

Oracle 12c – Recovering a lost /corrupted table from RMAN Backup after user error or application issue

Oracle 12c has automated table level recovery using RMAN. If you lose a table after user error or get data destroyed because of user or application issue, you can easily restore and recover that table to point in time when issue happened using a single RMAN Command.

```
Recover table owner.table_name until scn nnnnnnnn auxiliary destination ' ';
```

Prior to Oracle 12c this was done as follows (obviously a tedious process)

1. Identify data files holding lost /corrupted tables
2. Identify free space for system/sysaux and datafiles of step 1
3. TSPITR
4. Export table data
5. Import in database

It is a lot easier in Oracle 12c. Below are the requirements for using RMAN table restore.

1. Initialization parameter compatible is set to 12.0 or higher
2. Database is running in archive log mode
3. Control file auto backup is enabled before level 0 backup
4. RETENTION POLICY is set
5. Table should not be residing in system table space
6. Level 0 backup and all desired backups are available

Some important Parameters for above recover command.

DATAPUMP DESTINATION ' ' → additional location if you want to keep your dump file somewhere other than auxiliary destination

DUMP FILE 'xyz.dat' → Name of dump file

NOTABLEIMPORT → Use this switch if you do not want to import table in database in single command;

REMAP TABLE → If you want to import table data in different table.

Demonstration

1. Validate compatible is set

```
SQL> show parameter compatible
```

NAME	TYPE	VALUE
Compatible	string	12.1.0.2.0

2. Validate archive log mode

```
SQL> archive log list
```

Database log mode	Archive Mode
Automatic archival	Enabled
Archive destination	USE_DB_RECOVERY_FILE_DEST
Oldest online log sequence	7
Next log sequence to archive	9
Current log sequence	9

3. Validate controlfile auto backup and retention policy is set

```

RMAN> Show all;
RMAN configuration parameters for database with db_unique_name NCDB are:
CONFIGURE RETENTION POLICY TO REDUNDANCY 1;
CONFIGURE BACKUP OPTIMIZATION OFF; # default
CONFIGURE DEFAULT DEVICE TYPE TO DISK; # default
CONFIGURE CONTROLFILE AUTOBACKUP ON;
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '%F'; # default
CONFIGURE DEVICE TYPE DISK PARALLELISM 1 BACKUP TYPE TO BACKUPSET; # default
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
CONFIGURE MAXSETSIZE TO UNLIMITED; # default
CONFIGURE ENCRYPTION FOR DATABASE OFF; # default
CONFIGURE ENCRYPTION ALGORITHM 'AES128'; # default
CONFIGURE COMPRESSION ALGORITHM 'BASIC' AS OF RELEASE 'DEFAULT' OPTIMIZE FOR LOAD
TRUE ; # default
CONFIGURE RMAN OUTPUT TO KEEP FOR 7 DAYS; # default
CONFIGURE ARCHIVELOG DELETION POLICY TO NONE; # default
CONFIGURE SNAPSHOT CONTROLFILE NAME TO
'/home/oracle/app/oracle/product/12.1.0/dbhome_1/dbs/snapcf_ncdb.f'; # default

```

4. Create test data

```

SQL> connect anuj/anuj
Connected.
SQL> create table anuj(id number, company varchar2(60));

Table created.

SQL> insert into anuj values (1,'Aitel');

1 row created.
SQL> commit;

SQL> select CURRENT_SCN from v$database;

CURRENT_SCN
-----
1616607

```

```
SQL> select * from anuj.anuj;
```

```
          ID COMPANY
```

```
-----  
          1 Aitel
```

5. Take RMAN Backup

```
[oracle@Anujhost ~]$ rman target / log=/rman_test/Backup_recovery_1.log
```

```
RMAN> BACKUP INCREMENTAL LEVEL 0 DATABASE PLUS ARCHIVELOG;
```

6. Delete test data

```
SQL> drop table anuj.anuj purge;
```

7. Recover table from RMAN Backup

```
RMAN> recover table anuj.anuj until scn 1616607 auxiliary destination '/rman_test';
```

8. Validate if test data is restored

```
SQL> select * from anuj.anuj;
```

```
          ID COMPANY
```

```
-----  
          1 Aitel
```

So we recovered our table now the most interesting part is reviewing the log file and see how smartly all the process is automated here..

```
Starting backup at 25-DEC-14
```

➔ **Running level0 backup**

```
current log archived  
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=4 RECID=1 STAMP=867199900
```

```
input archived log thread=1 sequence=5 RECID=2 STAMP=867199929
input archived log thread=1 sequence=6 RECID=3 STAMP=867202781
channel ORA_DISK_1: starting piece 1 at 25-DEC-14
channel ORA_DISK_1: finished piece 1 at 25-DEC-14
piece
handle=/rman_test/fast_recovery_area/NCDB/backupset/2014_12_25/o1_mf_annnn_TAG20141225T013941_b9qd9
g7r_.bkp tag=TAG20141225T013941 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:00:01
Finished backup at 25-DEC-14
```

```
Starting backup at 25-DEC-14
using channel ORA_DISK_1
channel ORA_DISK_1: starting incremental level 0 datafile backup set
channel ORA_DISK_1: specifying datafile(s) in backup set
input datafile file number=00001 name=/rman_test/NCDB/datafile/o1_mf_system_b9q38ggn_.dbf
input datafile file number=00003 name=/rman_test/NCDB/datafile/o1_mf_sysaux_b9q35rv8_.dbf
input datafile file number=00005 name=/rman_test/NCDB/datafile/o1_mf_test_tbs_b9q53wrdd_.dbf
input datafile file number=00004 name=/rman_test/NCDB/datafile/o1_mf_undotbs1_b9q3ch4c_.dbf
input datafile file number=00006 name=/rman_test/NCDB/datafile/o1_mf_users_b9q3cfxz_.dbf
channel ORA_DISK_1: starting piece 1 at 25-DEC-14
channel ORA_DISK_1: finished piece 1 at 25-DEC-14
piece
handle=/rman_test/fast_recovery_area/NCDB/backupset/2014_12_25/o1_mf_nnnd0_TAG20141225T013943_b9qd9
hm6_.bkp tag=TAG20141225T013943 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:00:35
Finished backup at 25-DEC-14
```

```
Starting backup at 25-DEC-14
current log archived
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=7 RECID=4 STAMP=867202818
channel ORA_DISK_1: starting piece 1 at 25-DEC-14
channel ORA_DISK_1: finished piece 1 at 25-DEC-14
piece
handle=/rman_test/fast_recovery_area/NCDB/backupset/2014_12_25/o1_mf_annnn_TAG20141225T014018_b9qdb
lz6_.bkp tag=TAG20141225T014018 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:00:02
Finished backup at 25-DEC-14
```

```
Starting Control File and SPFILE Autobackup at 25-DEC-14
piece handle=/rman_test/fast_recovery_area/NCDB/autobackup/2014_12_25/o1_mf_s_867202820_b9qdbn92_.bkp
comment=NONE
Finished Control File and SPFILE Autobackup at 25-DEC-14
```

```
RMAN>
```

```
RMAN>
```

➔ Starting table recovery

```
Starting recover at 25-DEC-14
```

```
using channel ORA_DISK_1
```

```
RMAN-05026: WARNING: presuming following set of tablespaces applies to specified Point-in-Time
```

```
List of tablespaces expected to have UNDO segments
```

```
Tablespace SYSTEM
```

```
Tablespace UNDOTBS1
```

```
Creating automatic instance, with SID='beay'
```

➔ automatic auxiliary instance created

initialization parameters used for automatic instance:

```
db_name=NCDB
db_unique_name=beay_pitr_NCDB
compatible=12.1.0.2.0
db_block_size=8192
db_files=200
diagnostic_dest=/home/oracle/app/oracle
_system_trig_enabled=FALSE
sga_target=1264M
processes=200
db_create_file_dest=/rman_test
log_archive_dest_1='location=/rman_test'
#No auxiliary parameter file used
```

starting up automatic instance NCDB

Oracle instance started

Total System Global Area 1325400064 bytes

```
Fixed Size          2924112 bytes
Variable Size       352321968 bytes
Database Buffers    956301312 bytes
Redo Buffers        13852672 bytes
Automatic instance created
```

contents of Memory Script:

```
{
# set requested point in time
set until scn 1616607;
# restore the controlfile
restore clone controlfile;
```

→ restore clone controlfile;

```
# mount the controlfile
sql clone 'alter database mount clone database';
# archive current online log
sql 'alter system archive log current';
}
```

executing Memory Script

executing command: SET until clause

Starting restore at 25-DEC-14

```
allocated channel: ORA_AUX_DISK_1
channel ORA_AUX_DISK_1: SID=7 device type=DISK
```

```
channel ORA_AUX_DISK_1: starting datafile backup set restore
channel ORA_AUX_DISK_1: restoring control file
channel ORA_AUX_DISK_1: reading from backup piece
/rman_test/fast_recovery_area/NCDB/autobackup/2014_12_25/o1_mf_s_867199931_b9q9jcb8_.bkp
channel ORA_AUX_DISK_1: piece
handle=/rman_test/fast_recovery_area/NCDB/autobackup/2014_12_25/o1_mf_s_867199931_b9q9jcb8_.bkp
tag=TAG20141225T005211
channel ORA_AUX_DISK_1: restored backup piece 1
channel ORA_AUX_DISK_1: restore complete, elapsed time: 00:00:01
output file name=/rman_test/NCDB/controlfile/o1_mf_b9qdfkng_.ctl
```

Finished restore at 25-DEC-14

sql statement: alter database mount clone database

sql statement: alter system archive log current

contents of Memory Script:

```
{
# set requested point in time
set until scn 1616607;
# set destinations for recovery set and auxiliary set datafiles
set newname for clone datafile 1 to new;
set newname for clone datafile 4 to new;
set newname for clone datafile 3 to new;
set newname for clone tempfile 1 to new;
# switch all tempfiles
switch clone tempfile all;
# restore the tablespaces in the recovery set and the auxiliary set
restore clone datafile 1, 4, 3;
```

switch clone datafile all;

}

executing Memory Script

executing command: SET until clause

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

renamed tempfile 1 to /rman_test/NCDB/datafile/o1_mf_temp_%u_.tmp in control file

Starting restore at 25-DEC-14

using channel ORA_AUX_DISK_1

channel ORA_AUX_DISK_1: starting datafile backup set restore

channel ORA_AUX_DISK_1: specifying datafile(s) to restore from backup set

channel ORA_AUX_DISK_1: restoring datafile 00001 to /rman_test/NCDB/datafile/o1_mf_system_%u_.dbf

channel ORA_AUX_DISK_1: restoring datafile 00004 to /rman_test/NCDB/datafile/o1_mf_undotbs1_%u_.dbf

channel ORA_AUX_DISK_1: restoring datafile 00003 to /rman_test/NCDB/datafile/o1_mf_sysaux_%u_.dbf

channel ORA_AUX_DISK_1: reading from backup piece

/rman_test/fast_recovery_area/NCDB/backupset/2014_12_25/o1_mf_nnnd0_TAG20141225T005144_b9q9hjm_.bkp

channel ORA_AUX_DISK_1: piece

handle=/rman_test/fast_recovery_area/NCDB/backupset/2014_12_25/o1_mf_nnnd0_TAG20141225T005144_b9q9hjm_.bkp tag=TAG20141225T005144

channel ORA_AUX_DISK_1: restored backup piece 1

channel ORA_AUX_DISK_1: restore complete, elapsed time: 00:00:35

Finished restore at 25-DEC-14

datafile 1 switched to datafile copy

input datafile copy RECID=4 STAMP=867202956 file name=/rman_test/NCDB/datafile/o1_mf_system_b9qdfry1_.dbf

datafile 4 switched to datafile copy

```
input datafile copy RECID=5 STAMP=867202956 file
name=/rman_test/NCDB/datafile/o1_mf_undotbs1_b9qdfryn_.dbf
datafile 3 switched to datafile copy
input datafile copy RECID=6 STAMP=867202956 file name=/rman_test/NCDB/datafile/o1_mf_sysaux_b9qdfry8_.dbf
```

contents of Memory Script:

```
{
# set requested point in time
set until scn 1616607;
# online the datafiles restored or switched
sql clone "alter database datafile 1 online";
sql clone "alter database datafile 4 online";
sql clone "alter database datafile 3 online";
# recover and open database read only
recover clone database tablespace "SYSTEM", "UNDOTBS1", "SYSAUX";
sql clone 'alter database open read only';
}
```

executing Memory Script

executing command: SET until clause

sql statement: alter database datafile 1 online

sql statement: alter database datafile 4 online

sql statement: alter database datafile 3 online

Starting recover at 25-DEC-14
using channel ORA_AUX_DISK_1

starting media recovery

```
archived log for thread 1 with sequence 5 is already on disk as file
/rman_test/fast_recovery_area/NCDB/archivelog/2014_12_25/o1_mf_1_5_b9q9j9s8_.arc
archived log for thread 1 with sequence 6 is already on disk as file
/rman_test/fast_recovery_area/NCDB/archivelog/2014_12_25/o1_mf_1_6_b9qd9fsl_.arc
archived log file name=/rman_test/fast_recovery_area/NCDB/archivelog/2014_12_25/o1_mf_1_5_b9q9j9s8_.arc
thread=1 sequence=5
archived log file name=/rman_test/fast_recovery_area/NCDB/archivelog/2014_12_25/o1_mf_1_6_b9qd9fsl_.arc
thread=1 sequence=6
media recovery complete, elapsed time: 00:00:01
Finished recover at 25-DEC-14
```

sql statement: alter database open read only

contents of Memory Script:

```
{
  sql clone "create spfile from memory";
  shutdown clone immediate;
  startup clone nomount;
  sql clone "alter system set control_files =
'/rman_test/NCDB/controlfile/o1_mf_b9qdfkng_.ctl' comment=
'RMAN set' scope=spfile";
  shutdown clone immediate;
  startup clone nomount;
# mount database
sql clone 'alter database mount clone database';
}
```

executing Memory Script

sql statement: create spfile from memory

database closed

database dismounted

Oracle instance shut down

connected to auxiliary database (not started)

Oracle instance started

Total System Global Area 1325400064 bytes

Fixed Size	2924112 bytes
Variable Size	369099184 bytes
Database Buffers	939524096 bytes
Redo Buffers	13852672 bytes

sql statement: alter system set control_files = '/rman_test/NCDB/controlfile/o1_mf_b9qdfkng_ctl' comment='RMAN set' scope=spfile

Oracle instance shut down

connected to auxiliary database (not started)

Oracle instance started

Total System Global Area 1325400064 bytes

Fixed Size	2924112 bytes
Variable Size	369099184 bytes
Database Buffers	939524096 bytes
Redo Buffers	13852672 bytes

sql statement: alter database mount clone database

contents of Memory Script:

```
{  
# set requested point in time  
set until scn 1616607;  
# set destinations for recovery set and auxiliary set datafiles  
set newname for datafile 5 to new;  
# restore the tablespaces in the recovery set and the auxiliary set  
restore clone datafile 5;
```

switch clone datafile all;

}

executing Memory Script

executing command: SET until clause

executing command: SET NEWNAME

Starting restore at 25-DEC-14

allocated channel: ORA_AUX_DISK_1

channel ORA_AUX_DISK_1: SID=21 device type=DISK

channel ORA_AUX_DISK_1: starting datafile backup set restore

channel ORA_AUX_DISK_1: specifying datafile(s) to restore from backup set


```
channel ORA_AUX_DISK_1: restoring datafile 00005 to
/rman_test/BEAY_PITR_NCDB/datafile/o1_mf_test_tbs_%u_.dbf
channel ORA_AUX_DISK_1: reading from backup piece
/rman_test/fast_recovery_area/NCDB/backupset/2014_12_25/o1_mf_nnnd0_TAG20141225T005144_b9q9hirm_.bk
p
channel ORA_AUX_DISK_1: piece
handle=/rman_test/fast_recovery_area/NCDB/backupset/2014_12_25/o1_mf_nnnd0_TAG20141225T005144_b9q9h
irm_.bkp tag=TAG20141225T005144
channel ORA_AUX_DISK_1: restored backup piece 1
channel ORA_AUX_DISK_1: restore complete, elapsed time: 00:00:07
Finished restore at 25-DEC-14
```

```
datafile 5 switched to datafile copy
input datafile copy RECID=8 STAMP=867203012 file
name=/rman_test/BEAY_PITR_NCDB/datafile/o1_mf_test_tbs_b9qdf9g_.dbf
```

```
contents of Memory Script:
{
# set requested point in time
set until scn 1616607;
# online the datafiles restored or switched
sql clone "alter database datafile 5 online";
# recover and open resetlogs
recover clone database tablespace "TEST_TBS", "SYSTEM", "UNDOTBS1", "SYSAUX" delete archivelog;
alter clone database open resetlogs;
}
executing Memory Script
```

```
executing command: SET until clause
```

```
sql statement: alter database datafile 5 online
```

```
Starting recover at 25-DEC-14
using channel ORA_AUX_DISK_1
```

```
starting media recovery
```

```
archived log for thread 1 with sequence 5 is already on disk as file
/rman_test/fast_recovery_area/NCDB/archivelog/2014_12_25/o1_mf_1_5_b9q9j9s8_.arc
archived log for thread 1 with sequence 6 is already on disk as file
/rman_test/fast_recovery_area/NCDB/archivelog/2014_12_25/o1_mf_1_6_b9qd9fsl_.arc
archived log file name=/rman_test/fast_recovery_area/NCDB/archivelog/2014_12_25/o1_mf_1_5_b9q9j9s8_.arc
thread=1 sequence=5
archived log file name=/rman_test/fast_recovery_area/NCDB/archivelog/2014_12_25/o1_mf_1_6_b9qd9fsl_.arc
thread=1 sequence=6
media recovery complete, elapsed time: 00:00:00
Finished recover at 25-DEC-14
```

```
database opened
```

```
contents of Memory Script:
{
# create directory for datapump import
sql "create or replace directory TSPITR_DIROBJ_DPDIR as "
/rman_test"";
# create directory for datapump export
sql clone "create or replace directory TSPITR_DIROBJ_DPDIR as "
/rman_test"";
```

```

}
executing Memory Script

sql statement: create or replace directory TSPITR_DIROBJ_DPDIR as "/rman_test"

sql statement: create or replace directory TSPITR_DIROBJ_DPDIR as "/rman_test"

Performing export of tables...
EXPDP> Starting "SYS"."TSPITR_EXP_beay_ncae":
EXPDP> Estimate in progress using BLOCKS method...
EXPDP> Processing object type TABLE_EXPORT/TABLE/TABLE_DATA
EXPDP> Total estimation using BLOCKS method: 64 KB
EXPDP> Processing object type TABLE_EXPORT/TABLE/TABLE
EXPDP> Processing object type TABLE_EXPORT/TABLE/STATISTICS/TABLE_STATISTICS
EXPDP> Processing object type TABLE_EXPORT/TABLE/STATISTICS/MARKER
EXPDP> . . exported "ANUJ"."ANUJ"                5.484 KB   1 rows
EXPDP> Master table "SYS"."TSPITR_EXP_beay_ncae" successfully loaded/unloaded
EXPDP> *****
EXPDP> Dump file set for SYS.TSPITR_EXP_beay_ncae is:
EXPDP> /rman_test/tspittr_beay_27203.dmp
EXPDP> Job "SYS"."TSPITR_EXP_beay_ncae" successfully completed at Thu Dec 25 01:44:19 2014 elapsed 0 00:00:23
Export completed

contents of Memory Script:
{
# shutdown clone before import
shutdown clone abort
}
executing Memory Script

Oracle instance shut down

Performing import of tables...
IMPDP> Master table "SYS"."TSPITR_IMP_beay_wAuC" successfully loaded/unloaded
IMPDP> Starting "SYS"."TSPITR_IMP_beay_wAuC":
IMPDP> Processing object type TABLE_EXPORT/TABLE/TABLE
IMPDP> Processing object type TABLE_EXPORT/TABLE/TABLE_DATA
IMPDP> . . imported "ANUJ"."ANUJ"                5.484 KB   1 rows
IMPDP> Processing object type TABLE_EXPORT/TABLE/STATISTICS/TABLE_STATISTICS
IMPDP> Processing object type TABLE_EXPORT/TABLE/STATISTICS/MARKER
IMPDP> Job "SYS"."TSPITR_IMP_beay_wAuC" successfully completed at Thu Dec 25 01:44:34 2014 elapsed 0
00:00:04
Import completed

Removing automatic instance
Automatic instance removed
auxiliary instance file /rman_test/NCDB/datafile/o1_mf_temp_b9qdg09_.tmp deleted
auxiliary instance file /rman_test/BEAY_PITR_NCDB/onlinelog/o1_mf_3_b9qdj28_.log deleted
auxiliary instance file /rman_test/BEAY_PITR_NCDB/onlinelog/o1_mf_2_b9qdj5d_.log deleted
auxiliary instance file /rman_test/BEAY_PITR_NCDB/onlinelog/o1_mf_1_b9qdj3_.log deleted
auxiliary instance file /rman_test/BEAY_PITR_NCDB/datafile/o1_mf_test_tbs_b9qdf9g_.dbf deleted
auxiliary instance file /rman_test/NCDB/datafile/o1_mf_sysaux_b9qdf8_.dbf deleted
auxiliary instance file /rman_test/NCDB/datafile/o1_mf_undotbs1_b9qdfryn_.dbf deleted
auxiliary instance file /rman_test/NCDB/datafile/o1_mf_system_b9qdfry1_.dbf deleted
auxiliary instance file /rman_test/NCDB/controlfile/o1_mf_b9qdfkng_.ctl deleted
auxiliary instance file tspritr_beay_27203.dmp deleted

```

→ Exporting table after recovering database

Finished recover at 25-DEC-14