**[How to check for and repair block corruption with RMAN in Oracle 9i and Oracle 10g](http://sysdba.wordpress.com/2006/04/05/how-to-check-for-and-repair-block-corruption-with-rman-in-oracle-9i-and-oracle-10g/" \o "Permanent Link: How to check for and repair block corruption with RMAN in Oracle 9i and Oracle 10g)**

Problem: the application encounters an ORA-01578 runtime error because there are one or more corrupt blocks in a table it is reading.

How can corrupt blocks be caused?  
First of all we have two diffent kinds of block corruption:  
- physical corruption (media corrupt)  
- logical corruption (soft corrupt)  
Physical corruption can be caused by defected memory boards, controllers or broken sectors on a hard disk;  
Logical corrution can amoung other reasons be caused by an attempt to recover through a NOLOGGING action.  
There are two initialization parameters for dealing with block corruption:  
- DB\_BOCK\_CHECKSUM (calculates a checksum for each block before it is written to disk, every time)  
causes 1-2% performance overhead  
- DB\_BLOCK\_CHECKING (serverprocess checks block for internal consistency after every DML)  
causes 1-10% performance overhead  
If performance is not a big issue then you should use these!

Normally RMAN checks only for physically corrupt blocks  
with every backup it takes and every image copy it makes.  
This is a common misunderstanding amoung a lot of DBAs.  
RMAN doesn not automatically detect logical corruption by default!  
We have to tell it to do so by using CHECK LOGICAL!  
The info about corruptions can be found in the following views:  
  
SYS @ orcl AS SYSDBA SQL > select \* from v$backup\_corruption;  
*RECID STAMP SET\_STAMP SET\_COUNT PIECE# FILE# BLOCK#*  
*———- ———- ———- ———- ———- ———- ———-*  
*BLOCKS CORRUPTION\_CHANGE# MAR CORRUPTIO*  
*———- —————— — ———*  
*1 586945441 586945402 3 1 5 81*  
*4 0 YES CORRUPT*  
– SYS @ orcl AS SYSDBA SQL > select \* from v$copy\_corruption;

Here is a case study:

HR @ orcl SQL > select last\_name, salary  
2 from employees;  
 *ERROR at line 2:*  
*ORA-01578: ORACLE data block corrupted (file # 5, block # 83)*  
*# this could be an ORA-26040 in Oracle 8i! and before*  
*ORA-01110: data file 5: ‘/u01/app/oracle/oradata/orcl/  
example01.dbf’*  
  
This is what you find in the alert\_.log:  
*Wed Apr 5 08:17:40 2006*  
*Hex dump of (file 5, block 83) in trace file*  
*/u01/app/oracle/admin/orcl/udump/orcl\_ora\_14669.trc*  
*Corrupt block relative dba: 0×01400053 (file 5, block 83)*  
*Bad header found during buffer read*  
*Data in bad block:*  
*type: 67 format: 7 rdba: 0x0a545055*  
*last change scn: 0×0000.0006d162 seq: 0×1 flg: 0×04*  
*spare1: 0×52 spare2: 0×52 spare3: 0×0*  
*consistency value in tail: 0xd1622301*  
*check value in block header: 0x63be*  
*computed block checksum: 0xe420*  
*Reread of rdba: 0×01400053 (file 5, block 83)  
found same corrupted data*  
*Wed Apr 5 08:17:41 2006*  
*Corrupt Block Found*  
*TSN = 6, TSNAME = EXAMPLE*  
*RFN = 5, BLK = 83, RDBA = 20971603*  
*OBJN = 51857, OBJD = 51255, OBJECT = , SUBOBJECT =*  
*SEGMENT OWNER = , SEGMENT TYPE =*  
  
Starting with Oracle 9i we can use RMAN  
to check a database for both physically and logically corrupt blocks.  
Here is the syntax:  
RMAN> backup validate check logical database;  
*Starting backup at 05-04-2006:08:23:20  
allocated channel: ORA\_DISK\_1  
channel ORA\_DISK\_1: sid=136 devtype=DISK  
channel ORA\_DISK\_1: starting full datafile backupset  
channel ORA\_DISK\_1: specifying datafile(s) in backupset  
input datafile fno=00001 name=/u01/app/oracle/oradata/orcl/  
system01.dbf  
input datafile fno=00003 name=/u01/app/oracle/oradata/orcl/  
sysaux01.dbf  
input datafile fno=00005 name=/u01/app/oracle/oradata/orcl/  
example01.dbf  
input datafile fno=00002 name=/u01/app/oracle/oradata/orcl/  
undotbs01.dbf  
input datafile fno=00004 name=/u01/app/oracle/oradata/orcl/  
users01.dbf  
channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:45  
channel ORA\_DISK\_1: starting full datafile backupset  
channel ORA\_DISK\_1: specifying datafile(s) in backupset  
including current control file in backupset  
including current SPFILE in backupset  
channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:03  
channel ORA\_DISK\_1: starting full datafile backupset  
channel ORA\_DISK\_1: specifying datafile(s) in backupset  
including current control file in backupset  
including current SPFILE in backupset  
channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:03  
Finished backup at 05-04-2006:08:24:10*  
RMAN does not physically backup the database with this command  
but it reads all blocks and checks for corruptions.  
If it finds corrupted blocks it will place the information about the corruption into a view:

SYS @ orcl AS SYSDBA SQL > select \* from v$database\_block\_corruption;  
*FILE# BLOCK# BLOCKS CORRUPTION\_CHANGE# CORRUPTIO  
———- ———- ———- —————— ———  
5 81 4 0 CORRUPT*  
this is what we find in the alert\_.log:  
*Corrupt block relative dba: 0x014000b1 (file 5, block 177)*  
*Bad header found during backing up datafile*  
*Data in bad block:*  
*type: 67 format: 7 rdba: 0x0a545055*  
*last change scn: 0×0000.0007bc77 seq: 0×3 flg: 0×04*  
*spare1: 0×52 spare2: 0×52 spare3: 0×0*  
*consistency value in tail: 0xbc772003*  
*check value in block header: 0xb32*  
*computed block checksum: 0xe4c1*  
*Reread of blocknum=177, file=/u01/app/oracle/oradata/orcl/  
example01.dbf.  
found same corrupt data*  
  
Now we can tell RMAN to recover all the blocks  
which it has found as being corrupt:  
RMAN> blockrecover corruption list;  
# (all blocks from v$database\_block\_corruption)  
*Starting blockrecover at 05-04-2006:10:09:15*  
*using channel ORA\_DISK\_1*  
*channel ORA\_DISK\_1: restoring block(s) from datafile copy /u01/app/  
oracle/flash\_recovery\_area/ORCL/datafile/o1\_mf\_example\_236tmb1c\_.dbf*  
*starting media recovery*  
*archive log thread 1 sequence 2 is already on disk as file /u01/app/oracle/  
flash\_recovery\_area/ORCL/archivelog/2006\_04\_05/o1\_mf\_1\_2\_236wxbsp\_.arc*  
*archive log thread 1 sequence 1 is already on disk as file  
/u01/app/oracle/oradata/  
orcl/redo01.log*  
*media recovery complete, elapsed time: 00:00:01*  
*Finished blockrecover at 05-04-2006:10:09:24*

this is in the alert\_.log:  
*Starting block media recovery*  
*Wed Apr 5 10:09:22 2006*  
*Media Recovery Log /u01/app/oracle/flash\_recovery\_area/ORCL/  
archivelog/2006\_04\_05/o1\_mf\_1\_2\_%u\_.arc*  
*Wed Apr 5 10:09:23 2006*  
*Media Recovery Log /u01/app/oracle/flash\_recovery\_area/ORCL/  
archivelog/2006\_04\_05/o1\_mf\_1\_2\_236wxbsp\_.arc ( restored)*  
*Wed Apr 5 10:09:23 2006*  
*Recovery of Online Redo Log: Thread 1 Group 1 Seq 1 Reading mem 0*  
*Mem# 0 errs 0: /u01/app/oracle/oradata/orcl/redo01.log*  
*Wed Apr 5 10:09:23 2006*  
*Completed block media recovery*

I recommend you to check your database for corrupt blocks  
with RMAN on a regular basis, proactively.  
If you do so you RMAN finds out about block corruptions  
before your application runs into an ORA-01578 and  
before you find out that you have backed up the corrupt blocks again and again.

There have been incidents when DBAs found out  
that they did not have a backup with the un-corruted block any more,  
because you have deleted the last one with a not corrupted version.  
They could not recover the block any more!

For more detailed info about recovering corrupt blocks  
(without and with RMAN, releases 7-10g)  
pls see metalink also:  
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