**RMAN : Block-Level Media Recovery - Concept & Example (Doc ID 144911.1)**

**Applies to:**

Oracle Database - Enterprise Edition - Version 9.0.1.0 and later  
 Information in this document applies to any platform.  
 \*\*Checked for relevance on 26-Mar-2012\*\*\*

**Purpose**

Explanation and examples of RMAN Block-level Media Recovery

**Scope**

For Analysts and customers wanting to understand the concept and use  
 of Block Level Recovery with RMAN

**Details**

**Block-Level Media Recovery  
 -----------------------------  
  
Restriction:  
  
  The data file header block (block 1) cannot be recovered.  
  
 #  
  
 Block-level Media Recovery is most useful in situations where only a  
 small subset of blocks in a datafile need media recovery. Before Oracle9i if  
 a single block required recovery the DBA would need to restore the complete  
 datafile and apply all redo changes. Recovery time is reduced as only blocks  
 needing recovery need to be restored from backup and only the required set of  
 corrupt blocks undergo redo application.  
  
 Data blocks undergoing media recovery are inaccessible to queries or DML because  
 they are media corrupt, but the datafile itself remains online. This is a  
 significant availability improvement over file-level recovery, where the entire  
 datafile is offline for the duration of the recovery. Blocks undergoing recovery  
 are not visible to users until the recovery process is complete.  
  
 Recovery Manager Interface  
 RMAN will support BMR via the new BLOCKRECOVER command:**

BLOCKRECOVER bmr\_block\_specifier\_list bmr\_option\_list;  
 bmr\_block\_specifier\_list: bmr\_block\_specifier |  
 bmr\_block\_specifier\_list bmr\_block\_specifier  
 bmr\_block\_specifier: DATAFILE datafile\_specifier BLOCK block\_list |  
 TABLESPACE tablespace\_specifier DBA dba\_list  
 CORRUPTION LIST  
 datafile\_specifier: text\_string | integer  
 block\_list: integer |  
 block\_list , integer  
 tablespace\_specifier: text\_string  
 dba\_list: integer |  
 dba\_list , integer  
 bmr\_option\_list: bmr\_option |  
 bmr\_option\_list | bmr\_option  
 bmr\_option: from backupset |  
 from datafilecopy |  
 from tag text\_string |  
 restore until time\_clause |  
 nofileupdate |  
 save final blocks |  
 save all blocks  
 time\_clause: TIME date\_string |  
 SCN integer |  
 LOGSEQ integer THREAD integer

This command will identify the backups from which to obtain the blocks to  
 recover. If the user has never used RMAN before with this database, and their  
 only existing backups are image copies taken with v7 methods, they should use  
 the catalog datafilecopy command to identify those files to RMAN prior to using  
 the blockrecover command.. The catalog archivelog command may also be required  
 to specify restored archives. In some cases it may be necessary for the  
 customer to first configure the catalog if they are not using RMAN at all.

% rman target /  
 RMAN> catalog datafilecopy '<name>';  
       catalog archivelog '<name>';

See also :

[Note 342972.1](https://support.oracle.com/epmos/faces/DocumentDisplay?parent=DOCUMENT&sourceId=144911.1&id=342972.1) HOW TO PERFORM BLOCK MEDIA RECOVERY (BMR) WHEN BACKUPS ARE NOT TAKEN BY RMAN

If the user has backups or archivelogs that need to be restored from tape,  
 they should allocate the required channel(s) before the blockrecover command.  
 Archivelog restores for BMR can be run in parallel on multiple channels, but  
 datafile/backupset scans and the recovery session must all run in the same  
 server session.  
  
 To allow selection of which backup will be used to select the desired blocks,  
 the blockrecover command supports options used in the restore command:  
  
 FROM BACKUPSET -- restore blocks from backupsets only  
 FROM DATAFILECOPY -- restore blocks from datafile copies only  
 FROM TAG -- restore blocks from tagged backup  
 RESTORE UNTIL TIME|SCN|LOGSEQ -- limit search to backups made at or before this time.  
  
 Starting from 9.0.1, a new view, V$DATABASE\_BLOCK\_CORRUPTION, will reflect the  
 blocks that were found to be corrupted since the last RMAN backup.  
  
 Examples:  
  
 How to identify blocks needing recovery:

SQL> select \* from mine;  
 select \* from mine  
 \*  
 ERROR at line 1:  
 ORA-01578: ORACLE data block corrupted (file # 5, block # 114)  
 ORA-01110: data file 5: '/u02/oradata/DB1/users01.dbf'

Or use RMAN to populate the V$DATABASE\_BLOCK\_CORRUPTION view.

RMAN> run {BACKUP VALIDATE DATABASE;}  
  
 Starting backup at 09-MAY-01  
 using channel ORA\_DISK\_1  
 using channel ORA\_DISK\_2  
 channel ORA\_DISK\_1: starting full datafile backupset  
 channel ORA\_DISK\_1: specifying datafile(s) in backupset  
 input datafile fno=00002 name=/u02/oradata/DB1/undotbs01.dbf  
 input datafile fno=00003 name=/u02/oradata/DB1/indx01.dbf  
 input datafile fno=00005 name=/u02/oradata/DB1/users01.dbf  
 input datafile fno=00008 name=/u02/oradata/DB1/repcat01.dbf  
 input datafile fno=00004 name=/u02/oradata/DB1/tools01.dbf  
 channel ORA\_DISK\_2: starting full datafile backupset  
 channel ORA\_DISK\_2: specifying datafile(s) in backupset  
 including current controlfile in backupset  
 input datafile fno=00001 name=/u02/oradata/DB1/system01.dbf  
 input datafile fno=00006 name=/u02/oradata/DB1/joanes/joanes\_1.dbf  
 input datafile fno=00007 name=/u02/oradata/DB1/joanes/joanes\_test\_1.dbf  
 channel ORA\_DISK\_1: backup set complete, elapsed time: 00:01:28  
 channel ORA\_DISK\_2: backup set complete, elapsed time: 00:01:54  
 Finished backup at 09-MAY-01

Result:

SQL> select \* from V$backup\_corruption;  
  
 RECID STAMP SET\_STAMP SET\_COUNT PIECE# FILE# BLOCK#  
 ---------- ---------- ---------- ---------- ---------- ---------- ----------  
 BLOCKS CORRUPTION\_CHANGE# MAR  
 ---------- ------------------ ---  
 1 429201733 429201725 8 1 5 114  
 1 0 YES

Perform Block Level Recovery by either explicitly identifying the file and block to be recovered or use the corruption list - v$backup\_corruption  
  
 Recovery using Explicit File/Block:

$ rman catalog rman/rman@DB2 target / log=rman1.log  
 RMAN> run {blockrecover datafile 5 block 114;}  
 RMAN> exit  
 Recovery Manager: Release 9.0.0.0.0 - Beta  
 (c) Copyright 2000 Oracle Corporation. All rights reserved.  
  
 connected to target database: DB1 (DBID=1021434286)  
 connected to recovery catalog database  
  
 RMAN>  
 Starting blockrecover at 08-MAY-01  
 allocated channel: ORA\_DISK\_1  
 channel ORA\_DISK\_1: sid=8 devtype=DISK  
 allocated channel: ORA\_DISK\_2  
 channel ORA\_DISK\_2: sid=7 devtype=DISK  
 channel ORA\_DISK\_1: restoring block(s)  
 channel ORA\_DISK\_1: specifying block(s) to restore from backup set  
 restoring blocks of datafile 00005  
 channel ORA\_DISK\_1: restored block(s) from backup piece 1  
 piece handle=/u02/oradata/DB1/joanes/04cp9jk9\_1\_1 tag=null params=NULL  
 channel ORA\_DISK\_1: block restore complete  
 channel ORA\_DISK\_1: block restore complete  
  
 starting media recovery  
 media recovery complete  
  
 Finished blockrecover at 08-MAY-01

Alternatively, you can use Data Recovery Advisor (DRA):

**RMAN> list failure;  
 List of Database Failures  
 =========================  
  
 Failure ID Priority Status    Time Detected Summary  
 ---------- -------- --------- ------------- -------  
 441        HIGH     OPEN      20-SEP-13     Datafile 4: '/u01/V112\_oradata/users01.dbf' contains one or more corrupt blocks  
  
 RMAN> advise failure;  
 List of Database Failures  
 =========================  
  
 Failure ID Priority Status    Time Detected Summary  
 ---------- -------- --------- ------------- -------  
 441        HIGH     OPEN      20-SEP-13     Datafile 4: '/u01/V112\_oradata/users01.dbf' contains one or more corrupt blocks  
  
 analyzing automatic repair options; this may take some time  
 using channel ORA\_DISK\_1  
 analyzing automatic repair options complete  
  
 Mandatory Manual Actions  
 ========================  
 no manual actions available  
  
 Optional Manual Actions  
 =======================  
 no manual actions available  
  
 Automated Repair Options  
 ========================  
 Option Repair Description  
 ------ ------------------  
 1      Perform block media recovery of block 520 in file 4    
   Strategy: The repair includes complete media recovery with no data loss  
   Repair script: /u02/app/oracle/diag/rdbms/v112/V112/hm/reco\_4024241654.hm  
  
RMAN> repair failure preview;  
 Strategy: The repair includes complete media recovery with no data loss  
 Repair script: /u02/app/oracle/diag/rdbms/v112/V112/hm/reco\_4024241654.hm  
  
 contents of repair script:  
    # block media recovery  
    recover datafile 4 block 520;  
  
RMAN> repair failure noprompt;  
 Strategy: The repair includes complete media recovery with no data loss  
 Repair script: /u02/app/oracle/diag/rdbms/v112/V112/hm/reco\_4024241654.hm  
  
 contents of repair script:  
    # block media recovery  
    recover datafile 4 block 520;  
  
 executing repair script  
  
 Starting recover at 20-SEP-13  
 using channel ORA\_DISK\_1  
  
 channel ORA\_DISK\_1: restoring block(s)  
 channel ORA\_DISK\_1: specifying block(s) to restore from backup set  
 restoring blocks of datafile 00004  
 channel ORA\_DISK\_1: reading from backup piece /u01/temp/flash\_areas/V112/V112/backupset/2013\_09\_20/o1\_mf\_nnndf\_TAG20130920T092224\_93rm0khr\_.bkp  
 channel ORA\_DISK\_1: piece handle=/u01/temp/flash\_areas/V112/V112/backupset/2013\_09\_20/o1\_mf\_nnndf\_TAG20130920T092224\_93rm0khr\_.bkp tag=TAG20130920T092224  
 channel ORA\_DISK\_1: restored block(s) from backup piece 1  
 channel ORA\_DISK\_1: block restore complete, elapsed time: 00:00:01  
  
 starting media recovery  
  
 archived log for thread 1 with sequence 187 is already on disk as file /u01/temp/flash\_areas/V112/V112/archivelog/2013\_09\_20/o1\_mf\_1\_187\_93rmnqwg\_.arc  
 archived log for thread 1 with sequence 188 is already on disk as file /u01/temp/flash\_areas/V112/V112/archivelog/2013\_09\_20/o1\_mf\_1\_188\_93rmq47g\_.arc  
 archived log for thread 1 with sequence 189 is already on disk as file /u01/temp/flash\_areas/V112/V112/archivelog/2013\_09\_20/o1\_mf\_1\_189\_93rn7994\_.arc  
 archived log for thread 1 with sequence 190 is already on disk as file /u01/temp/flash\_areas/V112/V112/archivelog/2013\_09\_20/o1\_mf\_1\_190\_93rnymmf\_.arc  
 media recovery complete, elapsed time: 00:00:03  
 Finished recover at 20-SEP-13  
 repair failure complete**

Recovery using Corruption list :

RMAN> run {blockrecover corruption list;}  
 Starting blockrecover at 08-MAY-01  
 using channel ORA\_DISK\_1  
 using channel ORA\_DISK\_2  
 channel ORA\_DISK\_1: restoring block(s)  
 channel ORA\_DISK\_1: specifying block(s) to restore from backup set  
 restoring blocks of datafile 00005  
 channel ORA\_DISK\_1: restored block(s) from backup piece 1  
 piece handle=/u02/oradata/DB1/joanes/08cpa69t\_1\_1 tag=null params=NULL  
 channel ORA\_DISK\_1: block restore complete  
 channel ORA\_DISK\_1: restoring block(s)  
 channel ORA\_DISK\_1: specifying block(s) to restore from backup set  
 restoring blocks of datafile 00005  
 channel ORA\_DISK\_1: restored block(s) from backup piece 1  
 piece handle=/u02/oradata/DB1/joanes/04cp9jk9\_1\_1 tag=null params=NULL  
 channel ORA\_DISK\_1: block restore complete  
  
 starting media recovery  
 media recovery complete  
  
 Finished blockrecover at 08-MAY-01

**11.2 RMAN Block recovery syntax**  
=========================  
  
In 11.2 you can use RMAN to:  
  
1) validate all database files and archived redo log files for physical and logical corruption:  
  
 BACKUP VALIDATE CHECK LOGICAL DATABASE ARCHIVELOG ALL;  
  
2) to check individual data blocks, as shown in the following example:  
  
 VALIDATE DATAFILE 4 BLOCK 10 TO 13;  
  
3) validate backup sets:  
  
 VALIDATE BACKUPSET 3;  
  
You specify backup sets by primary key, which is shown in the output of the LIST BACKUP command.  
  
  
The following RMAN command recovers the corrupted blocks:  
  
  
1) recover all corrupted blocks reported in v$database\_block\_corruption  
  
 RMAN> RECOVER CORRUPTION LIST;  
  
2) recover individual blocks, see eg:  
  
 RMAN> RECOVER DATAFILE 1 BLOCK 233, 235 DATAFILE 2 BLOCK 100 TO 200;  
  
  
  
  
**Restriction Note:**

o **The data file header block (block 1) cannot be recovered !  
  
  
 # Example showing behaviour for a Corrupt File Header Block 1  using Blockrecover  
  
  Block 1 (datafile header) is phisycally corrupt in this example with some garbage.    
  The rman block recover command does not error out but alert log is updated:  
  
  
 RMAN> blockrecover datafile 7 block 1;  
  
 Starting recover at 19-MAR-13  
 using channel ORA\_DISK\_1  
  
 starting media recovery  
 media recovery complete, elapsed time: 00:00:00  
  
 Finished recover at 19-MAR-13  
  
  
# There is no errors here but alert.log registers the problem:  
 ...  
 Corrupt block relative dba: 0x01c00001 (file 7, block 1)  
 Bad header found during kcvxfh v10  
 Data in bad block:  
  type: 99 format: 7 rdba: 0x0a747075  
  last change scn: 0x0000.00000000 seq: 0x1 flg: 0x04  
  spare1: 0x72 spare2: 0x72 spare3: 0x0  
  consistency value in tail: 0x00000b01  
  check value in block header: 0xf5c4  
  computed block checksum: 0xc4da  
 Reading datafile '/emea/bde/64bit/app/oracle/oradata/EMB11203/tc.dbf' for corruption at rdba: 0x01c00001 (file 7, block 1)  
 Reread (file 7, block 1) found same corrupt data (no logical check)  
 Tue Mar 19 13:31:46 2013  
 alter database recover datafile list clear  
 Completed: alter database recover datafile list clear**

**Documentation References:**  
  
<http://docs.oracle.com/cd/B10501_01/server.920/a96565/rcmsynta10.htm#79197>  
Oracle9i Recovery Manager Reference  
Release 2 (9.2)  
.   
 BLOCKRECOVER  
 Restrictions and Usage Notes  
 ..  
 The datafile header block (block 1) cannot be recovered.   
-----  
  
  
<http://docs.oracle.com/cd/E11882_01/backup.112/e10643/rcmsynta2001.htm#CHDCAGGA>  
Oracle® Database Backup and Recovery Reference  
11g Release 2 (11.2)  
.  
 RECOVER  
 (blockObject)   
 ..  
 DBA integer : Note: The data file header block (block 1) cannot be recovered.  
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