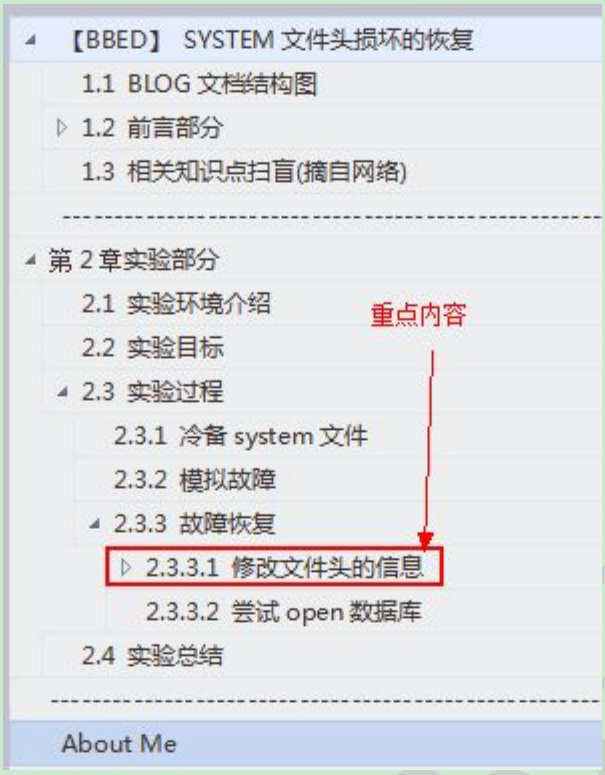
【BBED】 SYSTEM 文件头损坏的恢复

1.1 BLOG 文档结构图



- 【BBED】 SYSTEM 文件头损坏的恢复
  - 1.1 BLOG 文档结构图
  - 1.2 前言部分
  - 1.3 相关知识点扫盲(摘自网络)
  - ---
- 第 2 章实验部分
  - 2.1 实验环境介绍
  - 2.2 实验目标
  - 2.3 实验过程
    - 2.3.1 冷备 system 文件
    - 2.3.2 模拟故障
    - 2.3.3 故障恢复
      - 2.3.3.1 修改文件头的信息
      - 2.3.3.2 尝试 open 数据库
  - 2.4 实验总结
  - ---
  - About Me

1.2 前言部分

1.2.1 导读和注意事项

各位技术爱好者，看完本文后，你可以掌握如下的技能，也可以学到一些其它你所不知道的知识，~O(∩_∩)O~：

① BBED 恢复 SYSTEM 文件头

② BBED 查看文件头的信息

Tips：

① 若文章代码格式有错乱，推荐使用 QQ、搜狗或 360 浏览器，也可以下载 pdf 格式的文档来查看，pdf 文档下载地址：http://yunpan.cn/cdEQedhCs2kFz （提取码：ed9b）

② 本篇 BLOG 中命令的输出部分需要特别关注的地方我都用灰色背景和粉红色字体来表示，比如下边的例子中，thread 1 的最大归档日志号为 33，thread 2 的最大归档日志号为 43 是需要特别关注的地方；而命令一般使用黄色背景和红色字体标注；对代码或代码输出部分的注释一般采用蓝色字体表示。

```
  List of Archived Logs in backup set 11
  Thrd Seq     Low SCN    Low Time            Next SCN   Next Time
  ---- ------- ---------- ------------------- ---------- ---------
  1    32      1621589    2015-05-29 11:09:52 1625242    2015-05-29 11:15:48
  1    33      1625242    2015-05-29 11:15:48 1625293    2015-05-29 11:15:58
  2    42      1613951    2015-05-29 10:41:18 1625245    2015-05-29 11:15:49
  2    43      1625245    2015-05-29 11:15:49 1625253    2015-05-29 11:15:53



[ZFXXDB1:root]:/>lsvg -o
T_XDESK_APP1_vg
rootvg
[ZFXXDB1:root]:/>
00:27:22 SQL> alter tablespace idxtbs read write;


====》2097152*512/1024/1024/1024=1G
```

本文如有错误或不完善的地方请大家多多指正，ITPUB 留言或 QQ 皆可，您的批评指正是我写作的最大动力。

1.2.2 相关参考文章链接

【推荐】 【BBED】 sys.bootstrap$ 对象的恢复：http://blog.itpub.net/26736162/viewspace-2083621/

【推荐】 【BBED】丢失归档文件情况下的恢复：http://blog.itpub.net/26736162/viewspace-2079337/

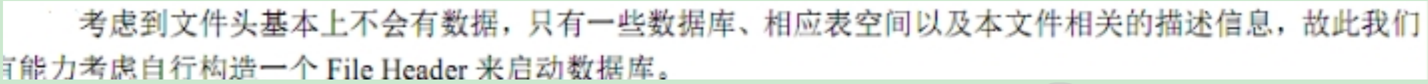
【推荐】 【BBED】编译及基本命令(1)：http://blog.itpub.net/26736162/viewspace-2075216/

1.2.3 本文简介

本文的实验过程主要是为了学习 BBED，大家学完做完这 1 篇还有之前的 3 篇 blog，那么 BBED 基本算是入门了，

恭喜。

1.3 相关知识点扫盲(摘自网络)



考虑到文件头基本上不会有数据，只有一些数据库、相应表空间以及本文件相关的描述信息，故此我们有能力考虑自行构造一个 File Header 来启动数据库。

第 2 章　实验部分

2.1 实验环境介绍

项目	db
db 类型	单实例
db version	11.2.0.4.0
db 存储	FS
主机 IP 地址/hosts 配置	192.168.59.129
OS 版本及 kernel 版本	AIX 7.1 64 位
归档模式	Archive Mode
ORACLE_SID	oralhr

2.2 实验目标

破坏 SYSTEM 的文件头，然后利用 SYSAUX 文件的文件头来恢复 SYSTEM 文件头。

2.3 实验过程

2.3.1 冷备 system 文件

```
[ZHLHRDB2:oracle]:/oracle>sqlplus / as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Thu Apr 14 16:10:07 2016

Copyright (c) 1982, 2013, Oracle.  All rights reserved.


Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.4.0 - 64bit Production
With the Partitioning, Real Application Clusters, OLAP, Data Mining
and Real Application Testing options

SYS@oralhr> shutdown immediate
Database closed.
Database dismounted.
ORACLE instance shut down.
SYS@oralhr> exit
Disconnected from Oracle Database 11g Enterprise Edition Release 11.2.0.4.0 - 64bit Production
With the Partitioning, Real Application Clusters, OLAP, Data Mining
and Real Application Testing options
[ZHLHRDB2:oracle]:/oracle>cp /oracle/app/oracle/datafile/oralhr/system01.dbf 
/oracle/app/oracle/datafile/oralhr/system01.dbf_bk
[ZHLHRDB2:oracle]:/oracle>
[ZHLHRDB2:oracle]:/oracle>sqlplus / as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Thu Apr 14 16:34:04 2016

Copyright (c) 1982, 2013, Oracle.  All rights reserved.

Connected to an idle instance.

SYS@oralhr> startup
ORACLE instance started.

Total System Global Area 3089920000 bytes
Fixed Size                  2250360 bytes
Variable Size             721422728 bytes
Database Buffers         2348810240 bytes
Redo Buffers               17436672 bytes
Database mounted.
Database opened.
SYS@oralhr>
SYS@oralhr> set line 9999 pagesize 9999
SYS@oralhr> col name format a80
SYS@oralhr> select file#||' '||name||' '||bytes name from v$datafile;

NAME
--------------------------------------------------------------------------------
1 /oracle/app/oracle/datafile/oralhr/system01.dbf 786432000
```

```
2 /oracle/app/oracle/datafile/oralhr/sysaux01.dbf 576716800
3 /oracle/app/oracle/datafile/oralhr/undotbs01.dbf 78643200
4 /oracle/app/oracle/datafile/oralhr/users01.dbf 310640640

SYS@oralhr>
```

2.3.2　　模拟故障

```
[ZHLHRDB2:oracle]:/home/oracle>l
total 208
-rwxrwxrwx    1 oracle   dba              57 Apr 05 17:01 bbed.par
-rwxrwxrwx    1 oracle   dba           52224 Apr 14 15:55 bifile.bbd
-rwxrwxrwx    1 oracle   asmadmin       5715 Apr 06 15:34 ctl.sql
-rwxrwxrwx    1 oracle   dba             302 Apr 14 10:32 file.txt
drwxrwxrwx    8 oracle   dba            4096 Apr 13 17:16 gdul
-rwxrwxrwx    1 oracle   dba           21008 Apr 14 16:35 log.bbd
drwxrwxrwx    4 oracle   dba             256 Apr 12 15:52 oracle_bk
drwxrwxrwx    4 oracle   dba             256 Apr 05 16:54 rman_bak
-rwxrwxrwx    1 oracle   dba             757 Apr 11 10:02 rman_bk_db_archive_lhr.sh
-rwxrwxrwx    1 oracle   dba            1023 Apr 08 11:25 rman_bk_db_lhr.sh
[ZHLHRDB2:oracle]:/home/oracle>cat file.txt
1 /oracle/app/oracle/datafile/oralhr/system01.dbf 786432000
2 /oracle/app/oracle/datafile/oralhr/sysaux01.dbf 566231040
3 /oracle/app/oracle/datafile/oralhr/undotbs01.dbf 78643200
4 /oracle/app/oracle/datafile/oralhr/users01.dbf 310640640
5 /oracle/app/oracle/datafile/oralhr/system01.dbf_bk 786432000
[ZHLHRDB2:oracle]:/home/oracle>bbed PASSWORD=blockedit  mode=edit blocksize=8192 
listfile=/home/oracle/file.txt

BBED: Release 2.0.0.0.0 - Limited Production on Thu Apr 14 16:36:00 2016

Copyright (c) 1982, 2011, Oracle and/or its affiliates.  All rights reserved.

************* !!! For Oracle Internal Use only !!! ***************

BBED> info
 File#  Name                                                        Size(blks)
 -----  ----                                                        ----------
     1  /oracle/app/oracle/datafile/oralhr/system01.dbf                  96000
     2  /oracle/app/oracle/datafile/oralhr/sysaux01.dbf                  69120
     3  /oracle/app/oracle/datafile/oralhr/undotbs01.dbf                  9600
     4  /oracle/app/oracle/datafile/oralhr/users01.dbf                   37920
     5  /oracle/app/oracle/datafile/oralhr/system01.dbf_bk               96000
BBED> help copy
COPY [ DBA | FILE | FILENAME | BLOCK ] TO [ DBA | FILE | FILENAME | BLOCK ]

BBED> set count 128
        COUNT           128

BBED> copy file 1 block 111 to  file 1 block 1
Warning: contents of previous BIFILE will be lost. Proceed? (Y/N) Y
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 377              Offsets:    0 to  127            Dba:0x00400179
------------------------------------------------------------------------
 1ea20000 0040006f 000000e2 00000104 fa4c0000 00000001 03450080 00000000
 00000000 0000f800 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

 <32 bytes per line>

BBED> sum apply
Check value for File 1, Block 380:
current = 0xfa4c, required = 0xfa4c

BBED>
BBED>
```

重启数据库：

```
SYS@oralhr> startup force
ORACLE instance started.

Total System Global Area 3089920000 bytes
Fixed Size                  2250360 bytes
Variable Size             721422728 bytes
Database Buffers         2348810240 bytes
Redo Buffers               17436672 bytes
Database mounted.
ORA-01092: ORACLE instance terminated. Disconnection forced
ORA-01122: database file 1 failed verification check
ORA-01110: data file 1: '/oracle/app/oracle/datafile/oralhr/system01.dbf'
ORA-01210: data file header is media corrupt


SYS@oralhr>
```

告警日志：

```
Fri Apr 15 08:52:22 2016
ALTER DATABASE OPEN
Read of datafile '/oracle/app/oracle/datafile/oralhr/system01.dbf' (fno 1) header failed with ORA-01210
Hex dump of (file 1, block 1) in trace file
/oracle/app/oracle/diag/rdbms/oralhr/oralhr/trace/oralhr_ora_7602280.trc
Corrupt block relative dba: 0x00400001 (file 1, block 1)
Bad header found during datafile header read
Data in bad block:
 type: 30 format: 2 rdba: 0x0040006f
 last change scn: 0x0000.000000e2 seq: 0x1 flg: 0x04
 spare1: 0x0 spare2: 0x0 spare3: 0x0
 consistency value in tail: 0x00e21e01
 check value in block header: 0xfa4c
 computed block checksum: 0x0
Rereading datafile 1 header failed with ORA-01210
Errors in file /oracle/app/oracle/diag/rdbms/oralhr/oralhr/trace/oralhr_ora_7602280.trc:
ORA-01122: database file 1 failed verification check
ORA-01110: data file 1: '/oracle/app/oracle/datafile/oralhr/system01.dbf'
ORA-01210: data file header is media corrupt
ORA-1122 signalled during: ALTER DATABASE OPEN...
Fri Apr 15 08:52:23 2016
Checker run found 1 new persistent data failures
```

ORA-01210: data file header is media corrupt 文件头有介质损坏，下边用 BBED 来恢复。

2.3.3 故障恢复

```
[ZHLHRDB2:oracle]:/home/oracle>bbed PASSWORD=blockedit  mode=edit blocksize=8192
listfile=/home/oracle/file.txt

BBED: Release 2.0.0.0.0 - Limited Production on Thu Apr 14 16:42:59 2016

Copyright (c) 1982, 2011, Oracle and/or its affiliates.  All rights reserved.

************* !!! For Oracle Internal Use only !!! ***************

BBED> info
 File#  Name                                                        Size(blks)
 -----  ----                                                        ----------
```

```
     1  /oracle/app/oracle/datafile/oralhr/system01.dbf                   96000
     2  /oracle/app/oracle/datafile/oralhr/sysaux01.dbf                   69120
     3  /oracle/app/oracle/datafile/oralhr/undotbs01.dbf                   9600
     4  /oracle/app/oracle/datafile/oralhr/users01.dbf                    37920
     5  /oracle/app/oracle/datafile/oralhr/system01.dbf_bk                96000

BBED> set count 128
        COUNT           128

BBED>
BBED> set dba 1,1
        DBA             0x00400001 (4194305 1,1)

BBED> map /v
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                                     Dba:0x00400001
------------------------------------------------------------
BBED-00400: invalid blocktype (30)
BBED>
```

可以看到 dba 1，1 是一个非法的块类型，下边利用 BBED 将 SYSAUX 上的 FILE HEADER 拷贝到 SYSTEM 上，然后修改文件头相关的内容：

```

BBED> copy file 2 block 1 to  file 1 block 1
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:    0 to  511           Dba:0x00400001
------------------------------------------------------------------------
 0ba20000 00800001 00000000 00000104 ed220000 00000000 0b200400 1793c969
 4f52414c 48520000 0000093b 00011300 00002000 00020003 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000716 00000000 3155becc 362e0deb 000e20dc 00007f18 00000000
 00000000 00000000 00000004 000000a6 3630b88e 000000a5 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000001 00065359 53415558 00000000 00000000
 00000000 00000000 00000000 00000000 00000002 00000000 00000000 00000000
 00000000 0000b7e0 00000000 00000000 00000000 00000000 00000000 00000000
 3155bebd 00000001 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 0013e5a8 0000c388 363142ec 00010000 0000002d 00000002 00100000

 <32 bytes per line>
BBED> sum apply
Check value for File 1, Block 1:
current = 0xed22, required = 0xed22

BBED> map /v
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                                     Dba:0x00400001
------------------------------------------------------------
 Data File Header

 struct kcvfh, 860 bytes                    @0
    struct kcvfhbfh, 20 bytes               @0
    struct kcvfhhdr, 76 bytes               @20
    ub4 kcvfhrdb                            @96
    struct kcvfhcrs, 8 bytes                @100
    ub4 kcvfhcrt                            @108
    ub4 kcvfhrlc                            @112
    struct kcvfhrls, 8 bytes                @116
    ub4 kcvfhbti                            @124
    struct kcvfhbsc, 8 bytes                @128
    ub2 kcvfhbth                            @136
    ub2 kcvfhsta                            @138
    struct kcvfhckp, 160 bytes              @484
    ub4 kcvfhcpc                            @140
    ub4 kcvfhrts                            @144
    ub4 kcvfhccc                            @148
    struct kcvfhbcp, 160 bytes              @152
    ub4 kcvfhbhz                            @312
    struct kcvfhxcd, 16 bytes               @316
    sword kcvfhtsn                          @332
    ub2 kcvfhtln                            @336
    text kcvfhtnm[30]                       @338
    ub4 kcvfhrfn                            @368
    struct kcvfhrfs, 8 bytes                @372
    ub4 kcvfhrft                            @380
    struct kcvfhafs, 8 bytes                @384
    ub4 kcvfhbbc                            @392
    ub4 kcvfhncb                            @396
    ub4 kcvfhmcb                            @400
    ub4 kcvfhlcb                            @404
    ub4 kcvfhbcs                            @408
    ub2 kcvfhofb                            @412
    ub2 kcvfhnfb                            @414
    ub4 kcvfhprc                            @416
    struct kcvfhprs, 8 bytes                @420
    struct kcvfhprfs, 8 bytes               @428
    ub4 kcvfhtrt                            @444

 ub4 tailchk                                @8188


BBED>
BBED> p  kcvfh
struct kcvfh, 860 bytes                     @0
   struct kcvfhbfh, 20 bytes                @0
      ub1 type_kcbh                         @0        0x0b
      ub1 frmt_kcbh                         @1        0xa2
      ub1 spare1_kcbh                       @2        0x00
      ub1 spare2_kcbh                       @3        0x00
      ub4 rdba_kcbh                         @4        0x00800001
      ub4 bas_kcbh                          @8        0x00000000
      ub2 wrp_kcbh                          @12       0x0000
      ub1 seq_kcbh                          @14       0x01
      ub1 flg_kcbh                          @15       0x04 (KCBHFCKV)
      ub2 chkval_kcbh                       @16       0xed22
      ub2 spare3_kcbh                       @18       0x0000
   struct kcvfhhdr, 76 bytes                @20
      ub4 kccfhswv                          @20       0x00000000
      ub4 kccfhcvn                          @24       0x0b200400
      ub4 kccfhdbi                          @28       0x1793c969
      text kccfhdbn[0]                      @32      O
      text kccfhdbn[1]                      @33      R
      text kccfhdbn[2]                      @34      A
      text kccfhdbn[3]                      @35      L
      text kccfhdbn[4]                      @36      H
      text kccfhdbn[5]                      @37      R
      text kccfhdbn[6]                      @38
      text kccfhdbn[7]                      @39
      ub4 kccfhcsq                          @40       0x0000093b
      ub4 kccfhfsz                          @44       0x00011300
      s_blkz kccfhbsz                       @48       0x00
      ub2 kccfhfno                          @52       0x0002
      ub2 kccfhtyp                          @54       0x0003
      ub4 kccfhacid                         @56       0x00000000
      ub4 kccfhcks                          @60       0x00000000
      text kccfhtag[0]                      @64
      text kccfhtag[1]                      @65
      text kccfhtag[2]                      @66
      text kccfhtag[3]                      @67
      text kccfhtag[4]                      @68
      text kccfhtag[5]                      @69
      text kccfhtag[6]                      @70
      text kccfhtag[7]                      @71
      text kccfhtag[8]                      @72
      text kccfhtag[9]                      @73
      text kccfhtag[10]                     @74
      text kccfhtag[11]                     @75
      text kccfhtag[12]                     @76
      text kccfhtag[13]                     @77
      text kccfhtag[14]                     @78
      text kccfhtag[15]                     @79
      text kccfhtag[16]                     @80
      text kccfhtag[17]                     @81
      text kccfhtag[18]                     @82
      text kccfhtag[19]                     @83
      text kccfhtag[20]                     @84
      text kccfhtag[21]                     @85
      text kccfhtag[22]                     @86
      text kccfhtag[23]                     @87
      text kccfhtag[24]                     @88
      text kccfhtag[25]                     @89
      text kccfhtag[26]                     @90
      text kccfhtag[27]                     @91
      text kccfhtag[28]                     @92
      text kccfhtag[29]                     @93
      text kccfhtag[30]                     @94
      text kccfhtag[31]                     @95
   ub4 kcvfhrdb                             @96       0x00000000
   struct kcvfhcrs, 8 bytes                 @100
      ub4 kscnbas                           @100      0x00000716
      ub2 kscnwrp                           @104      0x0000
   ub4 kcvfhcrt                             @108      0x3155becc
   ub4 kcvfhrlc                             @112      0x362e0deb
   struct kcvfhrls, 8 bytes                 @116
      ub4 kscnbas                           @116      0x000e20dc
      ub2 kscnwrp                           @120      0x0000
   ub4 kcvfhbti                             @124      0x00000000
   struct kcvfhbsc, 8 bytes                 @128
      ub4 kscnbas                           @128      0x00000000
      ub2 kscnwrp                           @132      0x0000
   ub2 kcvfhbth                             @136      0x0000
   ub2 kcvfhsta                             @138      0x0004 (KCVFHOFZ)
   struct kcvfhckp, 160 bytes               @484
      struct kcvcpscn, 8 bytes              @484
         ub4 kscnbas                        @484      0x0013e5a8
         ub2 kscnwrp                        @488      0x0000
      ub4 kcvcptim                          @492      0x363142ec
      ub2 kcvcpthr                          @496      0x0001
      union u, 12 bytes                     @500
         struct kcvcprba, 12 bytes          @500
            ub4 kcrbaseq                    @500      0x0000002d
            ub4 kcrbabno                    @504      0x00000002
            ub2 kcrbabof                    @508      0x0010
      ub1 kcvcpetb[0]                       @512      0x02
      ub1 kcvcpetb[1]                       @513      0x00
      ub1 kcvcpetb[2]                       @514      0x00
      ub1 kcvcpetb[3]                       @515      0x00
      ub1 kcvcpetb[4]                       @516      0x00
      ub1 kcvcpetb[5]                       @517      0x00
      ub1 kcvcpetb[6]                       @518      0x00
      ub1 kcvcpetb[7]                       @519      0x00
      ub1 kcvcpetb[8]                       @520      0x00
      ub1 kcvcpetb[9]                       @521      0x00
      ub1 kcvcpetb[10]                      @522      0x00
      ub1 kcvcpetb[11]                      @523      0x00
      ub1 kcvcpetb[12]                      @524      0x00
      ub1 kcvcpetb[13]                      @525      0x00
      ub1 kcvcpetb[14]                      @526      0x00
      ub1 kcvcpetb[15]                      @527      0x00
      ub1 kcvcpetb[16]                        @528        0x00
      ub1 kcvcpetb[17]                        @529        0x00
      ub1 kcvcpetb[18]                        @530        0x00
      ub1 kcvcpetb[19]                        @531        0x00
      ub1 kcvcpetb[20]                        @532        0x00
      ub1 kcvcpetb[21]                        @533        0x00
      ub1 kcvcpetb[22]                        @534        0x00
      ub1 kcvcpetb[23]                        @535        0x00
      ub1 kcvcpetb[24]                        @536        0x00
      ub1 kcvcpetb[25]                        @537        0x00
      ub1 kcvcpetb[26]                        @538        0x00
      ub1 kcvcpetb[27]                        @539        0x00
      ub1 kcvcpetb[28]                        @540        0x00
      ub1 kcvcpetb[29]                        @541        0x00
      ub1 kcvcpetb[30]                        @542        0x00
      ub1 kcvcpetb[31]                        @543        0x00
      ub1 kcvcpetb[32]                        @544        0x00
      ub1 kcvcpetb[33]                        @545        0x00
      ub1 kcvcpetb[34]                        @546        0x00
      ub1 kcvcpetb[35]                        @547        0x00
      ub1 kcvcpetb[36]                        @548        0x00
      ub1 kcvcpetb[37]                        @549        0x00
      ub1 kcvcpetb[38]                        @550        0x00
      ub1 kcvcpetb[39]                        @551        0x00
      ub1 kcvcpetb[40]                        @552        0x00
      ub1 kcvcpetb[41]                        @553        0x00
      ub1 kcvcpetb[42]                        @554        0x00
      ub1 kcvcpetb[43]                        @555        0x00
      ub1 kcvcpetb[44]                        @556        0x00
      ub1 kcvcpetb[45]                        @557        0x00
      ub1 kcvcpetb[46]                        @558        0x00
      ub1 kcvcpetb[47]                        @559        0x00
      ub1 kcvcpetb[48]                        @560        0x00
      ub1 kcvcpetb[49]                        @561        0x00
      ub1 kcvcpetb[50]                        @562        0x00
      ub1 kcvcpetb[51]                        @563        0x00
      ub1 kcvcpetb[52]                        @564        0x00
      ub1 kcvcpetb[53]                        @565        0x00
      ub1 kcvcpetb[54]                        @566        0x00
      ub1 kcvcpetb[55]                        @567        0x00
      ub1 kcvcpetb[56]                        @568        0x00
      ub1 kcvcpetb[57]                        @569        0x00
      ub1 kcvcpetb[58]                        @570        0x00
      ub1 kcvcpetb[59]                        @571        0x00
      ub1 kcvcpetb[60]                        @572        0x00
      ub1 kcvcpetb[61]                        @573        0x00
      ub1 kcvcpetb[62]                        @574        0x00
      ub1 kcvcpetb[63]                        @575        0x00
      ub1 kcvcpetb[64]                        @576        0x00
      ub1 kcvcpetb[65]                        @577        0x00
      ub1 kcvcpetb[66]                        @578        0x00
      ub1 kcvcpetb[67]                        @579        0x00
      ub1 kcvcpetb[68]                        @580        0x00
      ub1 kcvcpetb[69]                        @581        0x00
      ub1 kcvcpetb[70]                        @582        0x00
      ub1 kcvcpetb[71]                        @583        0x00
      ub1 kcvcpetb[72]                        @584        0x00
      ub1 kcvcpetb[73]                        @585        0x00
      ub1 kcvcpetb[74]                        @586        0x00
      ub1 kcvcpetb[75]                        @587        0x00
      ub1 kcvcpetb[76]                        @588        0x00
      ub1 kcvcpetb[77]                        @589        0x00
      ub1 kcvcpetb[78]                        @590        0x00
      ub1 kcvcpetb[79]                        @591        0x00
      ub1 kcvcpetb[80]                        @592        0x00
      ub1 kcvcpetb[81]                        @593        0x00
      ub1 kcvcpetb[82]                        @594        0x00
      ub1 kcvcpetb[83]                        @595        0x00
      ub1 kcvcpetb[84]                        @596        0x00
      ub1 kcvcpetb[85]                        @597        0x00
      ub1 kcvcpetb[86]                      @598      0x00
      ub1 kcvcpetb[87]                      @599      0x00
      ub1 kcvcpetb[88]                      @600      0x00
      ub1 kcvcpetb[89]                      @601      0x00
      ub1 kcvcpetb[90]                      @602      0x00
      ub1 kcvcpetb[91]                      @603      0x00
      ub1 kcvcpetb[92]                      @604      0x00
      ub1 kcvcpetb[93]                      @605      0x00
      ub1 kcvcpetb[94]                      @606      0x00
      ub1 kcvcpetb[95]                      @607      0x00
      ub1 kcvcpetb[96]                      @608      0x00
      ub1 kcvcpetb[97]                      @609      0x00
      ub1 kcvcpetb[98]                      @610      0x00
      ub1 kcvcpetb[99]                      @611      0x00
      ub1 kcvcpetb[100]                     @612      0x00
      ub1 kcvcpetb[101]                     @613      0x00
      ub1 kcvcpetb[102]                     @614      0x00
      ub1 kcvcpetb[103]                     @615      0x00
      ub1 kcvcpetb[104]                     @616      0x00
      ub1 kcvcpetb[105]                     @617      0x00
      ub1 kcvcpetb[106]                     @618      0x00
      ub1 kcvcpetb[107]                     @619      0x00
      ub1 kcvcpetb[108]                     @620      0x00
      ub1 kcvcpetb[109]                     @621      0x00
      ub1 kcvcpetb[110]                     @622      0x00
      ub1 kcvcpetb[111]                     @623      0x00
      ub1 kcvcpetb[112]                     @624      0x00
      ub1 kcvcpetb[113]                     @625      0x00
      ub1 kcvcpetb[114]                     @626      0x00
      ub1 kcvcpetb[115]                     @627      0x00
      ub1 kcvcpetb[116]                     @628      0x00
      ub1 kcvcpetb[117]                     @629      0x00
      ub1 kcvcpetb[118]                     @630      0x00
      ub1 kcvcpetb[119]                     @631      0x00
      ub1 kcvcpetb[120]                     @632      0x00
      ub1 kcvcpetb[121]                     @633      0x00
      ub1 kcvcpetb[122]                     @634      0x00
      ub1 kcvcpetb[123]                     @635      0x00
      ub1 kcvcpetb[124]                     @636      0x00
      ub1 kcvcpetb[125]                     @637      0x00
      ub1 kcvcpetb[126]                     @638      0x00
      ub1 kcvcpetb[127]                     @639      0x00
      ub1 kcvcpetb[128]                     @640      0x00
   ub4 kcvfhcpc                             @140      0x000000a6
   ub4 kcvfhrts                             @144      0x3630b88e
   ub4 kcvfhccc                             @148      0x000000a5
   struct kcvfhbcp, 160 bytes               @152
      struct kcvcpscn, 8 bytes              @152
         ub4 kscnbas                        @152      0x00000000
         ub2 kscnwrp                        @156      0x0000
      ub4 kcvcptim                          @160      0x00000000
      ub2 kcvcpthr                          @164      0x0000
      union u, 12 bytes                     @168
         struct kcvcprba, 12 bytes          @168
            ub4 kcrbaseq                    @168      0x00000000
            ub4 kcrbabno                    @172      0x00000000
            ub2 kcrbabof                    @176      0x0000
      ub1 kcvcpetb[0]                       @180      0x00
      ub1 kcvcpetb[1]                       @181      0x00
      ub1 kcvcpetb[2]                       @182      0x00
      ub1 kcvcpetb[3]                       @183      0x00
      ub1 kcvcpetb[4]                       @184      0x00
      ub1 kcvcpetb[5]                       @185      0x00
      ub1 kcvcpetb[6]                       @186      0x00
      ub1 kcvcpetb[7]                       @187      0x00
      ub1 kcvcpetb[8]                       @188      0x00
      ub1 kcvcpetb[9]                       @189      0x00
      ub1 kcvcpetb[10]                      @190      0x00
      ub1 kcvcpetb[11]                      @191      0x00
      ub1 kcvcpetb[12]                      @192      0x00
      ub1 kcvcpetb[13]                      @193      0x00
      ub1 kcvcpetb[14]                      @194      0x00
      ub1 kcvcpetb[15]                      @195      0x00
      ub1 kcvcpetb[16]                      @196      0x00
      ub1 kcvcpetb[17]                      @197      0x00
      ub1 kcvcpetb[18]                      @198      0x00
      ub1 kcvcpetb[19]                      @199      0x00
      ub1 kcvcpetb[20]                      @200      0x00
      ub1 kcvcpetb[21]                      @201      0x00
      ub1 kcvcpetb[22]                      @202      0x00
      ub1 kcvcpetb[23]                      @203      0x00
      ub1 kcvcpetb[24]                      @204      0x00
      ub1 kcvcpetb[25]                      @205      0x00
      ub1 kcvcpetb[26]                      @206      0x00
      ub1 kcvcpetb[27]                      @207      0x00
      ub1 kcvcpetb[28]                      @208      0x00
      ub1 kcvcpetb[29]                      @209      0x00
      ub1 kcvcpetb[30]                      @210      0x00
      ub1 kcvcpetb[31]                      @211      0x00
      ub1 kcvcpetb[32]                      @212      0x00
      ub1 kcvcpetb[33]                      @213      0x00
      ub1 kcvcpetb[34]                      @214      0x00
      ub1 kcvcpetb[35]                      @215      0x00
      ub1 kcvcpetb[36]                      @216      0x00
      ub1 kcvcpetb[37]                      @217      0x00
      ub1 kcvcpetb[38]                      @218      0x00
      ub1 kcvcpetb[39]                      @219      0x00
      ub1 kcvcpetb[40]                      @220      0x00
      ub1 kcvcpetb[41]                      @221      0x00
      ub1 kcvcpetb[42]                      @222      0x00
      ub1 kcvcpetb[43]                      @223      0x00
      ub1 kcvcpetb[44]                      @224      0x00
      ub1 kcvcpetb[45]                      @225      0x00
      ub1 kcvcpetb[46]                      @226      0x00
      ub1 kcvcpetb[47]                      @227      0x00
      ub1 kcvcpetb[48]                      @228      0x00
      ub1 kcvcpetb[49]                      @229      0x00
      ub1 kcvcpetb[50]                      @230      0x00
      ub1 kcvcpetb[51]                      @231      0x00
      ub1 kcvcpetb[52]                      @232      0x00
      ub1 kcvcpetb[53]                      @233      0x00
      ub1 kcvcpetb[54]                      @234      0x00
      ub1 kcvcpetb[55]                      @235      0x00
      ub1 kcvcpetb[56]                      @236      0x00
      ub1 kcvcpetb[57]                      @237      0x00
      ub1 kcvcpetb[58]                      @238      0x00
      ub1 kcvcpetb[59]                      @239      0x00
      ub1 kcvcpetb[60]                      @240      0x00
      ub1 kcvcpetb[61]                      @241      0x00
      ub1 kcvcpetb[62]                      @242      0x00
      ub1 kcvcpetb[63]                      @243      0x00
      ub1 kcvcpetb[64]                      @244      0x00
      ub1 kcvcpetb[65]                      @245      0x00
      ub1 kcvcpetb[66]                      @246      0x00
      ub1 kcvcpetb[67]                      @247      0x00
      ub1 kcvcpetb[68]                      @248      0x00
      ub1 kcvcpetb[69]                      @249      0x00
      ub1 kcvcpetb[70]                      @250      0x00
      ub1 kcvcpetb[71]                      @251      0x00
      ub1 kcvcpetb[72]                      @252      0x00
      ub1 kcvcpetb[73]                      @253      0x00
      ub1 kcvcpetb[74]                      @254      0x00
      ub1 kcvcpetb[75]                      @255      0x00
      ub1 kcvcpetb[76]                      @256      0x00
      ub1 kcvcpetb[77]                      @257      0x00
      ub1 kcvcpetb[78]                      @258      0x00
      ub1 kcvcpetb[79]                      @259      0x00
      ub1 kcvcpetb[80]                      @260      0x00
      ub1 kcvcpetb[81]                      @261      0x00
      ub1 kcvcpetb[82]                      @262      0x00
```

```
     ub1 kcvcpetb[83]                     @263      0x00
     ub1 kcvcpetb[84]                     @264      0x00
     ub1 kcvcpetb[85]                     @265      0x00
     ub1 kcvcpetb[86]                     @266      0x00
     ub1 kcvcpetb[87]                     @267      0x00
     ub1 kcvcpetb[88]                     @268      0x00
     ub1 kcvcpetb[89]                     @269      0x00
     ub1 kcvcpetb[90]                     @270      0x00
     ub1 kcvcpetb[91]                     @271      0x00
     ub1 kcvcpetb[92]                     @272      0x00
     ub1 kcvcpetb[93]                     @273      0x00
     ub1 kcvcpetb[94]                     @274      0x00
     ub1 kcvcpetb[95]                     @275      0x00
     ub1 kcvcpetb[96]                     @276      0x00
     ub1 kcvcpetb[97]                     @277      0x00
     ub1 kcvcpetb[98]                     @278      0x00
     ub1 kcvcpetb[99]                     @279      0x00
     ub1 kcvcpetb[100]                    @280      0x00
     ub1 kcvcpetb[101]                    @281      0x00
     ub1 kcvcpetb[102]                    @282      0x00
     ub1 kcvcpetb[103]                    @283      0x00
     ub1 kcvcpetb[104]                    @284      0x00
     ub1 kcvcpetb[105]                    @285      0x00
     ub1 kcvcpetb[106]                    @286      0x00
     ub1 kcvcpetb[107]                    @287      0x00
     ub1 kcvcpetb[108]                    @288      0x00
     ub1 kcvcpetb[109]                    @289      0x00
     ub1 kcvcpetb[110]                    @290      0x00
     ub1 kcvcpetb[111]                    @291      0x00
     ub1 kcvcpetb[112]                    @292      0x00
     ub1 kcvcpetb[113]                    @293      0x00
     ub1 kcvcpetb[114]                    @294      0x00
     ub1 kcvcpetb[115]                    @295      0x00
     ub1 kcvcpetb[116]                    @296      0x00
     ub1 kcvcpetb[117]                    @297      0x00
     ub1 kcvcpetb[118]                    @298      0x00
     ub1 kcvcpetb[119]                    @299      0x00
     ub1 kcvcpetb[120]                    @300      0x00
     ub1 kcvcpetb[121]                    @301      0x00
     ub1 kcvcpetb[122]                    @302      0x00
     ub1 kcvcpetb[123]                    @303      0x00
     ub1 kcvcpetb[124]                    @304      0x00
     ub1 kcvcpetb[125]                    @305      0x00
     ub1 kcvcpetb[126]                    @306      0x00
     ub1 kcvcpetb[127]                    @307      0x00
     ub1 kcvcpetb[128]                    @308      0x00
  ub4 kcvfhbhz                            @312      0x00000000
  struct kcvfhxcd, 16 bytes               @316
     ub4 space_kcvmxcd[0]                 @316      0x00000000
     ub4 space_kcvmxcd[1]                 @320      0x00000000
     ub4 space_kcvmxcd[2]                 @324      0x00000000
     ub4 space_kcvmxcd[3]                 @328      0x00000000
  sword kcvfhtsn                          @332      1
  ub2 kcvfhtln                            @336      0x0006
  text kcvfhtnm[0]                        @338     S
  text kcvfhtnm[1]                        @339     Y
  text kcvfhtnm[2]                        @340     S
  text kcvfhtnm[3]                        @341     A
  text kcvfhtnm[4]                        @342     U
  text kcvfhtnm[5]                        @343     X
  text kcvfhtnm[6]                        @344
  text kcvfhtnm[7]                        @345
  text kcvfhtnm[8]                        @346
  text kcvfhtnm[9]                        @347
  text kcvfhtnm[10]                       @348
  text kcvfhtnm[11]                       @349
  text kcvfhtnm[12]                       @350
  text kcvfhtnm[13]                       @351
  text kcvfhtnm[14]                       @352
  text kcvfhtnm[15]                       @353
```

```
   text kcvfhtnm[16]                    @354
   text kcvfhtnm[17]                    @355
   text kcvfhtnm[18]                    @356
   text kcvfhtnm[19]                    @357
   text kcvfhtnm[20]                    @358
   text kcvfhtnm[21]                    @359
   text kcvfhtnm[22]                    @360
   text kcvfhtnm[23]                    @361
   text kcvfhtnm[24]                    @362
   text kcvfhtnm[25]                    @363
   text kcvfhtnm[26]                    @364
   text kcvfhtnm[27]                    @365
   text kcvfhtnm[28]                    @366
   text kcvfhtnm[29]                    @367
   ub4 kcvfhrfn                         @368      0x00000002
   struct kcvfhrfs, 8 bytes             @372
      ub4 kscnbas                       @372      0x00000000
      ub2 kscnwrp                       @376      0x0000
   ub4 kcvfhrft                         @380      0x00000000
   struct kcvfhafs, 8 bytes             @384
      ub4 kscnbas                       @384      0x00000000
      ub2 kscnwrp                       @388      0x0000
   ub4 kcvfhbbc                         @392      0x00000000
   ub4 kcvfhncb                         @396      0x00000000
   ub4 kcvfhmcb                         @400      0x00000000
   ub4 kcvfhlcb                         @404      0x00000000
   ub4 kcvfhbcs                         @408      0x00000000
   ub2 kcvfhofb                         @412      0x0000
   ub2 kcvfhnfb                         @414      0x0000
   ub4 kcvfhprc                         @416      0x3155bebd
   struct kcvfhprs, 8 bytes             @420
      ub4 kscnbas                       @420      0x00000001
      ub2 kscnwrp                       @424      0x0000
   struct kcvfhprfs, 8 bytes            @428
      ub4 kscnbas                       @428      0x00000000
      ub2 kscnwrp                       @432      0x0000
   ub4 kcvfhtrt                         @444      0x00000000

BBED>
```

2.3.3.1 修改文件头的信息

我们需要修改的地方有十个，分别是：

```
      ub4 rdba_kcbh                        @4       0x00800001
      ub4 kccfhfsz                         @44      0x00011300
      ub2 kccfhfno                         @52      0x0002
   ub4 kcvfhrdb                            @96      0x00000000
    struct kcvfhcrs, 8 bytes               @100
       ub4 kscnbas                          @100     0x00000716
       ub2 kscnwrp                          @104     0x0000
    ub4 kcvfhcrt                            @108     0x3155becc
    ub2 kcvfhsta                            @138     0x0004 (KCVFHOFZ)
   sword kcvfhtsn                          @332     1
   text kcvfhtnm[3]                         @341    A
   text kcvfhtnm[4]                         @342    U
   text kcvfhtnm[5]                         @343    X
   ub4 kcvfhrfn                             @368     0x00000002
```

一、 ub4 rdba_kcbh 相对数据块地址

ub4 rdba_kcbh @4 0x00800001

原信息：

```
BBED> set dba 1,1
        DBA             0x00400001 (4194305 1,1)

BBED> p kcvfhbfh
struct kcvfhbfh, 20 bytes                   @0
   ub1 type_kcbh                            @0        0x0b
   ub1 frmt_kcbh                            @1        0xa2
   ub1 spare1_kcbh                          @2        0x00
   ub1 spare2_kcbh                          @3        0x00
   ub4 rdba_kcbh                            @4        0x00800001
   ub4 bas_kcbh                             @8        0x00000000
   ub2 wrp_kcbh                             @12       0x0000
   ub1 seq_kcbh                             @14       0x01
   ub1 flg_kcbh                             @15       0x04 (KCBHFCKV)
   ub2 chkval_kcbh                          @16       0xed22
   ub2 spare3_kcbh                          @18       0x0000

BBED>
BBED> d count 128 offset 4
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:    4 to  131           Dba:0x00400001
------------------------------------------------------------------------
 00800001 00000000 00000104 ed220000 00000000 0b200400 1793c969 4f52414c
 48520000 0000093b 00011300 00002000 00020003 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000716 00000000 3155becc 362e0deb 000e20dc 00007f18 00000000 00000000

 <32 bytes per line>

BBED>
```

该参数值代表当前数据块在数据库中的位置，转换为 2 进制后前 10 位代表文件号，后 22 位代表块号，转换表格如下：

	原值	新值
存储 16 进制	0x00800001	0x00400001
可读 16 进制	0x00800001	0x00400001
2 进制	0123456789 0123456789012345678901 ------------------------------------ 0000000010 0000000000000000000001	0123456789 0123456789012345678901 ------------------------------------ 0000000001 0000000000000000000001
表示意义	FILE 2 BLOCK 1	FILE 1 BLOCK 1

我们用计算器可以算得需要修改后的 16 进制，由于是 AIX 平台，存储和可读的顺序是一致的，这里很惭愧，第一次看到这的时候实在看不懂文件 2 是如何得到的，因为源资料不是这样写的，后来在公司老猫的帮助下，我才弄懂了这里的转换关系，所以我分享给大家，也感谢老猫的帮助。

转换：

```
BBED> set dba 1,1 offset 4
        DBA             0x00400001 (4194305 1,1)
        OFFSET          4
BBED> modify /x 00400001
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:    4 to  131           Dba:0x00400001
------------------------------------------------------------------------
 00400001 00000000 00000104 ed220000 00000000 0b200400 1793c969 4f52414c
 48520000 0000093b 00011300 00002000 00020003 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000716 00000000 3155becc 362e0deb 000e20dc 00007f18 00000000 00000000

 <32 bytes per line>

BBED> p kcvfhbfh
struct kcvfhbfh, 20 bytes                   @0
   ub1 type_kcbh                            @0         0x0b
   ub1 frmt_kcbh                            @1         0xa2
   ub1 spare1_kcbh                          @2         0x00
   ub1 spare2_kcbh                          @3         0x00
   ub4 rdba_kcbh                            @4         0x00400001
   ub4 bas_kcbh                             @8         0x00000000
   ub2 wrp_kcbh                             @12        0x0000
   ub1 seq_kcbh                             @14        0x01
   ub1 flg_kcbh                             @15        0x04 (KCBHFCKV)
   ub2 chkval_kcbh                          @16        0xed22
   ub2 spare3_kcbh                          @18        0x0000

BBED>
BBED>  sum apply
Check value for File 1, Block 1:
current = 0xede2, required = 0xede2
```

## 二、	文件大小和文件号

```
BBED> p kcvfhhdr
struct kcvfhhdr, 76 bytes                   @20
   ub4 kccfhswv                             @20        0x00000000
   ub4 kccfhcvn                             @24        0x0b200400
   ub4 kccfhdbi                             @28        0x1793c969
   text kccfhdbn[0]                         @32       O
   text kccfhdbn[1]                         @33       R
   text kccfhdbn[2]                         @34       A
   text kccfhdbn[3]                         @35       L
   text kccfhdbn[4]                         @36       H
   text kccfhdbn[5]                         @37       R
   text kccfhdbn[6]                         @38
   text kccfhdbn[7]                         @39
   ub4 kccfhcsq                             @40        0x0000093b
   ub4 kccfhfsz                             @44        0x00011300
   s_blkz kccfhbsz                          @48        0x00
   ub2 kccfhfno                             @52        0x0002
   ub2 kccfhtyp                             @54        0x0003
   ub4 kccfhacid                            @56        0x00000000
   ub4 kccfhcks                             @60        0x00000000
   text kccfhtag[0]                         @64
   text kccfhtag[1]                         @65
   text kccfhtag[2]                         @66
```

```
    text kccfhtag[3]                       @67
    text kccfhtag[4]                       @68
    text kccfhtag[5]                       @69
    text kccfhtag[6]                       @70
    text kccfhtag[7]                       @71
    text kccfhtag[8]                       @72
    text kccfhtag[9]                       @73
    text kccfhtag[10]                      @74
    text kccfhtag[11]                      @75
    text kccfhtag[12]                      @76
    text kccfhtag[13]                      @77
    text kccfhtag[14]                      @78
    text kccfhtag[15]                      @79
    text kccfhtag[16]                      @80
    text kccfhtag[17]                      @81
    text kccfhtag[18]                      @82
    text kccfhtag[19]                      @83
    text kccfhtag[20]                      @84
    text kccfhtag[21]                      @85
    text kccfhtag[22]                      @86
    text kccfhtag[23]                      @87
    text kccfhtag[24]                      @88
    text kccfhtag[25]                      @89
    text kccfhtag[26]                      @90
    text kccfhtag[27]                      @91
    text kccfhtag[28]                      @92
    text kccfhtag[29]                      @93
    text kccfhtag[30]                      @94
    text kccfhtag[31]                      @95

BBED>
```

1、 ub4 kccfhfsz 文件大小

ub4 kccfhfsz @44 0x00011300

具体转换过程参考如下表格：

	原值	新值
存储 16 进制	0x00011300	0x00017700
可读 16 进制	0x00011300	0x00017700
可读 10 进制(blocks)	70400	96000
DB FILE SIZE	576716800	786432000
OS FILE SIZE	576724992	786440192
算法	十六进制 11300 转换 10 进制为 70400,代表块数，70400*8192=576716800byte ，加上一个数据块代表 OS 文件的大小： 576716800+8192=576724992	从 OS 获取文件大小，从而反推 DB 基本的文件大小，OS 文件大小 786440192， 786440192-8192=786432000 为 DB 基本文件大小，786432000/8192=96000 为数据库的 blocks 数，转换 16 进制为 0x00017700
文件大小	[ZHLHRDB2:oracle]:/oracle>cd /oracle/app/oracle/datafile/oralhr [ZHLHRDB2:oracle]:/oracle/app/oracle/datafile/oralhr>l sys* -rw-r----- 1 oracle asmadmin 576724992 Apr 15 08:45 sysaux01.dbf	

	-rw-r----- 1 oracle asmadmin 786440192 Apr 15 09:31 system01.dbf -rw-r----- 1 oracle dba 786440192 Apr 14 10:02 system01.dbf_bk

修改：

```
[ZHLHRDB2:oracle]:/oracle>cd /oracle/app/oracle/datafile/oralhr
[ZHLHRDB2:oracle]:/oracle/app/oracle/datafile/oralhr>l sys*
-rw-r-----    1 oracle   asmadmin  576724992 Apr 15 08:45 sysaux01.dbf
-rw-r-----    1 oracle   asmadmin  786440192 Apr 15 09:31 system01.dbf
-rw-r-----    1 oracle   dba       786440192 Apr 14 10:02 system01.dbf_bk

BBED> set dba 1,1 offset 44 count 64
        DBA             0x00400001 (4194305 1,1)
        OFFSET          44
        COUNT           64

BBED> d
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:   44 to  107           Dba:0x00400001
------------------------------------------------------------------------
 00011300 00002000 00020003 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000716 00000000

 <32 bytes per line>

BBED> m /x 00017700
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:   44 to  107           Dba:0x00400001
------------------------------------------------------------------------
 00017700 00002000 00020003 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000716 00000000

 <32 bytes per line>

BBED> sum apply
Check value for File 1, Block 1:
current = 0x89e2, required = 0x89e2

BBED> d
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:   44 to  107           Dba:0x00400001
------------------------------------------------------------------------
 00017700 00002000 00020003 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000716 00000000

 <32 bytes per line>

BBED>
```

2、 ub2 kccfhfno 文件号

ub2 kccfhfno @52 0x0002

比较简单，原 sysaux 为 2 号文件，我们需要修改为 1 号文件：

```
BBED> set dba 1,1 offset 52 count 64
        DBA             0x00400001 (4194305 1,1)
        OFFSET          52
        COUNT           64
```

```
BBED> d
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:   52 to  115           Dba:0x00400001
------------------------------------------------------------------------
 00020003 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000716 00000000 3155becc 362e0deb

 <32 bytes per line>

BBED> m /x 00010003
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:   52 to  115           Dba:0x00400001
------------------------------------------------------------------------
 00010003 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000716 00000000 3155becc 362e0deb

 <32 bytes per line>

BBED> sum apply
Check value for File 1, Block 1:
current = 0x89e1, required = 0x89e1

BBED>
```

三、 ub4 kcvfhrdb bootstrap$ 对象的地址

ub4 kcvfhrdb   @96   0x00000000

该部分信息为 sys.bootstrap$ 对象的地址，在 10g 中固定 DBA 为 1,377， 但在 11g 中 dba 为 1,520，这里看到为 0，说明 2 号文件上不存在该对象， 其转换形式和 rdba_kcbh 部分是一样的，不再赘述。

11g 中存储在 1 号文件 520 块：

```
BBED> info
 File#  Name                                                        Size(blks)
 -----  ----                                                        ----------
     1  /oracle/app/oracle/datafile/oralhr/system01.dbf                  96000
     2  /oracle/app/oracle/datafile/oralhr/sysaux01.dbf                  69120
     3  /oracle/app/oracle/datafile/oralhr/undotbs01.dbf                  9600
     4  /oracle/app/oracle/datafile/oralhr/users01.dbf                   37920
     5  /oracle/app/oracle/datafile/oralhr/system01.dbf_bk               96000

BBED>
BBED>
BBED> set dba 5,1 offset 96 count 64
        DBA             0x01400001 (20971521 5,1)
        OFFSET          96
        COUNT           64

BBED> print kcvfhrdb
ub4 kcvfhrdb                                @96       0x00400208
====》 0000000001 0000000000001000001000， 1 号文件 520 块，下边我们进行修改：


BBED> set dba 1,1 offset 96 count 64
        DBA             0x00400001 (4194305 1,1)
        OFFSET          96
        COUNT           64

BBED> d
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:   96 to  159           Dba:0x00400001
------------------------------------------------------------------------
 00000000 00000716 00000000 3155becc 362e0deb 000e20dc 00007f18 00000000
 00000000 00000000 00000004 000000a6 3630b88e 000000a5 00000000 00000000

 <32 bytes per line>

BBED> modify /x 00400208
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:   96 to  159           Dba:0x00400001
------------------------------------------------------------------------
 00400208 00000716 00000000 3155becc 362e0deb 000e20dc 00007f18 00000000
 00000000 00000000 00000004 000000a6 3630b88e 000000a5 00000000 00000000

 <32 bytes per line>

BBED> sum apply
Check value for File 1, Block 1:
current = 0x8ba9, required = 0x8ba9

BBED>
```

四、 ub4 kscnbas 文件创建 SCN 号

```
struct kcvfhcrs, 8 bytes                    @100
   ub4 kscnbas                              @100        0x00000716
   ub2 kscnwrp                              @104        0x0000
```

```
SYS@oralhr> set line 9999
SYS@oralhr> col name format a60
SYS@oralhr> SELECT d.FILE#,d.CREATION_CHANGE#,to_char(d.CREATION_CHANGE#,'xxxxxxxxxxxx') scn_hx,d.NAME
FROM v$datafile d ;

     FILE# CREATION_CHANGE# SCN_HX                     NAME
---------- ---------------- -------------------------- ------------------------------------------------------------
         1                8              8             /oracle/app/oracle/datafile/oralhr/system01.dbf
         2             1814            716             /oracle/app/oracle/datafile/oralhr/sysaux01.dbf
         3           923586          e17c2             /oracle/app/oracle/datafile/oralhr/undotbs01.dbf
         4            16050           3eb2             /oracle/app/oracle/datafile/oralhr/users01.dbf

SYS@oralhr>
```

====》 2 号文件的 scn 为 1814 转换为 16 进制后就是 716，和 bbed 查询出来的一致，下边修改 1 号文件的 scn

```
BBED> p kcvfhcrs
struct kcvfhcrs, 8 bytes                    @100
   ub4 kscnbas                              @100      0x00000716
   ub2 kscnwrp                              @104      0x0000

BBED> set dba 1,1 offset 100 count 64
        DBA             0x00400001 (4194305 1,1)
        OFFSET          100
        COUNT           64

BBED> m /x 00000008
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:  100 to  163           Dba:0x00400001
```

```
------------------------------------------------------------------------
 00000008 00000000 3155becc 362e0deb 000e20dc 00007f18 00000000 00000000
 00000000 00000004 000000a6 3630b88e 000000a5 00000000 00000000 00000000

 <32 bytes per line>

BBED> sum apply
Check value for File 1, Block 1:
current = 0x8cb7, required = 0x8cb7

BBED> p kcvfhcrs
struct kcvfhcrs, 8 bytes                    @100
   ub4 kscnbas                              @100      0x00000008
   ub2 kscnwrp                              @104      0x0000

BBED>
```

五、 ub4 kcvfhcrt 文件创建时间

```
BBED> p kcvfhcrt
ub4 kcvfhcrt                                @108      0x3155becc

BBED>


SYS@oralhr> set line 9999
SYS@oralhr> col name format a60
SYS@oralhr> col scn_hx format a15
SYS@oralhr> col time_hx format a15
SYS@oralhr> select
file#,name,CREATION_CHANGE#,scn_hx,CREATION_TIME_N,to_char(CREATION_TIME_N,'xxxxxxxxxxxx')
time_hx,CREATION_TIME_D from (
  2  SELECT d.FILE#,
  3         d.NAME,
  4         d.CREATION_CHANGE#,
  5         to_char(d.CREATION_CHANGE#,'xxxxxxxxxxxx') scn_hx,
  6         ((to_char(d.CREATION_TIME, 'YYYY') - 1988) * 12 * 31 * 24 * 3600 +
  7         (to_char(d.CREATION_TIME, 'MM') - 1) * 31 * 24 * 3600 +
  8         (to_char(d.CREATION_TIME, 'dd') - 1) * 24 * 3600 +
  9         (to_char(d.CREATION_TIME, 'hh24')) * 3600 +
 10         (to_char(d.CREATION_TIME, 'mi')) * 60 +
 11         to_char(d.CREATION_TIME, 'ss')) CREATION_TIME_N,
 12         to_char(d.CREATION_TIME, 'YYYY-MM-DD HH24:MI:SS') CREATION_TIME_D
 13    FROM v$datafile d);

     FILE# NAME                                                         CREATION_CHANGE# SCN_HX          CREATION_TIME_N
TIME_HX         CREATION_TIME_D
---------- ------------------------------------------------------------ ---------------- --------------- ---------------
--------------- ------------------------------
         1 /oracle/app/oracle/datafile/oralhr/system01.dbf                             8               8
827702981       3155bec5    2013-10-01 21:29:41
         2 /oracle/app/oracle/datafile/oralhr/sysaux01.dbf                          1814             716
827702988       3155becc    2013-10-01 21:29:48
         3 /oracle/app/oracle/datafile/oralhr/undotbs01.dbf                       923586           e17c2
827712502       3155e3f6    2013-10-02 00:08:22
         4 /oracle/app/oracle/datafile/oralhr/users01.dbf                          16050             3eb2
827703010       3155bee2    2013-10-01 21:30:10

SYS@oralhr>

BBED> p kcvfhcrt
ub4 kcvfhcrt                                @108      0x3155becc

BBED> set dba 1,1 offset 108
        DBA             0x00400001 (4194305 1,1)
        OFFSET          108

BBED>
BBED> m /x 3155BEC5
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:  108 to  171           Dba:0x00400001
------------------------------------------------------------------------
 3155bec5 362e0deb 000e20dc 00007f18 00000000 00000000 00000000 00000004
 000000a6 3630b88e 000000a5 00000000 00000000 00000000 00000000 00000000

 <32 bytes per line>

BBED>
BBED> sum apply
Check value for File 1, Block 1:
current = 0x8cbe, required = 0x8cbe

BBED>
```

六、 ub2 kcvfhsta 文件头部状态

ub2 kcvfhsta @138 0x0004 (KCVFHOFZ)

表示文件的状态，对于文件 1，正常关闭的值为 8192，16 进制为 2000

```
BBED> set dba 1,1 offset 138  count 64
        DBA             0x00400001 (4194305 1,1)
        OFFSET          138
        COUNT           64

BBED> d
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:  138 to  201           Dba:0x00400001
------------------------------------------------------------------------
 00040000 00a63630 b88e0000 00a50000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

 <32 bytes per line>

BBED> m /x 2000
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:  138 to  201           Dba:0x00400001
------------------------------------------------------------------------
 20000000 00a63630 b88e0000 00a50000 00000000 00000000 00000000 00000000
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

 <32 bytes per line>

BBED> sum apply
Check value for File 1, Block 1:
current = 0xacba, required = 0xacba

BBED>
```

七、 kcvfhtsn 表空间号

sword kcvfhtsn   @332   1

system 为 0 号表空间：

```
SYS@oralhr> select ts#,name from v$tablespace;

       TS# NAME
---------- ------------------------------------------------------------
         0 SYSTEM
         1 SYSAUX
         2 UNDOTBS1
         4 USERS
         3 TEMP


BBED> p kcvfhtsn
sword kcvfhtsn                              @332      1

BBED> set dba 1,1 offset 332  count 64
        DBA             0x00400001 (4194305 1,1)
        OFFSET          332
        COUNT           64

BBED> m /x 00000000
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:  332 to  395           Dba:0x00400001
------------------------------------------------------------------------
 00000000 00065359 53415558 00000000 00000000 00000000 00000000 00000000
 00000000 00000002 00000000 00000000 00000000 00000000 0000b7e0 00000000

 <32 bytes per line>

BBED> sum apply
Check value for File 1, Block 1:
current = 0xacbb, required = 0xacbb

BBED>  p kcvfhtsn
sword kcvfhtsn                              @332      0

BBED>
```

八、 p kcvfhtnm 表空间名

text kcvfhtnm[3]   @341   A

text kcvfhtnm[4]   @342   U

text kcvfhtnm[5]   @343   X

```
 BBED> p kcvfhtnm
text kcvfhtnm[0]                            @338     S
text kcvfhtnm[1]                            @339     Y
text kcvfhtnm[2]                            @340     S
text kcvfhtnm[3]                            @341     A
text kcvfhtnm[4]                            @342     U
text kcvfhtnm[5]                            @343     X
text kcvfhtnm[6]                            @344
text kcvfhtnm[7]                            @345
text kcvfhtnm[8]                            @346
text kcvfhtnm[9]                            @347
text kcvfhtnm[10]                           @348
text kcvfhtnm[11]                           @349
text kcvfhtnm[12]                           @350
text kcvfhtnm[13]                           @351
text kcvfhtnm[14]                           @352
text kcvfhtnm[15]                           @353
text kcvfhtnm[16]                           @354
text kcvfhtnm[17]                           @355
text kcvfhtnm[18]                           @356
text kcvfhtnm[19]                           @357
text kcvfhtnm[20]                           @358
text kcvfhtnm[21]                           @359
text kcvfhtnm[22]                           @360
text kcvfhtnm[23]                           @361
text kcvfhtnm[24]                           @362
text kcvfhtnm[25]                           @363
text kcvfhtnm[26]                           @364
text kcvfhtnm[27]                           @365
text kcvfhtnm[28]                           @366
text kcvfhtnm[29]                           @367

BBED>
```

我们需要修改为 SYSTEM，可以查询 ASCII 码表，或者从其它库中获取，注意这个值不存在大小端的转换：

```
BBED> set dba 1,1 offset 338  count 64
        DBA             0x00400001 (4194305 1,1)
        OFFSET          338
        COUNT           64

BBED> d /v
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1       Offsets:  338 to  401  Dba:0x00400001
-------------------------------------------------------
 53595341 55580000 00000000 00000000 l SYSAUX.........
 00000000 00000000 00000000 00000000 l ...............
 00020000 00000000 00000000 00000000 l ...............
 00000000 b7e00000 00000000 00000000 l ...............

 <16 bytes per line>

BBED> set dba 5,1 offset 338  count 64
        DBA             0x01400001 (20971521 5,1)
        OFFSET          338
        COUNT           64

BBED> d /v
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf_bk (5)
 Block: 1       Offsets:  338 to  401  Dba:0x01400001
-------------------------------------------------------
 53595354 454d0000 00000000 00000000 l SYSTEM.........
 00000000 00000000 00000000 00000000 l ...............
 00010000 00000000 00000000 00000000 l ...............
 00000000 b7e00000 00000000 00000000 l ...............

BBED> set dba 5,1 offset 341  count 64
        DBA             0x01400001 (20971521 5,1)
        OFFSET          341
        COUNT           64

BBED> d /v
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf_bk (5)
 Block: 1       Offsets:  341 to  404  Dba:0x01400001
-------------------------------------------------------
 54454d00 00000000 00000000 00000000 l TEM............
 00000000 00000000 00000000 00000100 l ...............
 00000000 00000000 00000000 00000000 l ...............
 00b7e000 00000000 00000000 00000000 l ...............
 <16 bytes per line>

BBED> set dba 1,1 offset 341  count 64
        DBA             0x00400001 (4194305 1,1)
        OFFSET          341
        COUNT           64

BBED> d /v
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1       Offsets:  341 to  404  Dba:0x00400001
-------------------------------------------------------
 41555800 00000000 00000000 00000000 l AUX............
 00000000 00000000 00000000 00000200 l ................
 00000000 00000000 00000000 00000000 l ................
 00b7e000 00000000 00000000 00000000 l ................

 <16 bytes per line>

BBED> m /x 54454d00
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:  341 to  404           Dba:0x00400001
------------------------------------------------------------------------
 54454d00 00000000 00000000 00000000 00000000 00000000 00000000 00000200
 00000000 00000000 00000000 00000000 00b7e000 00000000 00000000 00000000

 <32 bytes per line>

BBED> sum apply
Check value for File 1, Block 1:
current = 0xbcbb, required = 0xbcbb

BBED> set dba 1,1 offset 338  count 64
        DBA             0x00400001 (4194305 1,1)
        OFFSET          338
        COUNT           64

BBED> d /v
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1       Offsets:  338 to  401  Dba:0x00400001
-------------------------------------------------------
 53595354 454d0000 00000000 00000000 l SYSTEM.........
 00000000 00000000 00000000 00000000 l ................
 00020000 00000000 00000000 00000000 l ................
 00000000 b7e00000 00000000 00000000 l ................

 <16 bytes per line>

BBED>
```

九、 ub4 kcvfhrfn 相对文件号

ub4 kcvfhrfn   @368   0x00000002

代表相对文件号，需要修改为 1 号：

```
BBED>  p kcvfhrfn
ub4 kcvfhrfn                                @368      0x00000002

BBED> set dba 1,1 offset 368   count 64
        DBA             0x00400001 (4194305 1,1)
        OFFSET          368
        COUNT           64

BBED> m /x 00000001
 File: /oracle/app/oracle/datafile/oralhr/system01.dbf (1)
 Block: 1                Offsets:  368 to  431           Dba:0x00400001
```

```
-------------------------------------------------------------------------
 00000001 00000000 00000000 00000000 00000000 0000b7e0 00000000 00000000
 00000000 00000000 00000000 00000000 3155bebd 00000001 00000000 00000000

 <32 bytes per line>

BBED> sum apply
Check value for File 1, Block 1:
current = 0xbcb8, required = 0xbcb8

BBED> p kcvfhrfn
ub4 kcvfhrfn                                @368       0x00000001

BBED>
```

2.3.3.2 尝试 open 数据库

在以上所有修改完毕后就可以尝试启动数据库了：

```
SYS@oralhr> select open_mode from v$database;

OPEN_MODE
----------------------------------------
MOUNTED

SYS@oralhr> alter database open;
alter database open
*
ERROR at line 1:
ORA-01113: file 1 needs media recovery
ORA-01110: data file 1: '/oracle/app/oracle/datafile/oralhr/system01.dbf'

SYS@oralhr> recover datafile 1;
Media recovery complete.
SYS@oralhr> alter database open;

Database altered.

SYS@oralhr>
```

由于没有修改文件头与检查点有关的内容，故需要做 recover 操作，由于归档日志都在，所以直接 recover datafile 1 恢复即可。

open 的过程中的告警日志：

```
Fri Apr 15 10:51:33 2016
alter database open
Errors in file /oracle/app/oracle/diag/rdbms/oralhr/oralhr/trace/oralhr_ora_7602280.trc:
ORA-01113: file 1 needs media recovery
ORA-01110: data file 1: '/oracle/app/oracle/datafile/oralhr/system01.dbf'
ORA-1113 signalled during: alter database open...
Fri Apr 15 10:51:33 2016
Checker run found 1 new persistent data failures
Fri Apr 15 10:54:28 2016
ALTER DATABASE RECOVER  datafile 1
Media Recovery Start
Serial Media Recovery started
```

```
Recovery of Online Redo Log: Thread 1 Group 3 Seq 45 Reading mem 0
  Mem# 0: /oracle/app/oracle/datafile/oralhr/redo03.log
Media Recovery Complete (oralhr)
Completed: ALTER DATABASE RECOVER  datafile 1
Fri Apr 15 10:54:40 2016
alter database open
Beginning crash recovery of 1 threads
 parallel recovery started with 7 processes
Started redo scan
Completed redo scan
 read 16 KB redo, 15 data blocks need recovery
Started redo application at
 Thread 1: logseq 45, block 14177
Recovery of Online Redo Log: Thread 1 Group 3 Seq 45 Reading mem 0
  Mem# 0: /oracle/app/oracle/datafile/oralhr/redo03.log
Completed redo application of 0.01MB
Completed crash recovery at
 Thread 1: logseq 45, block 14209, scn 1332897
 15 data blocks read, 15 data blocks written, 16 redo k-bytes read
Fri Apr 15 10:54:41 2016
LGWR: STARTING ARCH PROCESSES
Fri Apr 15 10:54:41 2016
ARC0 started with pid=33, OS id=23003154
ARC0: Archival started
LGWR: STARTING ARCH PROCESSES COMPLETE
Thread 1 advanced to log sequence 46 (thread open)
ARC0: STARTING ARCH PROCESSES
Thread 1 opened at log sequence 46
  Current log# 1 seq# 46 mem# 0: /oracle/app/oracle/datafile/oralhr/redo01.log
Successful open of redo thread 1
MTTR advisory is disabled because FAST_START_MTTR_TARGET is not set
Fri Apr 15 10:54:41 2016
SMON: enabling cache recovery
Fri Apr 15 10:54:41 2016
ARC1 started with pid=34, OS id=39977044
Fri Apr 15 10:54:41 2016
ARC2 started with pid=35, OS id=24707290
Fri Apr 15 10:54:41 2016
ARC3 started with pid=36, OS id=34668790
ARC1: Archival started
ARC2: Archival started
ARC3: Archival started
ARC0: STARTING ARCH PROCESSES COMPLETE
ARC1: Becoming the 'no FAL' ARCH
ARC1: Becoming the 'no SRL' ARCH
ARC2: Becoming the heartbeat ARCH
[7602280] Successfully onlined Undo Tablespace 2.
Undo initialization finished serial:0 start:890311400 end:890311459 diff:59 (0 seconds)
Verifying file header compatibility for 11g tablespace encryption..
Verifying 11g file header compatibility for tablespace encryption completed
SMON: enabling tx recovery
Database Characterset is AL32UTF8
Archived Log entry 40 added for thread 1 sequence 45 ID 0x1793c569 dest 1:
No Resource Manager plan active
replication_dependency_tracking turned off (no async multimaster replication found)
Starting background process QMNC
Fri Apr 15 10:54:41 2016
QMNC started with pid=37, OS id=34537504
Completed: alter database open
Fri Apr 15 10:54:42 2016
Starting background process CJQ0
Fri Apr 15 10:54:42 2016
CJQ0 started with pid=40, OS id=21037310
Fri Apr 15 10:59:43 2016
Starting background process SMCO
Fri Apr 15 10:59:43 2016
SMCO started with pid=41, OS id=28967004
```

2.4 实验总结

其实重要的不在于恢复的过程，而在于对 BBED 工具的了解，通过 BBED 来了解文件头块的内容和格式，对于这个案例我们可以直接将备份的文件头 copy 到 1 号文件的文件头实现恢复。

About Me

....

本文作者：小麦苗，只专注于数据库的技术，更注重技术的运用

ITPUB BLOG：http://blog.itpub.net/26736162

本文地址：http://blog.itpub.net/26736162/viewspace-2084329/

本文 pdf 版：http://yunpan.cn/cdEQedhCs2kFz （提取码：ed9b）

QQ：642808185 若加 QQ 请注明您所正在读的文章标题

于 2016-04-14 10:00~ 2016-04-15 19:00 在中行完成

....