete.

TSM Server output:

[root@myoradb ~]# dsmadmc -id=tsmadmin -password=admin1 -console
IBM Tivoli Storage Manager
Command Line Administrative Interface - Version 6, Release 2, Level 1.0
(c) Copyright by IBM Corporation and other(s) 1990, 2010. All Rights Reserved.

Session established with server TSMSERVER: Linux/x86_64
Server Version 6, Release 2, Level 1.0
Server date/time: 12/06/2013 13:31:02 Last access: 12/06/2013 13:27:46

ANR0406I Session 64 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(22337)).
ANR0568W Session 62 for admin TSMADMIN (Linux86) terminated - connection with client severed.
ANR0406I Session 65 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35867)).
ANR0511I Session 65 opened output volume ULT016L1.
ANR0514I Session 65 closed volume ULT016L1.
ANR0406I Session 66 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35868)).
ANR0403I Session 65 ended for node MYORADB (TDPO LinuxAMD64).
ANR0403I Session 66 ended for node MYORADB (TDPO LinuxAMD64).
ANR8810I Volume ULT017L1 has been labeled in library PLIBULT3580.
ANR8337I LTO volume ULT017L1 mounted in drive PRIMARYDRIVE3 (/dev/IBMtape2).
ANR1340I Scratch volume ULT017L1 is now defined in storage pool DAILYPOOL.
ANR0511I Session 64 opened output volume ULT017L1.
ANR0514I Session 64 closed volume ULT017L1.
ANR0406I Session 67 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35872)).
ANR0403I Session 66 ended for node MYORADB (TDPO LinuxAMD64).
ANR0403I Session 67 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 68 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35873)).
ANR0403I Session 68 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 69 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35874)).
ANR0511I Session 69 opened output volume ULT016L1.
Oracle 11g RMAN Database Backup Guidelines using TSM

ANR0514I Session 69 closed volume ULT016L1.
ANR0406I Session 70 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35875)).
ANR0403I Session 69 ended for node MYORADB (TDPO LinuxAMD64).
ANR0403I Session 70 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 71 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35877)).
ANR0406I Session 72 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35878)).
ANR0406I Session 73 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35879)).
ANR0406I Session 74 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35881)).
ANR0406I Session 75 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35882)).
ANR0403I Session 74 ended for node MYORADB (TDPO LinuxAMD64).
ANR0403I Session 75 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 76 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35884)).
ANR0514I Session 76 closed volume ULT016L1.
ANR0406I Session 77 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35885)).
ANR0403I Session 77 ended for node MYORADB (TDPO LinuxAMD64).
ANR8810I Volume ULT018L1 has been labeled in library PLIBULT3580.
ANR0403I Session 77 ended for node MYORADB (TDPO LinuxAMD64).
ANR8810I Volume ULT017L1 has been labeled in library PLIBULT3580.
ANR0403I Session 78 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 79 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35891)).
ANR0514I Session 79 closed volume ULT016L1.
ANR0406I Session 80 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35892)).
Oracle 11g RMAN Database Backup Guidelines using TSM

ANR0403I Session 79 ended for node MYORADB (TDPO LinuxAMD64).
ANR0403I Session 80 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 81 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35893)).
ANR0403I Session 81 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 82 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35894)).
ANR0511I Session 82 opened output volume ULT016L1.
ANR0514I Session 82 closed volume ULT016L1.
ANR0403I Session 82 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 83 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35896)).
ANR0403I Session 83 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 84 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35897)).
ANR0403I Session 84 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 85 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35898)).
ANR0403I Session 85 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 86 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35899)).
ANR0403I Session 86 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 87 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35900)).
ANR0403I Session 87 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 88 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35901)).
ANR0403I Session 88 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 89 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35902)).
ANR0403I Session 89 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 90 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35903)).
ANR0403I Session 90 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 91 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35904)).
ANR0403I Session 91 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 92 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35905)).
ANR0403I Session 92 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 93 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35906)).
ANR0403I Session 93 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 94 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35907)).
ANR0403I Session 94 ended for node MYORADB (TDPO LinuxAMD64).
Oracle 11g RMAN Database Backup Guidelines using TSM

ANR0406I Session 95 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35908)).
ANR0403I Session 95 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 96 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35909)).
ANR0403I Session 96 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 97 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35910)).
ANR0403I Session 97 ended for node MYORADB (TDPO LinuxAMD64).
ANR0406I Session 98 started for node MYORADB (TDPO LinuxAMD64) (Tcp/Ip 192.168.11.120(35911)).
ANR0403I Session 98 ended for node MYORADB (TDPO LinuxAMD64).

To check RMAN backup:
[oracle@myoracatdb scripts]$ rman catalog=rman/rman@CATDB1 target=sys/redhat@TSH1
RMAN> list backup summary;

```
# oracle@myoracatdb scripts]$ rman catalog=rman/rman@CATDB1 target=sys/redhat@TSH1

Recovery Manager: Release 11.2.0.1.0 - Production on Fri Dec 6 13:41:40 2013
Copyright (c) 1982, 2009, Oracle and/or its affiliates. All rights reserved.

connected to target database: TSH1 (DBID=1309426671) 
connected to recovery catalog database

RMAN> list backup summary:

List of Backups

<table>
<thead>
<tr>
<th>Key</th>
<th>TY</th>
<th>IV</th>
<th>S</th>
<th>Device Type</th>
<th>Completion Time</th>
<th>#Pieces</th>
<th>#Copies</th>
<th>Compressed</th>
<th>Tag</th>
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<tbody>
<tr>
<td>97</td>
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<td>A</td>
<td>A</td>
<td>DISK</td>
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<td>NO</td>
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<td>A</td>
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<td>1</td>
<td>NO</td>
<td>DB_BK_INCREMENT</td>
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<td>A</td>
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<td>06-DEC-13</td>
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<td>1</td>
<td>NO</td>
<td>TAG20131206T133141</td>
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<tr>
<td>345</td>
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<td>F</td>
<td>A</td>
<td>SET_TAPE</td>
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<td>1</td>
<td>NO</td>
<td>TAG20131206T133210</td>
</tr>
</tbody>
</table>
```

Oracle 11g RMAN Database Backup Guidelines using TSM

RMAN> list incarnation of database TSH1;

<table>
<thead>
<tr>
<th>DB Key</th>
<th>Inc Key</th>
<th>DB Name</th>
<th>DB ID</th>
<th>STATUS</th>
<th>Reset SCN</th>
<th>Reset Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>19</td>
<td>TSH1</td>
<td>1309426671</td>
<td>PARENT 1</td>
<td>15-AUG-09</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>TSH1</td>
<td>1309426671</td>
<td>CURRENT</td>
<td>945194</td>
<td>07-AUG-12</td>
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RMAN> list backup of controlfile;

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<th>B5 Key</th>
<th>Type</th>
<th>LV Size</th>
<th>Device Type</th>
<th>Elapsed Time</th>
<th>Completion Time</th>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>9.36M</td>
<td>DISK</td>
<td>00:00:02</td>
<td>05-DEC-13</td>
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<tr>
<td></td>
<td></td>
<td>9.50M</td>
<td>SBT_TAPE</td>
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<td>9.50M</td>
<td>SBT_TAPE</td>
<td>00:00:04</td>
<td>06-DEC-13</td>
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<tr>
<td></td>
<td></td>
<td>9.50M</td>
<td>SBT_TAPE</td>
<td>00:00:04</td>
<td>06-DEC-13</td>
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<td></td>
</tr>
</tbody>
</table>
Oracle 11g RMAN Database Backup Guidelines using TSM

**Troubleshooting:**
RMAN Return TSM Error (ANS1025E)

```
RMAN-00571: --------------------------- ERROR MESSAGE STACK FOLLOWS ---------------------------
RMAN-00569: --------------------------- ERROR MESSAGE STACK FOLLOWS ---------------------------
RMAN-00571: --------------------------- ERROR MESSAGE STACK FOLLOWS ---------------------------
RMAN-00580: failure of backup command on c3 channel at 12/06/2013 12:33:48
ORA-19506: failed to create sequential file, name="df_TSML_11_1", parms=""
ORA-27028: skpgscrm: sftpbackup returned error
ORA-19511: Error received from media manager layer, error text:
       ANS1025E (RC137) Session rejected: Authentication failure
```

TSM Return Error (ANS1025E)

```
[root@myoradb ~]# /opt/tivoli/tdpm/bin64/tdpoconf SHOWNVior

IBM Tivoli Storage Manager for Databases:
Data Protection for Oracle
Version 5, Release 4, Level 1.0
(C) Copyright IBM Corporation 1997, 2007. All rights reserved.

Data Protection for Oracle Information
Version: 5
Release: 4
Level: 1
Sublevel: 0
Platform: 64 bit TDFS LinuxAMD64

Tivoli Storage Manager Server Information
Server Name: TSMSERVER
Server Address: 192.168.11.110
Communication Method: TCP/IP

Session Information
Owner Name: oracle
Node Name: myoradb
DMM_DIR: /opt/tivoli/tdpm/client/api/bin64
DMM_ORC_CONFIG: /opt/tivoli/tdpm/client/oracle/bin64/dmm.opt
TDPM_OPTFILE: /opt/tivoli/tdpm/client/oracle/bin64/tdpo.opt
Password Directory: /opt/tivoli/tdpm/client/oracle/bin64
Compression: FALSE
License Information: License file exists and contains valid license data.

ANS1025E (RC137) Session rejected: Authentication failure
```
Oracle 11g RMAN Database Backup Guidelines using TSM

[root@myoradb ~]# /opt/tivoli/tsm/client/oracle/bin64/tivpoconf password

IBM Tivoli Storage Manager for Databases:
Data Protection for Oracle
Version 5, Release 4, Level 1.0
(C) Copyright IBM Corporation 1997, 2007. All rights reserved.

******************************************************************************
* IBM Tivoli Storage Manager for Databases Utility
* Password file initialization/update program
******************************************************************************

Please enter current password:

Please enter new password:

Please reenter new password for verification:

ANU0260I Password successfully changed.

RMAN Return TSM Error (ANS50326E)

channel c2: starting piece 1 at 06_DEC-2013:13:16:16
RMAN-03009: failure of backup command on c2 channel at 12/06/2013 13:16:16
ORA-19502: write error on file "df_TSM1_13_1", block number 1 (block size=8192)
ORA-27030: skgfrt: sbtwrite2 returned error
ORA-19511: Error received from media manager layer, error text:
  ANS0326E (RC41) This node has exceeded its maximum number of mount points.

channel c2: starting piece 1 at 06_DEC-2013:13:16:16
RMAN-03009: failure of backup command on c2 channel at 12/06/2013 13:16:16
ORA-19502: write error on file "df_TSM1_13_1", block number 1 (block size=8192)
ORA-27030: skgfrt: sbtwrite2 returned error
ORA-19511: Error received from media manager layer, error text:
  ANS0326E (RC41) This node has exceeded its maximum number of mount points.

tsm: TSMERVER>UPDATE NODE MYORADB MAXNUMMP=5
ANR2063I Node MYORADB updated.

rsb: TSMERVER>
Oracle 11g RMAN Database Backup Guidelines using TSM