RMAN BACKUP AND RECOVERY PRACTICE WITH RAC AND ASM

Feb 1st,2007
Alejandro Vargas

Practice Objectives:

Build skills to perform backup and recovery using rman on a RAC environment, with ASM.

Practice Description:

Create a Backup of the ASM based Database using Rman backup as copy feature, use as Backup Destination a regular File System.
Simulate crash by deleting critical datafiles from ASM.
Perform recovery until time from the Rman backup, restoring the missing file into ASM.

Timeline	Action
01-02-07 15:23:22	***Check the configuration parameters of Rman.*** ***Connect to Rman without catalog. Controlfile is used to store Rman metadata:*** ***You need to set the environment before invoking Rman:*** ORACLE_BASE=/oradisk/app01/oracle ORACLE_HOME=/oradisk/app01/oracle/product/10gDB ORACLE_SID=racdbtst1 {oracle} /home/oracle [vmractest1.partnergsm.co.il] > rman target / nocatalog Recovery Manager: Release 10.2.0.1.0 - Production on Sun Feb 4 11:01:14 2007 Copyright (c) 1982, 2005, Oracle. All rights reserved. connected to target database: RACDBTST (DBID=519338572) using target database control file instead of recovery catalog RMAN> show all;

	RMAN configuration parameters are: CONFIGURE RETENTION POLICY TO REDUNDANCY 1; # default 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 '/vmasmtest/BACKUP/rman_backups/%F'; CONFIGURE DEVICE TYPE DISK PARALLELISM 2 BACKUP TYPE TO BACKUPSET; CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default CONFIGURE CHANNEL 1 DEVICE TYPE DISK CONNECT 'SYS/oracle@racdbtst1'; CONFIGURE CHANNEL 2 DEVICE TYPE DISK CONNECT 'SYS/oracle@racdbtst1'; CONFIGURE MAXSETSIZE TO UNLIMITED; CONFIGURE ENCRYPTION FOR DATABASE OFF; # default CONFIGURE ENCRYPTION ALGORITHM 'AES128'; # default CONFIGURE ARCHIVELOG DELETION POLICY TO NONE; # default CONFIGURE SNAPSHOT CONTROLFILE NAME TO '/oradisk/app01/oracle/product/10gDB/dbs/snapcf_racdbtst1.f'; # default ***Note: In this case we did set all channels to instance 1, because we are using a local file system to backup, ie: /vmasmtest/BACKUP/rman_backups. Because all files that need to be backed up are based on shared disks this is fine.*** ***Also, when using controlfile instead of a catalog database setting up CONTROLFILE AUTOBACKUP ON will backup the controlfile and spfile automatically with every backup or structural change to the database.***
01-02-07 15:46	***Check the archive log status and destination:*** SQL> archive log list Database log mode Archive Mode Automatic archival Enabled

	Archive destination +ARCHDG/racdbtst/archived_logs/ Oldest online log sequence 0 Next log sequence to archive 1 Current log sequence 1 ***Check existing tablespaces and datafiles:*** SQL> select tablespace_name,file_name from dba_data_files; TABLESPACE FILE_NAME ---------- -- SYSTEM +DATADG/racdbtst/datafile/system.259.606653665 UNDOTBS1 +DATADG/racdbtst/datafile/undotbs1.260.606653693 SYSAUX +DATADG/racdbtst/datafile/sysaux.261.60665369 UNDOTBS2 +DATADG/racdbtst/datafile/undotbs2.263.606653713 USERS +DATADG/racdbtst/datafile/users.264.606653719
01-02-07 15:49	***Create a test tablespace and a test table to be used to check Restore and Recover:*** SQL> create tablespace recop1; Tablespace created. SQL> create table restable1 tablespace recop1 as select sysdate timestamp from dual; Table created.
01-02-07 15:50	***Check tablespaces and datafiles, note that all of them are located on ASM's DATADG disk group:*** SQL> select tablespace_name,file_name from dba_data_files TABLESPACE FILE_NAME ---------- -- SYSTEM +DATADG/racdbtst/datafile/system.259.606653665 UNDOTBS1 +DATADG/racdbtst/datafile/undotbs1.260.606653693 SYSAUX +DATADG/racdbtst/datafile/sysaux.261.606653697

	UNDOTBS2 +DATADG/racdbtst/datafile/undotbs2.263.606653713 USERS +DATADG/racdbtst/datafile/users.264.606653719 RECOP1 +DATADG/racdbtst/datafile/recop1.273.613410453
01-02-07 15:52	***Check the timestamp we inserted on the test table, we will recover until this time later:*** SQL> SQL> select * from restable1; TIMESTAMP ---------- 01-02-07 15:49:06
01-02-07 15:58	***Execute backup using script rman_backup_as_copy_to_FS.*** This script does: 1) clean up the catalog (crosscheck / delete obsolete) 2) archive log current on both instances 3) backup database as copy to File System 4) archive log current on both instances 5) backup as copy archived logs 6) log actual backups See the Backup Log. The Backup generated the following files: ***Controlfile and spfile backup:*** c-519338572-20070201-0c 15728640 ***Datafiles:*** data_D-RACDBTST_I-519338572_TS-SYSTEM_FNO-1_69i8vq2f 513810432

	data_D-RACDBTST_I-519338572_TS-SYSAUX_FNO-3_68i8vq2f 702554112 data_D-RACDBTST_I-519338572_TS-UNDOTBS1_FNO-2_6ai8vq4h 209723392 data_D-RACDBTST_I-519338572_TS-UNDOTBS2_FNO-4_6bi8vq4i 209723392 data_D-RACDBTST_I-519338572_TS-USERS_FNO-5_6di8vq5h 53747712 data_D-RACDBTST_I-519338572_TS-RECOP1_FNO-6_6ci8vq5c 104865792 ***Controlfile and spfile backup:*** cf_D-RACDBTST_id-519338572_6ei8vq5p 15646720 c-519338572-20070201-0d 15728640 ***Archived log backups:*** RACDBTST_AL_20070201_6gi8vq80_s208_p1 1962496 RACDBTST_AL_20070201_6hi8vq80_s209_p1 7846912 RACDBTST_AL_20070201_6ji8vq8c_s211_p1 191488 RACDBTST_AL_20070201_6ii8vq8c_s210_p1 1001984 RACDBTST_AL_20070201_6li8vq8h_s213_p1 83456 RACDBTST_AL_20070201_6ki8vq8h_s212_p1 96768 RACDBTST_AL_20070201_6ni8vq8j_s215_p1 11264 RACDBTST_AL_20070201_6mi8vq8j_s214_p1 18432 RACDBTST_AL_20070201_6pi8vq8m_s217_p1 7680 RACDBTST_AL_20070201_6oi8vq8m_s216_p1 9216 RACDBTST_AL_20070201_6ri8vq8o_s219_p1 2560 RACDBTST_AL_20070201_6qi8vq8n_s218_p1 3072 RACDBTST_AL_20070201_6ti8vq8q_s221_p1 1536 RACDBTST_AL_20070201_6si8vq8p_s220_p1 1536 *Controlfile and spfile backup:* c-519338572-20070201-0e 15728640 ***Rman Backups list:*** backupset_info.log 3738

	Backup log: /tmp/rman_backup.err
01-02-07 16:14	***Insert some other records into the test table:*** Insert into the test table new rows,check its content: SQL> insert into restable1 select sysdate from dual; 1 row created. SQL> / 1 row created. SQL> / 1 row created. SQL> / 1 row created. SQL> commit; Commit complete. SQL> select * from restable1; TIMESTAMP ---------- 01-02-07 15:49:06 01-02-07 16:14:24 01-02-07 16:14:27 01-02-07 16:14:28 01-02-07 16:14:28 SQL> alter system archive log current; System altered.
01-02-07 16:19	***Simulate a crash by manually deleting some datafiles:*** Execute on both instances: SQL> select instance_name from v$instance;

```
INSTANCE_NAME
----------------
Racdbtst1
SQL> shutdown abort
ORACLE instance shut down.
SQL> select instance_name from v$instance;
INSTANCE_NAME
----------------
racdbtst2
SQL> shutdown abort
ORACLE instance shut down.
```

Inside ASM some files accidentally deleted!!!:

```
{oracle} /vmasmtest/BACKUP/rman_backups [vmractest1.partnergsm.co.il] > 10asm
{oracle} /vmasmtest/BACKUP/rman_backups [vmractest1.partnergsm.co.il] > sts +ASM1
{oracle} /vmasmtest/BACKUP/rman_backups [vmractest1.partnergsm.co.il] > asmcmd
ASMCMD> cd datadg/racdbtst/datafile
ASMCMD> ls
RECOP1.273.613410453
SYSAUX.261.606653697
SYSTEM.259.606653665
UNDOTBS1.260.606653693
UNDOTBS2.263.606653713
USERS.264.606653719
ASMCMD> rm USERS.264.606653719      <<<<< Note, only possible because the
ASMCMD> rm RECOP1.273.613410453     <<<<< Database is down!!!
ASMCMD> ls
SYSAUX.261.606653697
SYSTEM.259.606653665
UNDOTBS1.260.606653693
UNDOTBS2.263.606653713
```

	{oracle} /vmasmtest/BACKUP/rman_backups [vmractest1.partnergsm.co.il] > 10db {oracle} /vmasmtest/BACKUP/rman_backups [vmractest1.partnergsm.co.il] > sts racdbtst1 {oracle} /vmasmtest/BACKUP/rman_backups [vmractest1.partnergsm.co.il] > sqlplus SQL*Plus: Release 10.2.0.1.0 - Production on Thu Feb 1 16:29:24 2007 Copyright (c) 1982, 2005, Oracle. All rights reserved. Enter user-name: / as sysdba Connected to an idle instance. SQL> startup ORACLE instance started. Total System Global Area 285212672 bytes Fixed Size 1218992 bytes Variable Size 96470608 bytes Database Buffers 184549376 bytes Redo Buffers 2973696 bytes Database mounted. ORA-01157: cannot identify/lock data file 5 - see DBWR trace file ORA-01110: data file 5: '+DATADG/racdbtst/datafile/users.264.606653719' --- ***NOTE:*** Drop tablespace from inside the database **is not recoverable with Rman**; Rman will also deleted the backup copy of any deleted tablespace!!!!
01-02-07 16:15	***Execute recover until time using the existing backup:*** ***Set the database to work as single instance to perform the recovery and stop it:*** SQL> show parameters cluster_database NAME TYPE VALUE ------------------------------------ ----------- ------------------------------ cluster_database boolean TRUE cluster_database_instances integer 2 SQL> alter system set cluster_database=false scope=spfile sid='*';

	System altered. SQL> shutdown abort ORACLE instance shut down. ***Check the backup files and take note of the Database ID (highlighted):*** {oracle} /vmasmtest/BACKUP/rman_backups [vmractest1.partnergsm.co.il] > ls backupset_info.log RACDBTST_AL_20070201_6ii8vq8c_s210_p1 c-519338572-20070201-0c RACDBTST_AL_20070201_6ji8vq8c_s211_p1 c-519338572-20070201-0d RACDBTST_AL_20070201_6ki8vq8h_s212_p1 c-519338572-20070201-0e RACDBTST_AL_20070201_6li8vq8h_s213_p1 cf_D-RACDBTST_id-519338572_6ei8vq5p RACDBTST_AL_20070201_6mi8vq8j_s214_p1 chkrecov.sql RACDBTST_AL_20070201_6ni8vq8j_s215_p1 data_D-RACDBTST_I-519338572_TS-RECOP1_FNO-6_6ci8vq5c RACDBTST_AL_20070201_6oi8vq8m_s216_p1 data_D-RACDBTST_I-519338572_TS-SYSAUX_FNO-3_68i8vq2f RACDBTST_AL_20070201_6pi8vq8m_s217_p1 data_D-RACDBTST_I-519338572_TS-SYSTEM_FNO-1_69i8vq2f RACDBTST_AL_20070201_6qi8vq8n_s218_p1 data_D-RACDBTST_I-519338572_TS-UNDOTBS1_FNO-2_6ai8vq4h RACDBTST_AL_20070201_6ri8vq8o_s219_p1 data_D-RACDBTST_I-519338572_TS-UNDOTBS2_FNO-4_6bi8vq4i RACDBTST_AL_20070201_6si8vq8p_s220_p1 data_D-RACDBTST_I-519338572_TS-USERS_FNO-5_6di8vq5h RACDBTST_AL_20070201_6ti8vq8q_s221_p1 RACDBTST_AL_20070201_6gi8vq80_s208_p1 setnls.sql RACDBTST_AL_20070201_6hi8vq80_s209_p1 {oracle} /vmasmtest/BACKUP/rman_backups [vmractest1.partnergsm.co.il] > rman target / nocatalog Recovery Manager: Release 10.2.0.1.0 - Production on Thu Feb 1 16:34:20 2007 Copyright (c) 1982, 2005, Oracle. All rights reserved. connected to target database (not started) RMAN> set dbid=519338572

executing command: SET DBID
RMAN> startup nomount;
Oracle instance started
Total System Global Area 285212672 bytes
Fixed Size 1218992 bytes
Variable Size 96470608 bytes
Database Buffers 184549376 bytes
Redo Buffers 2973696 bytes

1) we do restore the controlfile from a time previous to the crash:

RMAN> restore controlfile from '/vmasmtest/BACKUP/rman_backups/cf_D-RACDBTST_id-519338572_6ei8vq5p';
Starting restore at 01/02/2007 16:36:03
allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=153 devtype=DISK
channel ORA_DISK_1: copied control file copy
output filename=+DATADG/racdbtst/controlfile/current.256.606653653
Finished restore at 01/02/2007 16:36:20

2) we mount the database:

RMAN> mount database;
database mounted
released channel: ORA_DISK_1

3) we set until which time we want to recover, using the 'set until time' clause, the we do restore and recover, in this example the three commands are passed to Rman within a single block:

RMAN> run { set until time="to_date('01-FEB-07 16:14:28','DD-MON-YY HH24:MI:SS')";
2> restore database;
3> recover database; }

```
executing command: SET until clause
Starting restore at 01/02/2007 16:40:26
allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=148 devtype=DISK
allocated channel: ORA_DISK_2
channel ORA_DISK_2: sid=153 devtype=DISK
creating datafile fno=6 name=+DATADG/racdbtst/datafile/recop1.273.613410453
channel ORA_DISK_1: restoring datafile 00001
input datafile copy recid=94 stamp=613410953
filename=/vmasmtest/BACKUP/rman_backups/data_D-RACDBTST_I-519338572_TS-SYSTEM_FNO-
1_69i8vq2f
destination for restore of datafile 00001:
+DATADG/racdbtst/datafile/system.259.606653665
channel ORA_DISK_2: restoring datafile 00002
input datafile copy recid=96 stamp=613410987
filename=/vmasmtest/BACKUP/rman_backups/data_D-RACDBTST_I-519338572_TS-
UNDOTBS1_FNO-2_6ai8vq4h
destination for restore of datafile 00002:
+DATADG/racdbtst/datafile/undotbs1.260.606653693
channel ORA_DISK_2: copied datafile copy of datafile 00002
output filename=+DATADG/racdbtst/datafile/undotbs1.260.606653693 recid=99
stamp=613413691
channel ORA_DISK_2: restoring datafile 00003
input datafile copy recid=95 stamp=613410960
filename=/vmasmtest/BACKUP/rman_backups/data_D-RACDBTST_I-519338572_TS-SYSAUX_FNO-
3_68i8vq2f
destination for restore of datafile 00003:
+DATADG/racdbtst/datafile/sysaux.261.606653697
channel ORA_DISK_1: copied datafile copy of datafile 00001
output filename=+DATADG/racdbtst/datafile/system.259.606653665 recid=100
stamp=613413726
channel ORA_DISK_1: restoring datafile 00004
```

	input datafile copy recid=97 stamp=613410989 filename=/vmasmtest/BACKUP/rman_backups/data_D-RACDBTST_I-519338572_TS- UNDOTBS2_FNO-4_6bi8vq4i destination for restore of datafile 00004: +DATADG/racdbtst/datafile/undotbs2.263.606653713 channel ORA_DISK_1: copied datafile copy of datafile 00004 output filename=+DATADG/racdbtst/datafile/undotbs2.263.606653713 recid=101 stamp=613413763 channel ORA_DISK_1: restoring datafile 00005 input datafile copy recid=98 stamp=613411000 filename=/vmasmtest/BACKUP/rman_backups/data_D-RACDBTST_I-519338572_TS-USERS_FNO- 5_6di8vq5h destination for restore of datafile 00005: +DATADG/racdbtst/datafile/users.264.606653719 channel ORA_DISK_2: copied datafile copy of datafile 00003 output filename=+DATADG/racdbtst/datafile/sysaux.261.606653697 recid=102 stamp=613413785 channel ORA_DISK_1: copied datafile copy of datafile 00005 output filename=+DATADG/racdbtst/datafile/users.264.613413795 recid=103 stamp=613413803 Finished restore at 01/02/2007 16:43:30 Starting recover at 01/02/2007 16:43:34 using channel ORA_DISK_1 using channel ORA_DISK_2 starting media recovery archive log thread 1 sequence 1 is already on disk as file +ARCHDG/racdbtst/archived_logs/1_1_613407184.dbf archive log thread 1 sequence 2 is already on disk as file +ARCHDG/racdbtst/archived_logs/1_2_613407184.dbf archive log thread 2 sequence 1 is already on disk as file +ARCHDG/racdbtst/archived_logs/2_1_613407184.dbf archive log thread 2 sequence 2 is already on disk as file +ARCHDG/racdbtst/archived_logs/2_2_613407184.dbf

	archive log thread 2 sequence 6 is already on disk as file +DATADG/racdbtst/onlinelog/group_4.266.606657351 archive log thread 2 sequence 7 is already on disk as file +DATADG/racdbtst/onlinelog/group_3.265.606657349 archive log filename=+ARCHDG/racdbtst/archived_logs/1_1_613407184.dbf thread=1 sequence=1 archive log filename=+ARCHDG/racdbtst/archived_logs/2_1_613407184.dbf thread=2 sequence=1 archive log filename=+ARCHDG/racdbtst/archived_logs/1_2_613407184.dbf thread=1 sequence=2 archive log filename=+ARCHDG/racdbtst/archived_logs/2_2_613407184.dbf thread=2 sequence=2 archive log filename=+ARCHDG/racdbtst/archived_logs/2_3_613407184.dbf thread=2 sequence=3 archive log filename=+ARCHDG/racdbtst/archived_logs/1_3_613407184.dbf thread=1 sequence=3 archive log filename=+ARCHDG/racdbtst/archived_logs/1_4_613407184.dbf thread=1 sequence=4 archive log filename=+ARCHDG/racdbtst/archived_logs/2_4_613407184.dbf thread=2 sequence=4 archive log filename=+ARCHDG/racdbtst/archived_logs/1_5_613407184.dbf thread=1 sequence=5 archive log filename=+ARCHDG/racdbtst/archived_logs/2_5_613407184.dbf thread=2 sequence=5 archive log filename=+ARCHDG/racdbtst/archived_logs/1_6_613407184.dbf thread=1 sequence=6 archive log filename=+DATADG/racdbtst/onlinelog/group_4.266.606657351 thread=2 sequence=6 media recovery complete, elapsed time: 00:00:09 Finished recover at 01/02/2007 16:44:16 ***4) Once recover finish we open using restlogs option:***

	RMAN> alter database open RESETLOGS; database opened RMAN> exit Recovery Manager complete.
01-02-07 16:49	***Finally we need to restablish Cluster Mode and open both instances.*** ***1)Mount instance 1 and set cluster_database=true :*** SQL> show parameters cluster_database NAME TYPE VALUE ------------------------------------ ----------- ------------------------------ cluster_database boolean FALSE cluster_database_instances integer 2 SQL> alter system set cluster_database=true scope=spfile sid='*'; System altered. SQL> shutdown immediate ORACLE instance shut down. ***2) Restart the database in cluster Mode:*** srvctl start database -d racdbtst srvctl start service -d racdbtst crs_stat –t {oracle} /home/oracle [vmractest1.partnergsm.co.il] > chkcrs HA Resource Target State ----------- ------ ----- ora.racdbtst.db ONLINE ONLINE on vmractest1 ora.racdbtst.racdbtst1.inst ONLINE ONLINE on vmractest1 ora.racdbtst.racdbtst2.inst ONLINE ONLINE on vmractest2 ora.racdbtst.ractest1.cs ONLINE ONLINE on vmractest2 ora.racdbtst.ractest1.racdbtst1.srv ONLINE ONLINE on vmractest1

	ora.racdbtst.ractest1.racdbtst2.srv	ONLINE	ONLINE on vmractest2
	ora.racdbtst.ractest2.cs	ONLINE	ONLINE on vmractest1
	ora.racdbtst.ractest2.racdbtst1.srv	ONLINE	ONLINE on vmractest1
	ora.racdbtst.ractest3.cs	ONLINE	ONLINE on vmractest2
	ora.racdbtst.ractest3.racdbtst2.srv	ONLINE	ONLINE on vmractest2
	ora.vmractest1.ASM1.asm	ONLINE	ONLINE on vmractest1
	ora.vmractest1.LISTENER_VMRACTEST1.lsnr	ONLINE	ONLINE on vmractest1
	ora.vmractest1.gsd	ONLINE	ONLINE on vmractest1
	ora.vmractest1.ons	ONLINE	ONLINE on vmractest1
	ora.vmractest1.vip	ONLINE	ONLINE on vmractest1
	ora.vmractest2.ASM2.asm	ONLINE	ONLINE on vmractest2
	ora.vmractest2.LISTENER_VMRACTEST2.lsnr	ONLINE	ONLINE on vmractest2
	ora.vmractest2.gsd	ONLINE	ONLINE on vmractest2
	ora.vmractest2.ons	ONLINE	ONLINE on vmractest2
	ora.vmractest2.vip	ONLINE	ONLINE on vmractest2
	3) Check restore point on test table:		
	SQL> select * from restable1; TIMESTAMP ---------- 01-02-07 15:49:06		

Rman Administration and Backup Script:

```
------- Script start on next line -----------
#!/bin/csh -x
# rman_backup_as_copy_to_FS
# ----------------------------
# 29-01-07 Alejandro Vargas
# ----------------------------
# This script make a backup copy to file system
# This backup can be restored on File system as a regular hot backup
# Or can be restored to ASM by using rman
# ------------------------------------------------------------------------------
# This script does:
# 1) Administrative tasks:
#    crosscheck
#    delete obsolete
# 2) Archive log current on 1st Instance
# 3) Archive log current on 2nd Instance
# 4) Rman backup as copy to file system including controlfile and archivelogs
# 5) Archive log current on 1st Instance
# 6) Archive log current on 2nd Instance
# 7) Rman backup as copy archivelogs not backed up and print backupset list to log
# ------------------------------------------------------------------------------
# This script works with 2 nodes only, if you have more than 2 nodes you need to customize it.
#
# This script use aliases and Environment variables set on .cshrc
# to setup the environment to point to the Database:
# setenv DBS_HOME /u01/app01/oracle/product/10gDB
# setenv BASE_PATH
/usr/kerberos/sbin:/usr/kerberos/bin:/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin:/usr/X11R6/bin:/ro
ot/bin
```

```
# alias 10db  'setenv $ORACLE_HOME $DBS_HOME; setenv PATH $ORACLE_HOME/bin:$BASE_PATH'

# This script do require as parameters the 2 instance names
# It will use them to archive all required logs from instances 1 and 2
# ------------------------------------------------------------------

set v_inst1=racdbtst1
set v_inst2=racdbtst2

# Rman Backup Location variable
# -----------------------------
set v_rman_loc=/vmasmtest/BACKUP/rman_backups

# Step 1: Administrative tasks, crosscheck and delete obsolete
# ------------------------------------------------------------

10db
setenv ORACLE_SID $v_inst1

rman target / nocatalog <<EOF
crosscheck backupset;
crosscheck copy;
crosscheck archivelog all;
delete noprompt expired backup ;
delete noprompt obsolete;
exit
EOF


# This script run from 1st node. We use an external identified DBA user, ops$oracle, to execute
# the archive log current. From the same session we connect as ops$oracle into the 2nd instance
# You need remote_os_authent=TRUE on both instances to connect remotely without password
```

```
# Step 2: Archive log current on 1st Instance
# Step 3: Archive log current on 2nd Instance
# ----------------------------------------

sqlplus -s /@$v_inst1 << EOF
select instance_name from v\$instance
/
alter system archive log current
/
connect /@$v_inst2;
select instance_name from v\$instance
/
alter system archive log current
/
exit
EOF

# On step 4 we use 4 channels. This needs to be customized according the number of cpu's/IO
# channels available. Rman is invoked in nocatalog mode, we need to have configured
# ORACLE_HOME, ORACLE_SID and PATH on the environment, as we did in the previous steps.

# Step 4: Rman backup as copy to file system including controlfile and archivelogs
# ------------------------------------------------------------------------------

rman target / nocatalog <<EOF
run {
allocate channel backup_disk1 type disk format '$v_rman_loc/%U';
allocate channel backup_disk2 type disk format '$v_rman_loc/%U';
backup as COPY tag '%TAG' database include current controlfile;
release channel backup_disk1;
release channel backup_disk2;
}
exit
```

```
EOF

# Step 5 and 6: Archive log current on 1st and 2nd Instances
# ----------------------------------------------------------
sqlplus -s /@$v_inst1 << EOF
select instance_name from v\$instance
/
alter system archive log current
/
connect /@$v_inst2;
select instance_name from v\$instance
/
alter system archive log current
/
exit
EOF

# Step 7: Rman backup as copy archivelogs not backed up and print backupset list to log

rman target / nocatalog <<EOF
backup as copy archivelog all format '$v_rman_loc/%d_AL_%T_%u_s%s_p%p'  ;
list backupset;
exit
EOF

# Redirecting rman output to log will suppress standard output, because of that
# running separately.

rman target / nocatalog log=$v_rman_loc/backupset_info.log <<EOF
list backup summary;
list backupset;
list backup of controlfile;
exit
```

```
EOF

# eof rman_backup_as_copy_to_FS
------- Script finish on previous line -----------
```

Rman Backup Log :

```
set v_inst1=racdbtst1
set v_inst2=racdbtst2
set v_rman_loc=/vmasmtest/BACKUP/rman_backups
setenv ORACLE_HOME /oradisk/app01/oracle/product/10gDB
setenv PATH
/oradisk/app01/oracle/product/10gDB/bin:/oradisk/app01/oracle/scripts/general:/usr/kerberos/sbin:/usr/ker
beros/bin:/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin:/usr/X11R6/bin:/root/bin:/oradisk/
app01/oracle/scripts:/usr/local/maint/oracle:/crmdb/app01/oracle/product/db_scripts/RAC:/crmdb/app01/orac
le/product/db_scripts
setenv ORACLE_SID racdbtst1
rman target / nocatalog
Recovery Manager: Release 10.2.0.1.0 - Production on Thu Feb 1 15:54:02 2007
Copyright (c) 1982, 2005, Oracle. All rights reserved.
connected to target database: RACDBTST (DBID=519338572)
using target database control file instead of recovery catalog
RMAN>
allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=131 instance=racdbtst1 devtype=DISK
allocated channel: ORA_DISK_2
channel ORA_DISK_2: sid=128 instance=racdbtst1 devtype=DISK
crosschecked backup piece: found to be 'AVAILABLE'
backup piece handle=/vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0a recid=25 stamp=613408516
crosschecked backup piece: found to be 'AVAILABLE'
backup piece handle=/vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0b recid=26 stamp=613408543
crosschecked backup piece: found to be 'AVAILABLE'
backup piece handle=/vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0c recid=27 stamp=613410462
Crosschecked 3 objects
RMAN>
released channel: ORA_DISK_1
```

```
released channel: ORA_DISK_2
allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=131 instance=racdbtst1 devtype=DISK
allocated channel: ORA_DISK_2
channel ORA_DISK_2: sid=128 instance=racdbtst1 devtype=DISK
validation succeeded for archived log
archive log filename=+ARCHDG/racdbtst/archived_logs/1_11_613393411.dbf recid=196 stamp=613407185
validation succeeded for archived log
archive log filename=+ARCHDG/racdbtst/archived_logs/1_12_613393411.dbf recid=197 stamp=613407186
validation succeeded for archived log
archive log filename=+ARCHDG/racdbtst/archived_logs/2_10_613393411.dbf recid=199 stamp=613407187
validation succeeded for archived log
archive log filename=+ARCHDG/racdbtst/archived_logs/2_11_613393411.dbf recid=198 stamp=613407186
Crosschecked 4 objects
RMAN>
released channel: ORA_DISK_1
released channel: ORA_DISK_2
allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=131 instance=racdbtst1 devtype=DISK
allocated channel: ORA_DISK_2
channel ORA_DISK_2: sid=128 instance=racdbtst1 devtype=DISK
validation succeeded for archived log
archive log filename=+ARCHDG/racdbtst/archived_logs/1_11_613393411.dbf recid=196 stamp=613407185
validation succeeded for archived log
archive log filename=+ARCHDG/racdbtst/archived_logs/1_12_613393411.dbf recid=197 stamp=613407186
validation succeeded for archived log
archive log filename=+ARCHDG/racdbtst/archived_logs/2_10_613393411.dbf recid=199 stamp=613407187
validation succeeded for archived log
archive log filename=+ARCHDG/racdbtst/archived_logs/2_11_613393411.dbf recid=198 stamp=613407186
Crosschecked 4 objects
RMAN>
using channel ORA_DISK_1
using channel ORA_DISK_2
```

```
RMAN>
RMAN retention policy will be applied to the command
RMAN retention policy is set to redundancy 1
using channel ORA_DISK_1
using channel ORA_DISK_2
Deleting the following obsolete backups and copies:
Type Key Completion Time Filename/Handle
-------------------- ------ ------------------ --------------------
Backup Set 25 01/02/2007 15:15:17
Backup Piece 25 01/02/2007 15:15:17 /vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0a
Backup Set 26 01/02/2007 15:15:44
Backup Piece 26 01/02/2007 15:15:44 /vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0b
deleted backup piece
backup piece handle=/vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0a recid=25 stamp=613408516
deleted backup piece
backup piece handle=/vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0b recid=26 stamp=613408543
Deleted 2 objects
RMAN>
Recovery Manager complete.
sqlplus -s /@racdbtst1
INSTANCE_NAME
----------------
racdbtst1
System altered.
INSTANCE_NAME
----------------
racdbtst2
System altered.
rman target / nocatalog
Recovery Manager: Release 10.2.0.1.0 - Production on Thu Feb 1 15:54:45 2007
Copyright (c) 1982, 2005, Oracle. All rights reserved.
connected to target database: RACDBTST (DBID=519338572)
using target database control file instead of recovery catalog
```

```
RMAN> 2> 3> 4> 5> 6> 7>
allocated channel: backup_disk1
channel backup_disk1: sid=147 instance=racdbtst1 devtype=DISK
allocated channel: backup_disk2
channel backup_disk2: sid=144 instance=racdbtst1 devtype=DISK
Starting backup at 01/02/2007 15:54:54
channel backup_disk1: starting datafile copy
input datafile fno=00003 name=+DATADG/racdbtst/datafile/sysaux.261.606653697
channel backup_disk2: starting datafile copy
input datafile fno=00001 name=+DATADG/racdbtst/datafile/system.259.606653665
output filename=/vmasmtest/BACKUP/rman_backups/data_D-RACDBTST_I-519338572_TS-SYSAUX_FNO-3_68i8vq2f
tag=%TAG recid=95 stamp=613410960
channel backup_disk1: datafile copy complete, elapsed time: 00:01:06
channel backup_disk1: starting datafile copy
input datafile fno=00002 name=+DATADG/racdbtst/datafile/undotbs1.260.606653693
output filename=/vmasmtest/BACKUP/rman_backups/data_D-RACDBTST_I-519338572_TS-SYSTEM_FNO-1_69i8vq2f
tag=%TAG recid=94 stamp=613410953
channel backup_disk2: datafile copy complete, elapsed time: 00:01:06
channel backup_disk2: starting datafile copy
input datafile fno=00004 name=+DATADG/racdbtst/datafile/undotbs2.263.606653713
output filename=/vmasmtest/BACKUP/rman_backups/data_D-RACDBTST_I-519338572_TS-UNDOTBS1_FNO-2_6ai8vq4h
tag=%TAG recid=96 stamp=613410987
channel backup_disk1: datafile copy complete, elapsed time: 00:00:26
channel backup_disk1: starting datafile copy
input datafile fno=00006 name=+DATADG/racdbtst/datafile/recop1.273.613410453
output filename=/vmasmtest/BACKUP/rman_backups/data_D-RACDBTST_I-519338572_TS-UNDOTBS2_FNO-4_6bi8vq4i
tag=%TAG recid=97 stamp=613410989
channel backup_disk2: datafile copy complete, elapsed time: 00:00:31
channel backup_disk2: starting datafile copy
input datafile fno=00005 name=+DATADG/racdbtst/datafile/users.264.606653719
output filename=/vmasmtest/BACKUP/rman_backups/data_D-RACDBTST_I-519338572_TS-USERS_FNO-5_6di8vq5h
tag=%TAG recid=98 stamp=613411000
channel backup_disk2: datafile copy complete, elapsed time: 00:00:08
```

```
channel backup_disk2: starting datafile copy
copying current control file
output filename=/vmasmtest/BACKUP/rman_backups/data_D-RACDBTST_I-519338572_TS-RECOP1_FNO-6_6ci8vq5c
tag=%TAG recid=99 stamp=613411003
channel backup_disk1: datafile copy complete, elapsed time: 00:00:17
output filename=/vmasmtest/BACKUP/rman_backups/cf_D-RACDBTST_id-519338572_6ei8vq5p tag=%TAG recid=100
stamp=613411005
channel backup_disk2: datafile copy complete, elapsed time: 00:00:05
Finished backup at 01/02/2007 15:56:46
Starting Control File and SPFILE Autobackup at 01/02/2007 15:56:47
piece handle=/vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0d comment=NONE
Finished Control File and SPFILE Autobackup at 01/02/2007 15:56:55
released channel: backup_disk1
released channel: backup_disk2
RMAN>
Recovery Manager complete.
sqlplus -s /@racdbtst1
INSTANCE_NAME
----------------
racdbtst1
System altered.
INSTANCE_NAME
----------------
racdbtst2
System altered.
rman target / nocatalog
Recovery Manager: Release 10.2.0.1.0 - Production on Thu Feb 1 15:57:23 2007
Copyright (c) 1982, 2005, Oracle. All rights reserved.
connected to target database: RACDBTST (DBID=519338572)
using target database control file instead of recovery catalog
RMAN>
Starting backup at 01/02/2007 15:57:33
current log archived
```

```
allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=131 instance=racdbtst1 devtype=DISK
allocated channel: ORA_DISK_2
channel ORA_DISK_2: sid=123 instance=racdbtst1 devtype=DISK
channel ORA_DISK_1: starting archive copy
input archive log thread=1 sequence=1 recid=200 stamp=613410876
channel ORA_DISK_2: starting archive copy
input archive log thread=2 sequence=1 recid=201 stamp=613410878
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6hi8vq80_s209_p1 recid=211
stamp=613411075
channel ORA_DISK_1: archivelog copy complete, elapsed time: 00:00:06
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6gi8vq80_s208_p1 recid=210
stamp=613411075
channel ORA_DISK_2: archivelog copy complete, elapsed time: 00:00:12
channel ORA_DISK_1: starting archive copy
input archive log thread=1 sequence=12 recid=197 stamp=613407186
channel ORA_DISK_2: starting archive copy
input archive log thread=2 sequence=11 recid=198 stamp=613407186
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6ii8vq8c_s210_p1 recid=213
stamp=613411087
channel ORA_DISK_1: archivelog copy complete, elapsed time: 00:00:05
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6ji8vq8c_s211_p1 recid=212
stamp=613411087
channel ORA_DISK_2: archivelog copy complete, elapsed time: 00:00:05
channel ORA_DISK_1: starting archive copy
input archive log thread=2 sequence=3 recid=204 stamp=613410922
channel ORA_DISK_2: starting archive copy
input archive log thread=1 sequence=3 recid=205 stamp=613411030
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6ki8vq8h_s212_p1 recid=214
stamp=613411090
channel ORA_DISK_1: archivelog copy complete, elapsed time: 00:00:01
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6li8vq8h_s213_p1 recid=215
stamp=613411090
```

```
channel ORA_DISK_2: archivelog copy complete, elapsed time: 00:00:02
channel ORA_DISK_1: starting archive copy
input archive log thread=1 sequence=2 recid=202 stamp=613410884
channel ORA_DISK_2: starting archive copy
input archive log thread=2 sequence=10 recid=199 stamp=613407187
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6mi8vq8j_s214_p1 recid=217
stamp=613411093
channel ORA_DISK_1: archivelog copy complete, elapsed time: 00:00:02
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6ni8vq8j_s215_p1 recid=216
stamp=613411093
channel ORA_DISK_2: archivelog copy complete, elapsed time: 00:00:03
channel ORA_DISK_1: starting archive copy
input archive log thread=2 sequence=4 recid=207 stamp=613410936
channel ORA_DISK_2: starting archive copy
input archive log thread=1 sequence=5 recid=209 stamp=613411063
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6oi8vq8m_s216_p1 recid=219
stamp=613411095
channel ORA_DISK_1: archivelog copy complete, elapsed time: 00:00:01
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6pi8vq8m_s217_p1 recid=218
stamp=613411095
channel ORA_DISK_2: archivelog copy complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting archive copy
input archive log thread=2 sequence=2 recid=203 stamp=613410778
channel ORA_DISK_2: starting archive copy
input archive log thread=1 sequence=4 recid=206 stamp=613411042
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6qi8vq8n_s218_p1 recid=221
stamp=613411097
channel ORA_DISK_1: archivelog copy complete, elapsed time: 00:00:02
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6ri8vq8o_s219_p1 recid=220
stamp=613411096
channel ORA_DISK_2: archivelog copy complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting archive copy
input archive log thread=1 sequence=11 recid=196 stamp=613407185
```

```
channel ORA_DISK_2: starting archive copy
input archive log thread=2 sequence=5 recid=208 stamp=613410951
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6ti8vq8q_s221_p1 recid=222
stamp=613411099
channel ORA_DISK_2: archivelog copy complete, elapsed time: 00:00:01
output filename=/vmasmtest/BACKUP/rman_backups/RACDBTST_AL_20070201_6si8vq8p_s220_p1 recid=223
stamp=613411099
channel ORA_DISK_1: archivelog copy complete, elapsed time: 00:00:03
Finished backup at 01/02/2007 15:58:20
Starting Control File and SPFILE Autobackup at 01/02/2007 15:58:21
piece handle=/vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0e comment=NONE
Finished Control File and SPFILE Autobackup at 01/02/2007 15:58:30
RMAN>
List of Backup Sets
===================
BS Key Type LV Size Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ -------------------
27 Full 14.98M DISK 00:00:03 01/02/2007 15:47:42
BP Key: 27 Status: AVAILABLE Compressed: NO Tag: TAG20070201T154739
Piece Name: /vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0c
Control File Included: Ckp SCN: 18263608 Ckp time: 01/02/2007 15:47:39
SPFILE Included: Modification time: 01/02/2007 15:08:10
BS Key Type LV Size Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ -------------------
28 Full 14.98M DISK 00:00:06 01/02/2007 15:56:53
BP Key: 28 Status: AVAILABLE Compressed: NO Tag: TAG20070201T155647
Piece Name: /vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0d
Control File Included: Ckp SCN: 18265214 Ckp time: 01/02/2007 15:56:47
SPFILE Included: Modification time: 01/02/2007 15:08:10
BS Key Type LV Size Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ -------------------
29 Full 14.98M DISK 00:00:06 01/02/2007 15:58:27
BP Key: 29 Status: AVAILABLE Compressed: NO Tag: TAG20070201T155821
```

```
Piece Name: /vmasmtest/BACKUP/rman_backups/c-519338572-20070201-0e
Control File Included: Ckp SCN: 18265591 Ckp time: 01/02/2007 15:58:21
SPFILE Included: Modification time: 01/02/2007 15:08:10
RMAN>
Recovery Manager complete.
rman target / nocatalog log=/vmasmtest/BACKUP/rman_backups/backupset_info.log
RMAN> RMAN> RMAN> RMAN>
```