**Restoring a ASM backup to non-ASM and restoring from RAC to single-instance**

Scenario:

1) We want to restore the production database which is running on two-node RAC environment in a test non-RAC environment

2) We want to restore the backup residing on ASM disk groups in a non-ASM file system.

Note:

The production database orcl has two instances named orcl1 and orcl2. The database will be restored in the test environment as single instance database named orcl.

The production database database files and FRA are located on the ASM disk +DATA and the file system location on the target server where the files will be restored will be /u01/app/oracle/oradata/orcl. The FRA will be the file system location /u01/app/oracle/flash\_recovery\_area

The database files will be OMF in this case. By using a different SET NEWNAME command we can if we prefer not restore the files as OMF. For easier manageability I would prefer not to use OMF but in this example OMF is shown.

These are the backupset pieces of the database, control file and archivelog backups which are located on the source server in the ASM disk group +DATA.

+DATA/orcl/backupset/2013\_02\_18/nnndf0\_tag20130218t093350\_0.345.807701631

+DATA/orcl/backupset/2013\_02\_18/ncnnf0\_tag20130218t093811\_0.337.807701893

+DATA/orcl/backupset/2013\_02\_18/annnf0\_tag20130218t093927\_0.325.807701967

On the source server we create a directory on the local file system where we will copy these files out from the ASM disk group. We can also NFS mount a remote file system which has adequate disk space in case the backup pieces are large in size and we do not have adequate space on the local file system.

Since it is 11gR2 Grid Infrastructure, we connect as the grid user who owns the GI software and use the asmcmd cp command to copy files from ASM to file system.

[oracle@kens-racnode1 backup]$ su - grid

Password:

[grid@kens-racnode1 ~]$ . oraenv

ORACLE\_SID = [grid] ? +ASM1

The Oracle base has been set to /u01/app/grid

grid@kens-racnode1 ~]$ asmcmd

ASMCMD> cd DATA

ASMCMD> cd ORCL

ASMCMD> cd BACKUPSET

ASMCMD> ls

2013\_02\_18/

ASMCMD> cd \*

ASMCMD> cp nnndf0\_tag20130218t093350\_0.345.807701631 /u02/app/backup

copying +DATA/ORCL/BACKUPSET/2013\_02\_18/nnndf0\_tag20130218t093350\_0.345.807701631 -> /u02/app/backup/nnndf0\_tag20130218t093350\_0.345.807701631

ASMCMD> cp ncnnf0\_tag20130218t093811\_0.337.807701893 /u02/app/backup

copying +DATA/ORCL/BACKUPSET/2013\_02\_18/ncnnf0\_tag20130218t093811\_0.337.807701893 -> /u02/app/backup/ncnnf0\_tag20130218t093811\_0.337.807701893

ASMCMD> cp annnf0\_tag20130218t093927\_0.325.807701967 /u02/app/backup

copying +DATA/ORCL/BACKUPSET/2013\_02\_18/annnf0\_tag20130218t093927\_0.325.807701967 -> /u02/app/backup/annnf0\_tag20130218t093927\_0.325.807701967

Now scp these files from the file system on the source server to a file system on the target server

Copy the password file and init.ora of one of the RAC instances from the source server to target server and make the required changes as we will bring up the database on the target server as a non-RAC single instance database

For example, this is how the init.ora for the single instance database orcl would look like

orcl.\_\_db\_cache\_size=603979776

orcl.\_\_java\_pool\_size=50331648

orcl.\_\_large\_pool\_size=16777216

orcl.\_\_oracle\_base='/u01/app/oracle'#ORACLE\_BASE set from environment

orcl.\_\_pga\_aggregate\_target=603979776

orcl.\_\_sga\_target=1157627904

orcl.\_\_shared\_io\_pool\_size=0

orcl.\_\_shared\_pool\_size=469762048

orcl.\_\_streams\_pool\_size=0

\*.audit\_file\_dest='/u01/app/oracle/admin/orcl/adump'

\*.audit\_trail='DB'

\*.compatible='11.2.0.0.0'

\*.control\_files='/u01/app/oracle/oradata/orcl/control01.ctl','/u01/app/oracle/oradata/orcl/control02.ctl'

\*.db\_block\_size=8192

\*.db\_file\_name\_convert='+DATA/orcl/onlinelog/','/u01/app/oracle/oradata/orcl/'

\*.db\_create\_online\_log\_dest\_1=’ /u01/app/oracle/oradata/'

\*.db\_domain='mydb.domain'

\*.db\_name='orcl'

\*.db\_recovery\_file\_dest='/u01/app/oracle/flash\_recovery\_area'

\*.db\_recovery\_file\_dest\_size=4G

\*.diagnostic\_dest='/u01/app/oracle'

\*.log\_archive\_format='%t\_%s\_%r.dbf'

\*.memory\_target=1761607680

\*.open\_cursors=300

\*.processes=150

\*.remote\_login\_passwordfile='EXCLUSIVE'

orcl.undo\_tablespace='UNDOTBS1'

On the target server, set the environment and start the database in NOMOUNT mode.

SQL> startup nomount;

ORACLE instance started.

Total System Global Area 1753731072 bytes

Fixed Size 2229144 bytes

Variable Size 1140853864 bytes

Database Buffers 603979776 bytes

Redo Buffers 6668288 bytes

Restore the control file

RMAN> restore controlfile from '/u01/app/oracle/backup/ncnnf0\_tag20130218t093811\_0.337.807701893';

Starting restore at 19-FEB-13

using target database control file instead of recovery catalog

allocated channel: ORA\_DISK\_1

channel ORA\_DISK\_1: SID=134 device type=DISK

channel ORA\_DISK\_1: restoring control file

channel ORA\_DISK\_1: restore complete, elapsed time: 00:00:01

output file name=/u01/app/oracle/oradata/orcl/control01.ctl

output file name=/u01/app/oracle/oradata/orcl/control02.ctl

Finished restore at 19-FEB-13

Mount the database and catalog the RMAN backup pieces

RMAN> alter database mount;

database mounted

released channel: ORA\_DISK\_1

RMAN> catalog start with '/u01/app/oracle/backup/';

searching for all files that match the pattern /u01/app/oracle/backup/

List of Files Unknown to the Database

=====================================

File Name: /u01/app/oracle/backup/ncnnf0\_tag20130218t093811\_0.337.807701893

File Name: /u01/app/oracle/backup/nnndf0\_tag20130218t093350\_0.345.807701631

File Name: /u01/app/oracle/backup/annnf0\_tag20130218t093927\_0.325.807701967

Do you really want to catalog the above files (enter YES or NO)? YES

cataloging files...

cataloging done

List of Cataloged Files

=======================

File Name: /u01/app/oracle/backup/ncnnf0\_tag20130218t093811\_0.337.807701893

File Name: /u01/app/oracle/backup/nnndf0\_tag20130218t093350\_0.345.807701631

File Name: /u01/app/oracle/backup/annnf0\_tag20130218t093927\_0.325.807701967

This is the RMAN script we will be using :

run {

SET NEWNAME FOR DATABASE TO '/u01/app/oracle/oradata/orcl/%b';

SET NEWNAME FOR tempfile 1 TO '/u01/app/oracle/oradata/orcl/%b';

restore database;

switch datafile all;

switch tempfile all;

}

Execute the same

RMAN> run {

SET NEWNAME FOR DATABASE TO '/u01/app/oracle/oradata/orcl/%b';

SET NEWNAME FOR tempfile 1 TO '/u01/app/oracle/oradata/orcl/%b';

restore database;

switch datafile all;

switch tempfile all;

}

2> 3> 4> 5> 6> 7>

executing command: SET NEWNAME

executing command: SET NEWNAME

Starting restore at 21-FEB-13

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting datafile backup set restore

channel ORA\_DISK\_1: specifying datafile(s) to restore from backup set

channel ORA\_DISK\_1: restoring datafile 00001 to /u01/app/oracle/oradata/orcl/system.260.787036171

channel ORA\_DISK\_1: restoring datafile 00002 to /u01/app/oracle/oradata/orcl/sysaux.261.787036171

channel ORA\_DISK\_1: restoring datafile 00003 to /u01/app/oracle/oradata/orcl/undotbs1.273.787036171

channel ORA\_DISK\_1: restoring datafile 00004 to /u01/app/oracle/oradata/orcl/users.266.787036173

channel ORA\_DISK\_1: restoring datafile 00005 to /u01/app/oracle/oradata/orcl/example.262.787036303

channel ORA\_DISK\_1: restoring datafile 00006 to /u01/app/oracle/oradata/orcl/undotbs2.268.787036459

channel ORA\_DISK\_1: restoring datafile 00007 to /u01/app/oracle/oradata/orcl/ggs\_data.327.798611507

channel ORA\_DISK\_1: reading from backup piece /u01/app/oracle/backup/nnndf0\_tag20130218t093350\_0.345.807701631

channel ORA\_DISK\_1: piece handle=/u01/app/oracle/backup/nnndf0\_tag20130218t093350\_0.345.807701631 tag=TAG20130218T093350

channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:00:45

Finished restore at 21-FEB-13

datafile 1 switched to datafile copy

input datafile copy RECID=9 STAMP=807958250 file name=/u01/app/oracle/oradata/orcl/system.260.787036171

datafile 2 switched to datafile copy

input datafile copy RECID=10 STAMP=807958250 file name=/u01/app/oracle/oradata/orcl/sysaux.261.787036171

datafile 3 switched to datafile copy

input datafile copy RECID=11 STAMP=807958250 file name=/u01/app/oracle/oradata/orcl/undotbs1.273.787036171

datafile 4 switched to datafile copy

input datafile copy RECID=12 STAMP=807958250 file name=/u01/app/oracle/oradata/orcl/users.266.787036173

datafile 5 switched to datafile copy

input datafile copy RECID=13 STAMP=807958250 file name=/u01/app/oracle/oradata/orcl/example.262.787036303

datafile 6 switched to datafile copy

input datafile copy RECID=14 STAMP=807958250 file name=/u01/app/oracle/oradata/orcl/undotbs2.268.787036459

datafile 7 switched to datafile copy

input datafile copy RECID=15 STAMP=807958250 file name=/u01/app/oracle/oradata/orcl/ggs\_data.327.798611507

renamed tempfile 1 to /u01/app/oracle/oradata/orcl/temp.263.787036293 in control file

We now need to perform a recovery of the database

This is the script we will use.

Note how we arrive at the sequence number 145

run {

set until sequence 145 thread 1;

recover database;

}

We need to identify the archive log sequence number which we will use in the SET UNTIL command. RMAN will perform recovery of the database until the log sequence number that we need to determine.

Run the RMAN command LIST BACKUP OF ARCHIVELOG.

Note the last or latest archive log backup for each thread (since this backup was taken from a RAC database).

Then among the two archive log sequence numbers, identify the one which has the lower NEXT\_SCN number.

That will be the archive log sequence that we need to make a note of.

Remember, we need to add 1 to this number which is then used in the SET UNTIL SEQUENCE clause of the RMAN RECOVER command.

For example, we see that for thread 1, the most recent archive log backup available belongs to log sequence number 144 while for thread 2 the most recent archive log backup available belongs to log sequence number 139 .

Comparing, the NEXT\_SCN value for both those sequence numbers, we can see that for sequence 144 , the NEXT\_SCN value is lower (736746 compared with 736760).

Thrd Seq Low SCN Low Time Next SCN Next Time

1 144 736706 28-MAR-12 736746 28-MAR-12

....

.....

2 139 736740 28-MAR-12 736760 28-MAR-12

RMAN> run {

set until sequence 145 thread 1;

recover database;

}

2> 3> 4>

executing command: SET until clause

Starting recover at 21-FEB-13

using channel ORA\_DISK\_1

starting media recovery

channel ORA\_DISK\_1: starting archived log restore to default destination

channel ORA\_DISK\_1: restoring archived log

archived log thread=1 sequence=144

channel ORA\_DISK\_1: restoring archived log

archived log thread=2 sequence=139

channel ORA\_DISK\_1: reading from backup piece /u01/app/oracle/backup/annnf0\_tag20130218t093927\_0.325.807701967

channel ORA\_DISK\_1: piece handle=/u01/app/oracle/backup/annnf0\_tag20130218t093927\_0.325.807701967 tag=TAG20130218T093927

channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:00:03

archived log file name=/u01/app/oracle/flash\_recovery\_area/ORCL/archivelog/2013\_02\_21/o1\_mf\_1\_144\_8lbwbp3o\_.arc thread=1 sequence=144

archived log file name=/u01/app/oracle/flash\_recovery\_area/ORCL/archivelog/2013\_02\_21/o1\_mf\_2\_139\_8lbwbp4o\_.arc thread=2 sequence=139

channel default: deleting archived log(s)

archived log file name=/u01/app/oracle/flash\_recovery\_area/ORCL/archivelog/2013\_02\_21/o1\_mf\_1\_144\_8lbwbp3o\_.arc RECID=270 STAMP=807958744

channel default: deleting archived log(s)

archived log file name=/u01/app/oracle/flash\_recovery\_area/ORCL/archivelog/2013\_02\_21/o1\_mf\_2\_139\_8lbwbp4o\_.arc RECID=269 STAMP=807958742

media recovery complete, elapsed time: 00:00:00

channel ORA\_DISK\_1: starting archived log restore to default destination

channel ORA\_DISK\_1: restoring archived log

archived log thread=2 sequence=140

channel ORA\_DISK\_1: restoring archived log

archived log thread=2 sequence=141

channel ORA\_DISK\_1: restoring archived log

archived log thread=2 sequence=142

channel ORA\_DISK\_1: restoring archived log

archived log thread=2 sequence=143

channel ORA\_DISK\_1: reading from backup piece /u01/app/oracle/backup/annnf0\_tag20130219t103153\_0.295.807791515

channel ORA\_DISK\_1: piece handle=/u01/app/oracle/backup/annnf0\_tag20130219t103153\_0.295.807791515 tag=TAG20130219T103153

channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:00:07

channel default: deleting archived log(s)

archived log file name=/u01/app/oracle/flash\_recovery\_area/ORCL/archivelog/2013\_02\_21/o1\_mf\_2\_140\_8lbwbt41\_.arc RECID=273 STAMP=807958750

channel default: deleting archived log(s)

archived log file name=/u01/app/oracle/flash\_recovery\_area/ORCL/archivelog/2013\_02\_21/o1\_mf\_2\_141\_8lbwbt1b\_.arc RECID=274 STAMP=807958750

channel default: deleting archived log(s)

archived log file name=/u01/app/oracle/flash\_recovery\_area/ORCL/archivelog/2013\_02\_21/o1\_mf\_2\_142\_8lbwbt66\_.arc RECID=272 STAMP=807958747

channel default: deleting archived log(s)

archived log file name=/u01/app/oracle/flash\_recovery\_area/ORCL/archivelog/2013\_02\_21/o1\_mf\_2\_143\_8lbwbvnc\_.arc RECID=271 STAMP=807958747

Finished recover at 21-FEB-13

Open the database with RESETLOGS option

RMAN> sql 'alter database open resetlogs';

sql statement: alter database open resetlogs

Note the location of the online redo log files. We can drop and recreate the online redo log file groups if we wnat to rename them from the OMF format in which they are currently present.

SQL> select member from v$logfile;

MEMBER

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

/u01/app/oracle/oradata/ORCL/onlinelog/o1\_mf\_2\_8lbwd9kq\_.log

/u01/app/oracle/oradata/ORCL/onlinelog/o1\_mf\_3\_8lbwdb5n\_.log

/u01/app/oracle/oradata/ORCL/onlinelog/o1\_mf\_1\_8lbwd8v5\_.log

/u01/app/oracle/oradata/ORCL/onlinelog/o1\_mf\_4\_8lbwdbqr\_.log