【RAC】将 RAC 备份集恢复为单实例数据库

1.1 BLOG 文档结构图

1.2 前言部分

1.2.1 导读

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 rac 数据库的备份集是如何恢复到单实例的数据库

② ASM 文件系统到 OS 文件系统的转换

③ 一般的备份恢复过程

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 实验环境介绍

源库：11.2.0.1　rac 库 2 个节点

目标库：11.2.0.1　RHEL6.5

1.2.3 相关参考文章链接

【RAC】将 RAC 备份集恢复为单实例数据库　http://blog.itpub.net/26736162/viewspace-1682255/

【RAC】将单实例备份集恢复为 rac 数据库 http://blog.itpub.net/26736162/viewspace-1682250/

【RAC】rac 环境下的数据库备份与还原 http://blog.itpub.net/26736162/viewspace-1682237/

RAC 系列

【推荐】 【RAC】如何让 Oracle RAC crs_stat 命令显示完整	http://blog.itpub.net/26736162/viewspace-1610957/
【推荐】 一步一步搭建 11gR2 rac+dg 之结尾篇(十)	http://blog.itpub.net/26736162/viewspace-1328156/
【推荐】 一步一步搭建 11gR2 rac+dg 之 DG SWITCHOVER 功能(九)	http://blog.itpub.net/26736162/viewspace-1328050/
一步一步搭建 11gR2 rac+dg 之配置单实例的 DG(八)	http://blog.itpub.net/26736162/viewspace-1298735/
一步一步搭建 11gR2 rac+dg 之 DG 机器配置(七)	http://blog.itpub.net/26736162/viewspace-1298733/
一步一步搭建 11gR2 rac+dg 之安装 rac 出现问题解决(六)	http://blog.itpub.net/26736162/viewspace-1297128/
一步一步搭建 oracle 11gR2 rac+dg 之 database 安装(五)	http://blog.itpub.net/26736162/viewspace-1297113/
一步一步搭建 oracle 11gR2 rac+dg 之 grid 安装(四)	http://blog.itpub.net/26736162/viewspace-1297101/
【推荐】 一步一步搭建 oracle 11gR2 rac+dg 之共享磁盘设置(三)	http://blog.itpub.net/26736162/viewspace-1291144/
【推荐】 一步一步搭建 oracle 11gR2 rac+dg 之环境准备(二)	http://blog.itpub.net/26736162/viewspace-1290416/

【推荐】 一步一步搭建 oracle 11gR2 rac + dg 之前传 （一）	http://blog.itpub.net/26736162/viewspace-1290405/

RMAN 备份恢复系列

【推荐】 【RMAN】rm -rf 误操作的恢复过程	http://blog.itpub.net/26736162/viewspace-1623938/
【推荐】 【RMAN】利用备份片还原数据库(中)-附加	http://blog.itpub.net/26736162/viewspace-1621938/
【推荐】 【RMAN】利用备份片还原数据库(下)	http://blog.itpub.net/26736162/viewspace-1621672/
【推荐】 【RMAN】利用备份片还原数据库(中)	http://blog.itpub.net/26736162/viewspace-1621661/
【推荐】 【RMAN】利用备份片还原数据库(上)	http://blog.itpub.net/26736162/viewspace-1621581/
【推荐】 【RMAN】RMAN 跨版本恢复(下)	http://blog.itpub.net/26736162/viewspace-1562583/
【推荐】 Oracle 组件 系列 小结	http://blog.itpub.net/26736162/viewspace-1562441/
【推荐】 【RMAN】RMAN 跨版本恢复(中)	http://blog.itpub.net/26736162/viewspace-1561352/
【推荐】 【RMAN】RMAN 跨版本恢复(上)	http://blog.itpub.net/26736162/viewspace-1561185/
【推荐】 关于在不同版本和平台之间进行还原或复制的常见问题	http://blog.itpub.net/26736162/viewspace-1549041/

【推荐】 undo 表空间文件丢失恢复（4）--无备份无 recover 的情况下恢复	http://blog.itpub.net/26736162/viewspace-1458787/
【推荐】 undo 表空间文件丢失恢复（3）--无备份无 redo 的情况下恢复	http://blog.itpub.net/26736162/viewspace-1458750/
【推荐】 undo 表空间文件丢失恢复（2）--无备份有 redo 的情况下恢复	http://blog.itpub.net/26736162/viewspace-1458663/
【推荐】 undo 表空间文件丢失恢复（1）--有备份	http://blog.itpub.net/26736162/viewspace-1458654/

【推荐】 ORACLE 数据泵之 NETWORK_LINK	http://blog.itpub.net/26736162/viewspace-1432591/

【推荐】 oracle 控制文件在缺失归档日志的情况下的恢复	http://blog.itpub.net/26736162/viewspace-1426552/
【推荐】 ORACLE 只读数据文件备份与恢复	http://blog.itpub.net/26736162/viewspace-1425283/

【推荐】 热备下的测试库搭建	http://blog.itpub.net/26736162/viewspace-1405324/

【推荐】 oracle 异构平台迁移之传输表空间一例	http://blog.itpub.net/26736162/viewspace-1391913/
【推荐】 oracle 传输表空间一例	http://blog.itpub.net/26736162/viewspace-1375260/

【推荐】 利用 rman 来实现 linux 平台数据库复制到 windows 平台数据库	http://blog.itpub.net/26736162/viewspace-1352436/
【推荐】 直接复制数据文件实现 linux 平台数据库复制到 windows 平台数据库	http://blog.itpub.net/26736162/viewspace-1352243/

【推荐】 使用 OEM 复制数据库	http://blog.itpub.net/26736162/viewspace-1224865/
【推荐】 采用 DUPLICATE 把 asm 数据库复制到文件系统	http://blog.itpub.net/26736162/viewspace-1224861/
Duplicating a Database Without Recovery Catalog or Target Connection	http://blog.itpub.net/26736162/viewspace-1223253/
【推荐】 Duplicating an Active Database	http://blog.itpub.net/26736162/viewspace-1223247/

1.2.4 本文简介

本文也可以理解成 rac 环境下的如何数据库迁移到单实例的数据库环境下，默认目标库已经安装好了同源库一样的数据库版本。

另外注意，BLOG 中代码部分需要特别关注的地方我都用黄色背景和红色字体来表示，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。

```
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
```

1.3 实验部分

1.3.1 实验目标

将 11.2.0.1 下的 rac 库备份并恢复到 11.2.0.1 下的单实例环境下。

1.3.2 源 rac 库执行

rac 库需要执行备份并传递到目标库。

1.3.2.1 查看 rac 环境及创建测试表

```
[root@node2 ~]# cat /etc/hosts
# Do not remove the following line, or various programs
# that require network functionality will fail.
127.0.0.1       localhost.localdomain localhost
::1             localhost6.localdomain6 localhost6

#public
192.168.1.31     node1
192.168.1.32     node2
#vip
192.168.1.131   node1-vip
192.168.1.132   node2-vip
#priv
9.9.9.31    node1-priv
```

```
9.9.9.32    node2-priv

#scan
192.168.1.35     cluster-scan



[root@node2 ~]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:79:BA:86
          inet addr:192.168.1.32  Bcast:192.168.1.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:150190 errors:0 dropped:0 overruns:0 frame:0
          TX packets:109804 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:205303912 (195.7 MiB)  TX bytes:20182601 (19.2 MiB)

eth0:1    Link encap:Ethernet  HWaddr 00:0C:29:79:BA:86
          inet addr:192.168.1.132  Bcast:192.168.1.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1

eth1      Link encap:Ethernet  HWaddr 00:0C:29:79:BA:90
          inet addr:9.9.9.32  Bcast:9.9.9.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:49075 errors:0 dropped:0 overruns:0 frame:0
          TX packets:49811 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:23642469 (22.5 MiB)  TX bytes:31528595 (30.0 MiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:16496 errors:0 dropped:0 overruns:0 frame:0
          TX packets:16496 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:15118447 (14.4 MiB)  TX bytes:15118447 (14.4 MiB)

[root@node2 ~]#
[root@node2 ~]# crsstat
Name                           Type                           Target     State      Host
------------------------------ ------------------------------ ---------- ---------  -------
ora.ARCH.dg                    ora.diskgroup.type             ONLINE     ONLINE     node1
ora.DATA.dg                    ora.diskgroup.type             ONLINE     ONLINE     node1
ora.LISTENER.lsnr              ora.listener.type              ONLINE     ONLINE     node1
ora.LISTENER_SCAN1.lsnr        ora.scan_listener.type         ONLINE     ONLINE     node1
ora.OVDISK.dg                  ora.diskgroup.type             ONLINE     ONLINE     node1
ora.TEST.dg                    ora.diskgroup.type             ONLINE     ONLINE     node1
ora.asm                        ora.asm.type                   ONLINE     ONLINE     node1
ora.db.db                      ora.database.type              OFFLINE    OFFLINE
ora.eons                       ora.eons.type                  ONLINE     ONLINE     node1
ora.gsd                        ora.gsd.type                   OFFLINE    OFFLINE
ora.jmrac.db                   ora.database.type              ONLINE     ONLINE     node1
ora.jmrac.haha.svc             ora.service.type               ONLINE     ONLINE     node1
ora.net1.network               ora.network.type               ONLINE     ONLINE     node1
ora.node1.ASM1.asm             application                    ONLINE     ONLINE     node1
ora.node1.LISTENER_NODE1.lsnr  application                    ONLINE     ONLINE     node1
ora.node1.gsd                  application                    OFFLINE    OFFLINE
ora.node1.ons                  application                    ONLINE     ONLINE     node1
ora.node1.vip                  ora.cluster_vip_net1.type      ONLINE     ONLINE     node1
ora.node2.ASM2.asm             application                    ONLINE     ONLINE     node2
ora.node2.LISTENER_NODE2.lsnr  application                    ONLINE     ONLINE     node2
ora.node2.gsd                  application                    OFFLINE    OFFLINE
ora.node2.ons                  application                    ONLINE     ONLINE     node2
ora.node2.vip                  ora.cluster_vip_net1.type      ONLINE     ONLINE     node2
ora.oc4j                       ora.oc4j.type                  OFFLINE    OFFLINE
ora.ons                        ora.ons.type                   ONLINE     ONLINE     node1
ora.ora11g.db                  ora.database.type              OFFLINE    OFFLINE
ora.registry.acfs              ora.registry.acfs.type         ONLINE     ONLINE     node1
```

```
ora.scan1.vip                  ora.scan_vip.type          ONLINE     ONLINE     node1
[root@node2 ~]#
[oracle@node2 ~]$ ORACLE_SID=jmrac2
[oracle@node2 ~]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.1.0 Production on Fri May 29 10:58:42 2015

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Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production
With the Partitioning, Real Application Clusters, Automatic Storage Management, OLAP,
Data Mining and Real Application Testing options

SQL> show parameter cluster

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
cluster_database                     boolean     TRUE
cluster_database_instances           integer     2
cluster_interconnects                string
SQL> show parameter name

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
db_file_name_convert                 string
db_name                              string      jmrac
db_unique_name                       string      jmrac
global_names                         boolean     FALSE
instance_name                        string      jmrac2
lock_name_space                      string
log_file_name_convert                string
service_names                        string      HAHA
SQL> archive log list;
Database log mode              Archive Mode
Automatic archival             Enabled
Archive destination            USE_DB_RECOVERY_FILE_DEST
Oldest online log sequence     41
Next log sequence to archive   42
Current log sequence           42
SQL>
SQL> create table lhr.rac_to_single_test as select * from dba_objects;

Table created.

SQL> select count(1) from lhr.rac_to_single_test ;

  COUNT(1)
----------
     72510

SQL>
SQL> set line 9999 pagesize 9999
SQL> col FILE_NAME format a60
SQL> select 'datafile' file_type, file#,name FILE_NAME,status,enabled from v$datafile
  2  union all
  3  select 'tempfile',file#,name FILE_NAME,status,enabled from v$tempfile
  4  union all
  5  select 'logfile',group# file#,member FILE_NAME,status,'' from v$logfile
  6  union all
  7  select 'controlfile', to_number('') ,name FILE_NAME,status,'' from v$controlfile
  8  ;

FILE_TYPE        FILE# FILE_NAME                                                  STATUS  ENABLED
---------- ---------- ------------------------------------------------------------ ------- ----------
datafile            1 +DATA/jmrac/datafile/system.268.877470209                    SYSTEM  READ WRITE
```

```
datafile            2 +DATA/jmrac/datafile/sysaux.269.877470211                ONLINE  READ WRITE
datafile            3 +DATA/jmrac/datafile/undotbs1.270.877470213              ONLINE  READ WRITE
datafile            4 +DATA/jmrac/datafile/users.271.877470213                 ONLINE  READ WRITE
datafile            5 +DATA/jmrac/datafile/example.279.877470401               ONLINE  READ WRITE
datafile            6 +DATA/jmrac/datafile/undotbs2.280.877470779              ONLINE  READ WRITE
tempfile            1 +DATA/jmrac/tempfile/temp.278.877470381                  ONLINE  READ WRITE
logfile             2 +DATA/jmrac/onlinelog/group_2.276.877470349
logfile             2 +DATA/jmrac/onlinelog/group_2.277.877470349
logfile             1 +DATA/jmrac/onlinelog/group_1.274.877470345
logfile             1 +DATA/jmrac/onlinelog/group_1.275.877470345
logfile             3 +DATA/jmrac/onlinelog/group_3.281.877470929
logfile             3 +DATA/jmrac/onlinelog/group_3.282.877470931
logfile             4 +DATA/jmrac/onlinelog/group_4.283.877470937
logfile             4 +DATA/jmrac/onlinelog/group_4.284.877470943
controlfile           +DATA/jmrac/controlfile/current.273.877470341
controlfile           +DATA/jmrac/controlfile/current.272.877470343

17 rows selected.

SQL>
```

我后续将在 192.168.1.32 即 rac 的第二个节点上执行操作，db_name 为 jmrac，数据库为归档模式，创建测试表 lhr.rac_to_single_test，数据量为 72510 行，其中有个 crsstat 命令，可以参考：【RAC】如何让 Oracle RAC crs_stat 命令显示完整 **http://blog.itpub.net/26736162/viewspace-1610957/**

1.3.2.2 生成 pfile 文件

```
SQL> show parameter instance_n

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
instance_name                        string      jmrac2
instance_number                      integer     2
SQL> show parameter spfile

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
spfile                               string      +DATA/jmrac/spfilejmrac.ora
SQL> create pfile='/home/oracle/rman_back/initjmrac.ora' from spfile;

File created.

SQL>
```

1.3.2.3 执行备份操作

备份脚本如下：

```
run
{
 allocate channel c1 type disk;
```

```
 allocate channel c2 type disk;
 backup database format  '/home/oracle/rman_back/full_%n_%T_%t_%s_%p.bak';
 sql 'alter system archive log current';
 backup archivelog all format '/home/oracle/rman_back/arch_%d_%T_%s_%p.bak' delete input;
 backup current controlfile format '/home/oracle/rman_back/ctl_%d_%T_%s_%p.bak';
 release channel c1;
 release channel c2;
}
```

执行过程如下：

```
[oracle@node2 ~]$ rman target /

Recovery Manager: Release 11.2.0.1.0 - Production on Fri May 29 11:12:51 2015

Copyright (c) 1982, 2009, Oracle and/or its affiliates.  All rights reserved.

connected to target database: JMRAC (DBID=1916705604)

{
run
2> {
3>  allocate channel c1 type disk;
4>  allocate channel c2 type disk;
5>  backup database format  '/home/oracle/rman_back/full_%n_%T_%t_%s_%p.bak';
6>  sql 'alter system archive log current';
7>  backup archivelog all format '/home/oracle/rman_back/arch_%d_%T_%s_%p.bak' delete input;
8>  backup current controlfile format '/home/oracle/rman_back/ctl_%d_%T_%s_%p.bak';
9>  release channel c1;
10>  release channel c2;
11> }

using target database control file instead of recovery catalog
allocated channel: c1
channel c1: SID=55 instance=jmrac2 device type=DISK

allocated channel: c2
channel c2: SID=57 instance=jmrac2 device type=DISK

Starting backup at 29-MAY-2015 11:12:59
channel c1: starting full datafile backup set
channel c1: specifying datafile(s) in backup set
input datafile file number=00001 name=+DATA/jmrac/datafile/system.268.877470209
input datafile file number=00004 name=+DATA/jmrac/datafile/users.271.877470213
input datafile file number=00006 name=+DATA/jmrac/datafile/undotbs2.280.877470779
channel c1: starting piece 1 at 29-MAY-2015 11:13:00
channel c2: starting full datafile backup set
channel c2: specifying datafile(s) in backup set
input datafile file number=00002 name=+DATA/jmrac/datafile/sysaux.269.877470211
input datafile file number=00005 name=+DATA/jmrac/datafile/example.279.877470401
input datafile file number=00003 name=+DATA/jmrac/datafile/undotbs1.270.877470213
channel c2: starting piece 1 at 29-MAY-2015 11:13:00
channel c1: finished piece 1 at 29-MAY-2015 11:15:35
piece handle=/home/oracle/rman_back/full_JMRACxxx_20150529_880974780_5_1.bak tag=TAG20150529T111259 comment=NONE
channel c1: backup set complete, elapsed time: 00:02:35
channel c1: starting full datafile backup set
channel c1: specifying datafile(s) in backup set
channel c2: finished piece 1 at 29-MAY-2015 11:15:35
piece handle=/home/oracle/rman_back/full_JMRACxxx_20150529_880974780_6_1.bak tag=TAG20150529T111259 comment=NONE
channel c2: backup set complete, elapsed time: 00:02:35
channel c2: starting full datafile backup set
channel c2: specifying datafile(s) in backup set
including current SPFILE in backup set
channel c2: starting piece 1 at 29-MAY-2015 11:15:35
```

```
including current control file in backup set
channel c1: starting piece 1 at 29-MAY-2015 11:15:38
channel c2: finished piece 1 at 29-MAY-2015 11:15:38
piece handle=/home/oracle/rman_back/full_JMRACxxx_20150529_880974935_8_1.bak tag=TAG20150529T111259 comment=NONE
channel c2: backup set complete, elapsed time: 00:00:03
channel c1: finished piece 1 at 29-MAY-2015 11:15:40
piece handle=/home/oracle/rman_back/full_JMRACxxx_20150529_880974935_7_1.bak tag=TAG20150529T111259 comment=NONE
channel c1: backup set complete, elapsed time: 00:00:02
Finished backup at 29-MAY-2015 11:15:40

sql statement: alter system archive log current

Starting backup at 29-MAY-2015 11:15:53
current log archived
channel c1: starting archived log backup set
channel c1: specifying archived log(s) in backup set
input archived log thread=2 sequence=31 RECID=50 STAMP=879502099
input archived log thread=1 sequence=24 RECID=52 STAMP=879511365
input archived log thread=2 sequence=32 RECID=51 STAMP=879502100
input archived log thread=1 sequence=25 RECID=55 STAMP=879527440
input archived log thread=2 sequence=33 RECID=53 STAMP=879522769
input archived log thread=2 sequence=34 RECID=54 STAMP=879527240
input archived log thread=2 sequence=35 RECID=57 STAMP=879586992
input archived log thread=1 sequence=26 RECID=56 STAMP=879527447
input archived log thread=1 sequence=27 RECID=60 STAMP=879590456
input archived log thread=2 sequence=36 RECID=58 STAMP=879586995
input archived log thread=2 sequence=37 RECID=59 STAMP=879590456
input archived log thread=1 sequence=28 RECID=61 STAMP=879590457
channel c1: starting piece 1 at 29-MAY-2015 11:16:05
channel c2: starting archived log backup set
channel c2: specifying archived log(s) in backup set
input archived log thread=2 sequence=38 RECID=63 STAMP=880971338
input archived log thread=1 sequence=29 RECID=62 STAMP=880971333
input archived log thread=2 sequence=39 RECID=64 STAMP=880971341
input archived log thread=1 sequence=30 RECID=65 STAMP=880972786
input archived log thread=2 sequence=40 RECID=66 STAMP=880972787
input archived log thread=2 sequence=41 RECID=67 STAMP=880972787
input archived log thread=1 sequence=31 RECID=68 STAMP=880974598
channel c2: starting piece 1 at 29-MAY-2015 11:16:05
channel c1: finished piece 1 at 29-MAY-2015 11:16:20
piece handle=/home/oracle/rman_back/arch_JMRAC_20150529_9_1.bak tag=TAG20150529T111603 comment=NONE
channel c1: backup set complete, elapsed time: 00:00:15
channel c1: deleting archived log(s)
archived log file name=+DATA/jmrac/archivelog/2015_05_12/thread_2_seq_31.359.879502097 RECID=50 STAMP=879502099
archived log file name=+DATA/jmrac/archivelog/2015_05_12/thread_1_seq_24.356.879511361 RECID=52 STAMP=879511365
archived log file name=+DATA/jmrac/archivelog/2015_05_12/thread_2_seq_32.357.879502099 RECID=51 STAMP=879502100
archived log file name=+DATA/jmrac/archivelog/2015_05_12/thread_1_seq_25.352.879527441 RECID=55 STAMP=879527440
archived log file name=+DATA/jmrac/archivelog/2015_05_12/thread_2_seq_33.353.879522767 RECID=53 STAMP=879522769
archived log file name=+DATA/jmrac/archivelog/2015_05_12/thread_2_seq_34.351.879527239 RECID=54 STAMP=879527240
archived log file name=+DATA/jmrac/archivelog/2015_05_13/thread_2_seq_35.333.879586991 RECID=57 STAMP=879586992
archived log file name=+DATA/jmrac/archivelog/2015_05_12/thread_1_seq_26.335.879527445 RECID=56 STAMP=879527447
archived log file name=+DATA/jmrac/archivelog/2015_05_13/thread_1_seq_27.331.879590457 RECID=60 STAMP=879590456
archived log file name=+DATA/jmrac/archivelog/2015_05_13/thread_2_seq_36.334.879586995 RECID=58 STAMP=879586995
archived log file name=+DATA/jmrac/archivelog/2015_05_13/thread_2_seq_37.332.879590455 RECID=59 STAMP=879590456
archived log file name=+DATA/jmrac/archivelog/2015_05_13/thread_1_seq_28.329.879590457 RECID=61 STAMP=879590457
channel c1: starting archived log backup set
channel c1: specifying archived log(s) in backup set
input archived log thread=2 sequence=42 RECID=70 STAMP=880974952
input archived log thread=1 sequence=32 RECID=69 STAMP=880974952
input archived log thread=1 sequence=33 RECID=72 STAMP=880974959
input archived log thread=2 sequence=43 RECID=71 STAMP=880974953
channel c1: starting piece 1 at 29-MAY-2015 11:16:23
channel c2: finished piece 1 at 29-MAY-2015 11:16:23
piece handle=/home/oracle/rman_back/arch_JMRAC_20150529_10_1.bak tag=TAG20150529T111603 comment=NONE
channel c2: backup set complete, elapsed time: 00:00:18
channel c2: deleting archived log(s)
archived log file name=+DATA/jmrac/archivelog/2015_05_29/thread_2_seq_38.330.880971315 RECID=63 STAMP=880971338
```

```
archived log file name=+DATA/jmrac/archivelog/2015_05_29/thread_1_seq_29.327.880971317 RECID=62 STAMP=880971333
archived log file name=+DATA/jmrac/archivelog/2015_05_29/thread_2_seq_39.326.880971341 RECID=64 STAMP=880971341
archived log file name=+DATA/jmrac/archivelog/2015_05_29/thread_1_seq_30.328.880972785 RECID=65 STAMP=880972786
archived log file name=+DATA/jmrac/archivelog/2015_05_29/thread_2_seq_40.325.880972785 RECID=66 STAMP=880972787
archived log file name=+DATA/jmrac/archivelog/2015_05_29/thread_2_seq_41.324.880972787 RECID=67 STAMP=880972787
archived log file name=+DATA/jmrac/archivelog/2015_05_29/thread_1_seq_31.322.880974595 RECID=68 STAMP=880974598
channel c1: finished piece 1 at 29-MAY-2015 11:16:23
piece handle=/home/oracle/rman_back/arch_JMRAC_20150529_11_1.bak tag=TAG20150529T111603 comment=NONE
channel c1: backup set complete, elapsed time: 00:00:00
channel c1: deleting archived log(s)
archived log file name=+DATA/jmrac/archivelog/2015_05_29/thread_2_seq_42.321.880974951 RECID=70 STAMP=880974952
archived log file name=+DATA/jmrac/archivelog/2015_05_29/thread_1_seq_32.323.880974951 RECID=69 STAMP=880974952
archived log file name=+DATA/jmrac/archivelog/2015_05_29/thread_1_seq_33.318.880974959 RECID=72 STAMP=880974959
archived log file name=+DATA/jmrac/archivelog/2015_05_29/thread_2_seq_43.320.880974953 RECID=71 STAMP=880974953
Finished backup at 29-MAY-2015 11:16:23

Starting backup at 29-MAY-2015 11:16:24
channel c1: starting full datafile backup set
channel c1: specifying datafile(s) in backup set
including current control file in backup set
channel c1: starting piece 1 at 29-MAY-2015 11:16:25
channel c1: finished piece 1 at 29-MAY-2015 11:16:26
piece handle=/home/oracle/rman_back/ctl_JMRAC_20150529_12_1.bak tag=TAG20150529T111624 comment=NONE
channel c1: backup set complete, elapsed time: 00:00:01
Finished backup at 29-MAY-2015 11:16:26

released channel: c1

released channel: c2

RMAN>

RMAN> exit


Recovery Manager complete.

[oracle@node2 ~]$ cd rman_back/
[oracle@node2 rman_back]$ ll
total 1313928
-rw-r----- 1 oracle asmadmin  85005824 May 29 11:16 arch_JMRAC_20150529_10_1.bak
-rw-r----- 1 oracle asmadmin  14320128 May 29 11:16 arch_JMRAC_20150529_11_1.bak
-rw-r----- 1 oracle asmadmin  34693632 May 29 11:16 arch_JMRAC_20150529_9_1.bak
-rw-r----- 1 oracle asmadmin  18579456 May 29 11:16 ctl_JMRAC_20150529_12_1.bak
-rw-r----- 1 oracle asmadmin 648372224 May 29 11:15 full_JMRACxxx_20150529_880974780_5_1.bak
-rw-r----- 1 oracle asmadmin 524435456 May 29 11:15 full_JMRACxxx_20150529_880974780_6_1.bak
-rw-r----- 1 oracle asmadmin  18579456 May 29 11:15 full_JMRACxxx_20150529_880974935_7_1.bak
-rw-r----- 1 oracle asmadmin     98304 May 29 11:15 full_JMRACxxx_20150529_880974935_8_1.bak
-rw-r--r-- 1 oracle asmadmin      1371 May 29 11:08 initjmrac.ora
[oracle@node2 rman_back]$
[oracle@node2 rman_back]$ ll -h
total 1.3G
-rw-r----- 1 oracle asmadmin  82M May 29 11:16 arch_JMRAC_20150529_10_1.bak
-rw-r----- 1 oracle asmadmin  14M May 29 11:16 arch_JMRAC_20150529_11_1.bak
-rw-r----- 1 oracle asmadmin  34M May 29 11:16 arch_JMRAC_20150529_9_1.bak
-rw-r----- 1 oracle asmadmin  18M May 29 11:16 ctl_JMRAC_20150529_12_1.bak
-rw-r----- 1 oracle asmadmin 619M May 29 11:15 full_JMRACxxx_20150529_880974780_5_1.bak
-rw-r----- 1 oracle asmadmin 501M May 29 11:15 full_JMRACxxx_20150529_880974780_6_1.bak
-rw-r----- 1 oracle asmadmin  18M May 29 11:15 full_JMRACxxx_20150529_880974935_7_1.bak
-rw-r----- 1 oracle asmadmin  96K May 29 11:15 full_JMRACxxx_20150529_880974935_8_1.bak
-rw-r--r-- 1 oracle asmadmin 1.4K May 29 11:08 initjmrac.ora
[oracle@node2 rman_back]$
```

1.3.2.4 将备份传递到 target 库

这个方法就多了，可以采用 ftp 上传下载，也可以采用 NFS 网络文件系统，或者 scp 命令都可以，这里我们采用 scp 直接传递。

源库：

```
[oracle@node2 rman_back]$ scp -r /home/oracle/rman_back  oracle@192.168.59.129:/home/oracle
ssh: connect to host 192.168.59.129 port 22: Network is unreachable
lost connection
```

由于 source db 的 IP 为 192.168.1.32，而目标库的 IP 为 192.168.59.129，不在同一个网段，所以我对目标库再添加一块网卡，所以目标库的 IP 配置如下：

目标库再添加一块网卡后：

```
[oracle@orcltest ~]$ ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:E7:E6:B0
          inet addr:192.168.59.129  Bcast:192.168.59.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fee7:e6b0/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:165 errors:0 dropped:0 overruns:0 frame:0
          TX packets:108 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:17969 (17.5 KiB)  TX bytes:17510 (17.0 KiB)

eth1      Link encap:Ethernet  HWaddr 00:0C:29:E7:E6:A6
          inet addr:192.168.1.128  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fee7:e6a6/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:3 errors:0 dropped:0 overruns:0 frame:0
          TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:746 (746.0 b)  TX bytes:1152 (1.1 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:5558 errors:0 dropped:0 overruns:0 frame:0
          TX packets:5558 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:354142 (345.8 KiB)  TX bytes:354142 (345.8 KiB)
```

源库 scp 操作：

```
[oracle@node2 rman_back]$ scp -r /home/oracle/rman_back  oracle@192.168.1.128:/home/oracle
The authenticity of host '192.168.1.128 (192.168.1.128)' can't be established.
RSA key fingerprint is 77:e6:11:1a:7c:c7:81:7c:88:c9:21:18:51:2a:84:d1.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.1.128' (RSA) to the list of known hosts.
oracle@192.168.1.128's password:
ctl_JMRAC_20150529_12_1.bak                                                                                 100%   18MB  17.7MB/s   00:01
arch_JMRAC_20150529_10_1.bak                                                                                100%   81MB  27.0MB/s   00:03
arch_JMRAC_20150529_9_1.bak                                                                                 100%   33MB  16.5MB/s   00:02
```

```
full_JMRACxxx_20150529_880974935_7_1.bak                                                    100%   18MB  17.7MB/s   00:01
full_JMRACxxx_20150529_880974780_5_1.bak                                                    100%  618MB  12.4MB/s   00:50
initjmrac.ora                                                                               100% 1371     1.3KB/s   00:00
full_JMRACxxx_20150529_880974780_6_1.bak                                                    100%  500MB  15.2MB/s   00:33
arch_JMRAC_20150529_11_1.bak                                                                100%   14MB   3.4MB/s   00:04
full_JMRACxxx_20150529_880974935_8_1.bak                                                    100%   96KB  96.0KB/s   00:00
[oracle@node2 rman_back]$
```

目标库查看结果：

```
[oracle@orcltest rman_back]$ ll -h
total 1.3G
-rw-r----- 1 oracle oinstall  82M May 29 12:26 arch_JMRAC_20150529_10_1.bak
-rw-r----- 1 oracle oinstall  14M May 29 12:28 arch_JMRAC_20150529_11_1.bak
-rw-r----- 1 oracle oinstall  34M May 29 12:26 arch_JMRAC_20150529_9_1.bak
-rw-r----- 1 oracle oinstall  18M May 29 12:26 ctl_JMRAC_20150529_12_1.bak
-rw-r----- 1 oracle oinstall 619M May 29 12:27 full_JMRACxxx_20150529_880974780_5_1.bak
-rw-r----- 1 oracle oinstall 501M May 29 12:28 full_JMRACxxx_20150529_880974780_6_1.bak
-rw-r----- 1 oracle oinstall  18M May 29 12:26 full_JMRACxxx_20150529_880974935_7_1.bak
-rw-r----- 1 oracle oinstall  96K May 29 12:28 full_JMRACxxx_20150529_880974935_8_1.bak
-rw-r--r-- 1 oracle oinstall 1.4K May 29 12:27 initjmrac.ora
[oracle@orcltest rman_back]$
```

至此，源库 rac 上需要操作的内容已完成。

1.3.3 target 库上执行

1.3.3.1 修改 pfile 文件生成 spfile 文件、生成 pfile 中的文件路径

主要有两方面的修改：

修改含文件路径的参数，达到符合当前服务器环境的实际情况，如 audit_file_dest，control_files，db_recovery_file_dest

修改多实例相关的参数,如 cluster_database，带有实例名的前缀

源 pfile 文件内容：

```
[oracle@orcltest rman_back]$ cp initjmrac.ora initjmrac.ora_bk
[oracle@orcltest rman_back]$ more initjmrac.ora_bk
jmrac1.__db_cache_size=16777216
jmrac2.__db_cache_size=16777216
jmrac1.__java_pool_size=4194304
jmrac2.__java_pool_size=4194304
jmrac1.__large_pool_size=4194304
jmrac2.__large_pool_size=4194304
jmrac1.__pga_aggregate_target=209715200
jmrac2.__pga_aggregate_target=209715200
jmrac1.__sga_target=314572800
```

```
jmrac2.__sga_target=314572800
jmrac1.__shared_io_pool_size=0
jmrac2.__shared_io_pool_size=0
jmrac1.__shared_pool_size=281018368
jmrac2.__shared_pool_size=281018368
jmrac1.__streams_pool_size=0
jmrac2.__streams_pool_size=0
*.audit_file_dest='/u01/app/oracle/admin/jmrac/adump'
*.audit_trail='db'
*.cluster_database=true
*.compatible='11.2.0.0.0'
*.control_files='+DATA/jmrac/controlfile/current.273.877470341','+DATA/jmrac/controlfile/current.272.877470343'
*.db_block_size=8192
*.db_create_file_dest='+DATA'
*.db_domain=''
*.db_name='jmrac'
*.db_recovery_file_dest='+DATA'
*.db_recovery_file_dest_size=4070572032
*.diagnostic_dest='/u01/app/oracle'
*.dispatchers='(PROTOCOL=TCP) (SERVICE=jmracXDB)'
jmrac2.instance_number=2
jmrac1.instance_number=1
*.log_archive_format='%t_%s_%r.dbf'
*.memory_target=524288000
*.nls_date_format='YYYY-MM-DD HH24:mi:ss'
*.open_cursors=300
*.processes=1500
*.remote_listener='remote_lsnr_jmrac'
*.remote_login_passwordfile='exclusive'
jmrac2.thread=2
jmrac1.thread=1
jmrac2.undo_tablespace='UNDOTBS2'
jmrac1.undo_tablespace='UNDOTBS1'
[oracle@orcltest rman_back]$
```

最终修改完之后，这里的初始化参数如下，比如原来的文件精简不少：

```
[oracle@orcltest rman_back]$ more initjmrac.ora
*.audit_file_dest='/u01/app/oracle/admin/jmrac/adump'
*.audit_trail='db'
*.compatible='11.2.0.0.0'
*.control_files='/u01/app/oracle/oradata/jmrac/control01.ctl','/u01/app/oracle/oradata/jmrac/control02.ctl'
*.db_block_size=8192
*.db_domain=''
*.db_name='jmrac'
*.db_recovery_file_dest='/u01/app/oracle/flash_recovery_area'
*.db_recovery_file_dest_size=4070572032
*.diagnostic_dest='/u01/app/oracle'
*.dispatchers='(PROTOCOL=TCP) (SERVICE=jmracXDB)'
*.log_archive_format='%t_%s_%r.dbf'
*.memory_target=524288000
*.nls_date_format='YYYY-MM-DD HH24:mi:ss'
*.open_cursors=300
*.processes=1500
*.remote_login_passwordfile='exclusive'
```

创建相关路径：

```
[oracle@orcltest onlinelog]$ mkdir -p /u01/app/oracle/admin/jmrac/adump
[oracle@orcltest onlinelog]$ mkdir -p /u01/app/oracle/oradata/jmrac/
```

```
[oracle@orcltest onlinelog]$ sqlplus -v

SQL*Plus: Release 11.2.0.1.0 Production

[oracle@orcltest onlinelog]$
[oracle@orcltest ~]$ env | grep ORA
ORACLE_BASE=/u01/app/oracle
ORACLE_HOME=/u01/app/oracle/product/11.2.0/dbhome_1
[oracle@orcltest ~]$ cd /u01/app/oracle/
```

生成 spfile 文件：

```
[oracle@orcltest dbs]$ ORACLE_SID=jmrac
[oracle@orcltest dbs]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.1.0 Production on Fri May 29 13:58:37 2015

Copyright (c) 1982, 2009, Oracle.  All rights reserved.

Connected to an idle instance.

SQL> create spfile from pfile='/home/oracle/rman_back/initjmrac.ora';

File created.

SQL> exit
Disconnected
[oracle@orcltest dbs]$ cd $ORACLE_HOME/dbs
[oracle@orcltest dbs]$ ll spfilejmrac.ora
-rw-r----- 1 oracle asmadmin 2560 May 29 13:59 spfilejmrac.ora
[oracle@orcltest dbs]$
```

1.3.3.2 启动到 nomount 状态并还原控制文件

```
[oracle@orcltest dbs]$ rman target /

Recovery Manager: Release 11.2.0.1.0 - Production on Fri May 29 14:45:56 2015

Copyright (c) 1982, 2009, Oracle and/or its affiliates.  All rights reserved.

connected to target database (not started)

RMAN> startup nomount;

Oracle instance started

Total System Global Area     521936896 bytes

Fixed Size                     2214936 bytes
Variable Size                482345960 bytes
Database Buffers              29360128 bytes
Redo Buffers                   8015872 bytes

RMAN> restore controlfile from '/home/oracle/rman_back/ctl_JMRAC_20150529_12_1.bak';

Starting restore at 2015-05-29 14:47:09
using target database control file instead of recovery catalog
allocated channel: ORA_DISK_1
```

```
channel ORA_DISK_1: SID=1146 device type=DISK

channel ORA_DISK_1: restoring control file
channel ORA_DISK_1: restore complete, elapsed time: 00:00:03
output file name=/u01/app/oracle/oradata/jmrac/control01.ctl
output file name=/u01/app/oracle/oradata/jmrac/control02.ctl
Finished restore at 2015-05-29 14:47:13

RMAN>
```

控制文件已经还原，注意**此处控制文件的还原路径是 spfile 中指定的路径**，接下来还原数据文件及恢复数据库。

1.3.3.3 启动到 mount 状态并还原和恢复整个数据库

一、 restore 数据库

```
RMAN> alter database mount;

database mounted
released channel: ORA_DISK_1

RMAN> list backupset summary;


List of Backups
===============
Key     TY LV S Device Type Completion Time     #Pieces #Copies Compressed Tag
------- -- -- - ----------- ------------------- ------- ------- ---------- ---
5       B  F  A DISK        2015-05-29 11:15:26 1       1       NO         TAG20150529T111259
6       B  F  A DISK        2015-05-29 11:15:31 1       1       NO         TAG20150529T111259
7       B  F  A DISK        2015-05-29 11:15:38 1       1       NO         TAG20150529T111259
8       B  F  A DISK        2015-05-29 11:15:39 1       1       NO         TAG20150529T111259
9       B  A  A DISK        2015-05-29 11:16:13 1       1       NO         TAG20150529T111603
10      B  A  A DISK        2015-05-29 11:16:17 1       1       NO         TAG20150529T111603
11      B  A  A DISK        2015-05-29 11:16:23 1       1       NO         TAG20150529T111603

RMAN>
RMAN> list backupset of archivelog all;


List of Backup Sets
===================


BS Key  Size       Device Type Elapsed Time Completion Time
------- ---------- ----------- ------------ -------------------
9       33.09M     DISK        00:00:08     2015-05-29 11:16:13
        BP Key: 9   Status: AVAILABLE  Compressed: NO  Tag: TAG20150529T111603
        Piece Name: /home/oracle/rman_back/arch_JMRAC_20150529_9_1.bak

  List of Archived Logs in backup set 9
  Thrd Seq     Low SCN    Low Time            Next SCN   Next Time
```

```
  ---- -------- ---------- ------------------- ---------- ---------
  1    24       1389153    2015-05-10 17:55:23 1442215    2015-05-12 12:42:40
  1    25       1442215    2015-05-12 12:42:40 1466390    2015-05-12 17:10:39
  1    26       1466390    2015-05-12 17:10:39 1466392    2015-05-12 17:10:40
  1    27       1466392    2015-05-12 17:10:40 1512521    2015-05-13 10:40:54
  1    28       1512521    2015-05-13 10:40:54 1512530    2015-05-13 10:40:56
  2    31       1389149    2015-05-10 17:55:22 1419988    2015-05-12 10:06:07
  2    32       1419988    2015-05-12 10:06:07 1419992    2015-05-12 10:06:07
  2    33       1444571    2015-05-12 13:34:16 1453906    2015-05-12 15:52:46
  2    34       1454056    2015-05-12 15:57:38 1466360    2015-05-12 17:07:19
  2    35       1466388    2015-05-12 17:10:39 1489679    2015-05-13 09:43:06
  2    36       1489679    2015-05-13 09:43:06 1489698    2015-05-13 09:43:08
  2    37       1490870    2015-05-13 10:00:32 1512524    2015-05-13 10:40:55

BS Key  Size       Device Type Elapsed Time Completion Time
------- ---------- ----------- ------------ -------------------
10      81.07M     DISK        00:00:12     2015-05-29 11:16:17
        BP Key: 10   Status: AVAILABLE  Compressed: NO  Tag: TAG20150529T111603
        Piece Name: /home/oracle/rman_back/arch_JMRAC_20150529_10_1.bak

  List of Archived Logs in backup set 10
  Thrd Seq     Low SCN    Low Time            Next SCN   Next Time
  ---- ------- ---------- ------------------- ---------- ---------
  1    29      1513517    2015-05-13 10:42:36 1591218    2015-05-29 10:15:08
  1    30      1591218    2015-05-29 10:15:08 1613556    2015-05-29 10:39:43
  1    31      1613556    2015-05-29 10:39:43 1621589    2015-05-29 11:09:52
  2    38      1512524    2015-05-13 10:40:55 1570420    2015-05-29 10:11:10
  2    39      1570420    2015-05-29 10:11:10 1570422    2015-05-29 10:11:11
  2    40      1592133    2015-05-29 10:20:48 1613554    2015-05-29 10:39:43
  2    41      1613554    2015-05-29 10:39:43 1613562    2015-05-29 10:39:44

BS Key  Size       Device Type Elapsed Time Completion Time
------- ---------- ----------- ------------ -------------------
11      13.66M     DISK        00:00:01     2015-05-29 11:16:23
        BP Key: 11   Status: AVAILABLE  Compressed: NO  Tag: TAG20150529T111603
        Piece Name: /home/oracle/rman_back/arch_JMRAC_20150529_11_1.bak

  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

RMAN>
```

这里需要注意的是，数据文件的转换，由于原 rac 库是 asm 存储的，所以到新环境需要采用 set newname 来转换一下，相关的可以参考哥的 blog：【oracle 官网】 Restoring a Database on a New Host **http://blog.itpub.net/26736162/viewspace-1548104/**，这里就直接操作了。

先得到转换的脚本：

```
SQL> set pagesize  200 linesize 200
SQL> select 'set newname for datafile ' || a.FILE# || ' to "' || a.NAME || '";'
  2    from v$datafile a
  3  union all
  4  select 'set newname for tempfile ' || a.FILE# || ' to "' || a.NAME || '";'
  5    from v$tempfile a
  6  union all
  7  SELECT 'SQL "ALTER DATABASE RENAME FILE ''''' || a.MEMBER || '''''  to  ''''' ||
```

```
  8         a.MEMBER || ''''' '';'
  9    FROM v$logfile a;

'SETNEWNAMEFORDATAFILE'||A.FILE#||'TO''||A.NAME||'';'
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
set newname for datafile 1 to "+DATA/jmrac/datafile/system.268.877470209";
set newname for datafile 2 to "+DATA/jmrac/datafile/sysaux.269.877470211";
set newname for datafile 3 to "+DATA/jmrac/datafile/undotbs1.270.877470213";
set newname for datafile 4 to "+DATA/jmrac/datafile/users.271.877470213";
set newname for datafile 5 to "+DATA/jmrac/datafile/example.279.877470401";
set newname for datafile 6 to "+DATA/jmrac/datafile/undotbs2.280.877470779";
set newname for tempfile 1 to "+DATA/jmrac/tempfile/temp.278.877470381";
SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_2.276.877470349''  to  ''+DATA/jmrac/onlinelog/group_2.276.877470349'' ";
SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_2.277.877470349''  to  ''+DATA/jmrac/onlinelog/group_2.277.877470349'' ";
SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_1.274.877470345''  to  ''+DATA/jmrac/onlinelog/group_1.274.877470345'' ";
SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_1.275.877470345''  to  ''+DATA/jmrac/onlinelog/group_1.275.877470345'' ";
SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_3.281.877470929''  to  ''+DATA/jmrac/onlinelog/group_3.281.877470929'' ";
SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_3.282.877470931''  to  ''+DATA/jmrac/onlinelog/group_3.282.877470931'' ";
SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_4.283.877470937''  to  ''+DATA/jmrac/onlinelog/group_4.283.877470937'' ";
SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_4.284.877470943''  to  ''+DATA/jmrac/onlinelog/group_4.284.877470943'' ";

15 rows selected.

SQL>
```

修改后如下：

```
RUN
{
  ALLOCATE CHANNEL c1 DEVICE TYPE DISK;
  set newname for datafile 1 to "/u01/app/oracle/oradata/jmrac/system01.dbf";
  set newname for datafile 2 to "/u01/app/oracle/oradata/jmrac/sysaux01.dbf";
  set newname for datafile 3 to "/u01/app/oracle/oradata/jmrac/undotbs01.dbf";
  set newname for datafile 4 to "/u01/app/oracle/oradata/jmrac/users01.dbf";
  set newname for datafile 5 to "/u01/app/oracle/oradata/jmrac/example01.dbf";
  set newname for datafile 6 to "/u01/app/oracle/oradata/jmrac/undotbs02.dbf";
  set newname for tempfile 1 to "/u01/app/oracle/oradata/jmrac/temp01.dbf";
  SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_2.276.877470349''  to  ''/u01/app/oracle/oradata/jmrac/redo02_1.log'' ";
  SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_2.277.877470349''  to  ''/u01/app/oracle/oradata/jmrac/redo02_2.log'' ";
  SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_1.274.877470345''  to  ''/u01/app/oracle/oradata/jmrac/redo01_1.log'' ";
  SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_1.275.877470345''  to  ''/u01/app/oracle/oradata/jmrac/redo01_2.log'' ";
  SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_3.281.877470929''  to  ''/u01/app/oracle/oradata/jmrac/redo03_1.log'' ";
  SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_3.282.877470931''  to  ''/u01/app/oracle/oradata/jmrac/redo03_2.log'' ";
  SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_4.283.877470937''  to  ''/u01/app/oracle/oradata/jmrac/redo04_1.log'' ";
  SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_4.284.877470943''  to  ''/u01/app/oracle/oradata/jmrac/redo04_2.log'' ";

  RESTORE DATABASE;
  SWITCH DATAFILE ALL;
  SWITCH TEMPFILE ALL;
}
```

rman 中还原数据文件：

```
RMAN> RUN
2> {
3>   ALLOCATE CHANNEL c1 DEVICE TYPE DISK;
4>   set newname for datafile 1 to "/u01/app/oracle/oradata/jmrac/system01.dbf";
5>   set newname for datafile 2 to "/u01/app/oracle/oradata/jmrac/sysaux01.dbf";
6>   set newname for datafile 3 to "/u01/app/oracle/oradata/jmrac/undotbs01.dbf";
7>   set newname for datafile 4 to "/u01/app/oracle/oradata/jmrac/users01.dbf";
8>   set newname for datafile 5 to "/u01/app/oracle/oradata/jmrac/example01.dbf";
```

```
9>   set newname for datafile 6 to "/u01/app/oracle/oradata/jmrac/undotbs02.dbf";
10>   set newname for tempfile 1 to "/u01/app/oracle/oradata/jmrac/temp01.dbf";
11>   SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_2.276.877470349''  to  ''/u01/app/oracle/oradata/jmrac/redo02_1.log'' ";
12>   SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_2.277.877470349''  to  ''/u01/app/oracle/oradata/jmrac/redo02_2.log'' ";
13>   SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_1.274.877470345''  to  ''/u01/app/oracle/oradata/jmrac/redo01_1.log'' ";
14>   SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_1.275.877470345''  to  ''/u01/app/oracle/oradata/jmrac/redo01_2.log'' ";
15>   SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_3.281.877470929''  to  ''/u01/app/oracle/oradata/jmrac/redo03_1.log'' ";
16>   SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_3.282.877470931''  to  ''/u01/app/oracle/oradata/jmrac/redo03_2.log'' ";
17>   SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_4.283.877470937''  to  ''/u01/app/oracle/oradata/jmrac/redo04_1.log'' ";
18>   SQL "ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_4.284.877470943''  to  ''/u01/app/oracle/oradata/jmrac/redo04_2.log'' ";
19>
20>   RESTORE DATABASE;
21>   SWITCH DATAFILE ALL;
22>   SWITCH TEMPFILE ALL;
23> }

allocated channel: c1
channel c1: SID=1137 device type=DISK

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

sql statement: ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_2.276.877470349''  to  ''/u01/app/oracle/oradata/jmrac/redo02_1.log''

sql statement: ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_2.277.877470349''  to  ''/u01/app/oracle/oradata/jmrac/redo02_2.log''

sql statement: ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_1.274.877470345''  to  ''/u01/app/oracle/oradata/jmrac/redo01_1.log''

sql statement: ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_1.275.877470345''  to  ''/u01/app/oracle/oradata/jmrac/redo01_2.log''

sql statement: ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_3.281.877470929''  to  ''/u01/app/oracle/oradata/jmrac/redo03_1.log''

sql statement: ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_3.282.877470931''  to  ''/u01/app/oracle/oradata/jmrac/redo03_2.log''

sql statement: ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_4.283.877470937''  to  ''/u01/app/oracle/oradata/jmrac/redo04_1.log''

sql statement: ALTER DATABASE RENAME FILE ''+DATA/jmrac/onlinelog/group_4.284.877470943''  to  ''/u01/app/oracle/oradata/jmrac/redo04_2.log''

Starting restore at 2015-05-29 15:16:46

channel c1: starting datafile backup set restore
channel c1: specifying datafile(s) to restore from backup set
channel c1: restoring datafile 00002 to /u01/app/oracle/oradata/jmrac/sysaux01.dbf
channel c1: restoring datafile 00003 to /u01/app/oracle/oradata/jmrac/undotbs01.dbf
channel c1: restoring datafile 00005 to /u01/app/oracle/oradata/jmrac/example01.dbf
channel c1: reading from backup piece /home/oracle/rman_back/full_JMRACxxx_20150529_880974780_6_1.bak
channel c1: piece handle=/home/oracle/rman_back/full_JMRACxxx_20150529_880974780_6_1.bak tag=TAG20150529T111259
channel c1: restored backup piece 1
channel c1: restore complete, elapsed time: 00:00:35
channel c1: starting datafile backup set restore
channel c1: specifying datafile(s) to restore from backup set
channel c1: restoring datafile 00001 to /u01/app/oracle/oradata/jmrac/system01.dbf
channel c1: restoring datafile 00004 to /u01/app/oracle/oradata/jmrac/users01.dbf
channel c1: restoring datafile 00006 to /u01/app/oracle/oradata/jmrac/undotbs02.dbf
channel c1: reading from backup piece /home/oracle/rman_back/full_JMRACxxx_20150529_880974780_5_1.bak
channel c1: piece handle=/home/oracle/rman_back/full_JMRACxxx_20150529_880974780_5_1.bak tag=TAG20150529T111259
```

```
channel c1: restored backup piece 1
channel c1: restore complete, elapsed time: 00:00:35
Finished restore at 2015-05-29 15:17:57

datafile 1 switched to datafile copy
input datafile copy RECID=8 STAMP=880989478 file name=/u01/app/oracle/oradata/jmrac/system01.dbf
datafile 2 switched to datafile copy
input datafile copy RECID=9 STAMP=880989478 file name=/u01/app/oracle/oradata/jmrac/sysaux01.dbf
datafile 3 switched to datafile copy
input datafile copy RECID=10 STAMP=880989478 file name=/u01/app/oracle/oradata/jmrac/undotbs01.dbf
datafile 4 switched to datafile copy
input datafile copy RECID=11 STAMP=880989478 file name=/u01/app/oracle/oradata/jmrac/users01.dbf
datafile 5 switched to datafile copy
input datafile copy RECID=12 STAMP=880989478 file name=/u01/app/oracle/oradata/jmrac/example01.dbf
datafile 6 switched to datafile copy
input datafile copy RECID=13 STAMP=880989479 file name=/u01/app/oracle/oradata/jmrac/undotbs02.dbf

renamed tempfile 1 to /u01/app/oracle/oradata/jmrac/temp01.dbf in control file
released channel: c1

RMAN>
```

告警日志：

```
Fri May 29 15:16:45 2015
ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_2.276.877470349'  to  '/u01/app/oracle/oradata/jmrac/redo02_1.log'
Deleted Oracle managed file +DATA/jmrac/onlinelog/group_2.276.877470349
Completed: ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_2.276.877470349'  to  '/u01/app/oracle/oradata/jmrac/redo02_1.log'
ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_2.277.877470349'  to  '/u01/app/oracle/oradata/jmrac/redo02_2.log'
Deleted Oracle managed file +DATA/jmrac/onlinelog/group_2.277.877470349
Completed: ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_2.277.877470349'  to  '/u01/app/oracle/oradata/jmrac/redo02_2.log'
ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_1.274.877470345'  to  '/u01/app/oracle/oradata/jmrac/redo01_1.log'
Deleted Oracle managed file +DATA/jmrac/onlinelog/group_1.274.877470345
Completed: ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_1.274.877470345'  to  '/u01/app/oracle/oradata/jmrac/redo01_1.log'
ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_1.275.877470345'  to  '/u01/app/oracle/oradata/jmrac/redo01_2.log'
Deleted Oracle managed file +DATA/jmrac/onlinelog/group_1.275.877470345
Completed: ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_1.275.877470345'  to  '/u01/app/oracle/oradata/jmrac/redo01_2.log'
ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_3.281.877470929'  to  '/u01/app/oracle/oradata/jmrac/redo03_1.log'
Deleted Oracle managed file +DATA/jmrac/onlinelog/group_3.281.877470929
Completed: ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_3.281.877470929'  to  '/u01/app/oracle/oradata/jmrac/redo03_1.log'
ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_3.282.877470931'  to  '/u01/app/oracle/oradata/jmrac/redo03_2.log'
Deleted Oracle managed file +DATA/jmrac/onlinelog/group_3.282.877470931
Completed: ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_3.282.877470931'  to  '/u01/app/oracle/oradata/jmrac/redo03_2.log'
ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_4.283.877470937'  to  '/u01/app/oracle/oradata/jmrac/redo04_1.log'
Deleted Oracle managed file +DATA/jmrac/onlinelog/group_4.283.877470937
Completed: ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_4.283.877470937'  to  '/u01/app/oracle/oradata/jmrac/redo04_1.log'
ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_4.284.877470943'  to  '/u01/app/oracle/oradata/jmrac/redo04_2.log'
Deleted Oracle managed file +DATA/jmrac/onlinelog/group_4.284.877470943
Completed: ALTER DATABASE RENAME FILE '+DATA/jmrac/onlinelog/group_4.284.877470943'  to  '/u01/app/oracle/oradata/jmrac/redo04_2.log'
Fri May 29 15:16:51 2015
Full restore complete of datafile 3 to datafile copy /u01/app/oracle/oradata/jmrac/undotbs01.dbf.  Elapsed time: 0:00:02
  checkpoint is 1624119
  last deallocation scn is 1529290
  Undo Optimization current scn is 1542977
Full restore complete of datafile 5 to datafile copy /u01/app/oracle/oradata/jmrac/example01.dbf.  Elapsed time: 0:00:09
  checkpoint is 1624119
  last deallocation scn is 1379034
Fri May 29 15:17:18 2015
Full restore complete of datafile 2 to datafile copy /u01/app/oracle/oradata/jmrac/sysaux01.dbf.  Elapsed time: 0:00:30
  checkpoint is 1624119
  last deallocation scn is 1348692
Full restore complete of datafile 6 to datafile copy /u01/app/oracle/oradata/jmrac/undotbs02.dbf.  Elapsed time: 0:00:00
  checkpoint is 1624083
  last deallocation scn is 1549684
```

```
  Undo Optimization current scn is 1542977
Full restore complete of datafile 4 to datafile copy /u01/app/oracle/oradata/jmrac/users01.dbf.  Elapsed time: 0:00:01
  checkpoint is 1624083
Fri May 29 15:17:52 2015
Full restore complete of datafile 1 to datafile copy /u01/app/oracle/oradata/jmrac/system01.dbf.  Elapsed time: 0:00:29
  checkpoint is 1624083
  last deallocation scn is 1547365
  Undo Optimization current scn is 1542977
Fri May 29 15:18:00 2015
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14335.trc:
ORA-19625: error identifying file +DATA/jmrac/datafile/system.268.877470209
ORA-17503: ksfdopn:2 Failed to open file +DATA/jmrac/datafile/system.268.877470209
ORA-15012: ASM file '+DATA/jmrac/datafile/system.268.877470209' does not exist
Switch of datafile 1 complete to datafile copy
  checkpoint is 1624083
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14335.trc:
ORA-19625: error identifying file +DATA/jmrac/datafile/sysaux.269.877470211
ORA-17503: ksfdopn:2 Failed to open file +DATA/jmrac/datafile/sysaux.269.877470211
ORA-15012: ASM file '+DATA/jmrac/datafile/sysaux.269.877470211' does not exist
Switch of datafile 2 complete to datafile copy
  checkpoint is 1624119
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14335.trc:
ORA-19625: error identifying file +DATA/jmrac/datafile/undotbs1.270.877470213
ORA-17503: ksfdopn:2 Failed to open file +DATA/jmrac/datafile/undotbs1.270.877470213
ORA-15012: ASM file '+DATA/jmrac/datafile/undotbs1.270.877470213' does not exist
Switch of datafile 3 complete to datafile copy
  checkpoint is 1624119
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14335.trc:
ORA-19625: error identifying file +DATA/jmrac/datafile/users.271.877470213
ORA-17503: ksfdopn:2 Failed to open file +DATA/jmrac/datafile/users.271.877470213
ORA-15012: ASM file '+DATA/jmrac/datafile/users.271.877470213' does not exist
Switch of datafile 4 complete to datafile copy
  checkpoint is 1624083
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14335.trc:
ORA-19625: error identifying file +DATA/jmrac/datafile/example.279.877470401
ORA-17503: ksfdopn:2 Failed to open file +DATA/jmrac/datafile/example.279.877470401
ORA-15012: ASM file '+DATA/jmrac/datafile/example.279.877470401' does not exist
Switch of datafile 5 complete to datafile copy
  checkpoint is 1624119
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14335.trc:
ORA-19625: error identifying file +DATA/jmrac/datafile/undotbs2.280.877470779
ORA-17503: ksfdopn:2 Failed to open file +DATA/jmrac/datafile/undotbs2.280.877470779
ORA-15012: ASM file '+DATA/jmrac/datafile/undotbs2.280.877470779' does not exist
Fri May 29 15:18:01 2015
Signalling error 1152 for datafile 5!
Switch of datafile 6 complete to datafile copy
  checkpoint is 1624083
Signalling error 1152 for datafile 6!
Checker run found 2 new persistent data failures
```

查看数据文件是否已经还原：

```
[oracle@orcltest jmrac]$ ll -h
total 1.5G
-rw-r----- 1 oracle asmadmin  18M May 29 15:18 control01.ctl
-rw-r----- 1 oracle asmadmin  18M May 29 15:18 control02.ctl
-rw-r----- 1 oracle asmadmin 101M May 29 15:16 example01.dbf
-rw-r----- 1 oracle asmadmin 541M May 29 15:17 sysaux01.dbf
-rw-r----- 1 oracle asmadmin 691M May 29 15:17 system01.dbf
-rw-r----- 1 oracle asmadmin  91M May 29 15:16 undotbs01.dbf
-rw-r----- 1 oracle asmadmin  26M May 29 15:17 undotbs02.dbf
-rw-r----- 1 oracle asmadmin  27M May 29 15:17 users01.dbf
[oracle@orcltest jmrac]$
```

二、 recover 数据库

由前边的备份集中可以看出，备份集中的 thread 1 的最大日志号为 33，thread 2 的最大日志号为 43，所以不完全恢复如下：

```
RMAN> RUN
2> {
3> set until sequence 33 thread 1;
set until sequence 43 thread 2;
recover database;
}
4> 5> 6>
executing command: SET until clause

executing command: SET until clause

Starting recover at 2015-05-29 15:28:05
using target database control file instead of recovery catalog
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=1146 device type=DISK

starting media recovery

channel ORA_DISK_1: starting archived log restore to default destination
channel ORA_DISK_1: restoring archived log
archived log thread=2 sequence=42
channel ORA_DISK_1: restoring archived log
archived log thread=1 sequence=32
channel ORA_DISK_1: restoring archived log
archived log thread=1 sequence=33
channel ORA_DISK_1: reading from backup piece /home/oracle/rman_back/arch_JMRAC_20150529_11_1.bak
channel ORA_DISK_1: piece handle=/home/oracle/rman_back/arch_JMRAC_20150529_11_1.bak tag=TAG20150529T111603
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
archived log file name=/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_2_42_bpj5896k_.arc thread=2 sequence=42
archived log file name=/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_1_32_bpj5897f_.arc thread=1 sequence=32
channel default: deleting archived log(s)
archived log file name=/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_1_32_bpj5897f_.arc RECID=74 STAMP=880990089
archived log file name=/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_1_33_bpj5897n_.arc thread=1 sequence=33
channel default: deleting archived log(s)
archived log file name=/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_2_42_bpj5896k_.arc RECID=75 STAMP=880990089
channel default: deleting archived log(s)
archived log file name=/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_1_33_bpj5897n_.arc RECID=73 STAMP=880990089
media recovery complete, elapsed time: 00:00:02
Finished recover at 2015-05-29 15:28:12

RMAN>
```

告警日志：

```
Fri May 29 15:28:06 2015
alter database recover datafile list clear
Completed: alter database recover datafile list clear
alter database recover datafile list
 1 , 2 , 3 , 4 , 5 , 6
Completed: alter database recover datafile list
 1 , 2 , 3 , 4 , 5 , 6
alter database recover if needed
 start until cancel using backup controlfile
Media Recovery Start
 started logmerger process
```

```
Parallel Media Recovery started with 2 slaves
ORA-279 signalled during: alter database recover if needed
 start until cancel using backup controlfile
...
alter database recover logfile '/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_2_42_bpj5896k_.arc'
Media Recovery Log /u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_2_42_bpj5896k_.arc
ORA-279 signalled during: alter database recover logfile '/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_2_42_bpj5896k_.arc'...
alter database recover logfile '/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_1_32_bpj5897f_.arc'
Media Recovery Log /u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_1_32_bpj5897f_.arc
ORA-279 signalled during: alter database recover logfile '/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_1_32_bpj5897f_.arc'...
alter database recover logfile '/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_1_33_bpj5897n_.arc'
Media Recovery Log /u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_1_33_bpj5897n_.arc
ORA-279 signalled during: alter database recover logfile '/u01/app/oracle/flash_recovery_area/JMRAC/archivelog/2015_05_29/o1_mf_1_33_bpj5897n_.arc'...
alter database recover cancel
Media Recovery Canceled
Completed: alter database recover cancel
```

1.3.3.4 RESETLOGS 打开数据库并验证数据

```
RMAN>  alter database open resetlogs;

database opened

RMAN>
```

告警日志：

```
Fri May 29 15:30:56 2015
alter database open
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-01589: must use RESETLOGS or NORESETLOGS option for database open
ORA-1589 signalled during: alter database open...
alter database open resetlogs
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 1 of thread 1
ORA-00312: online log 1 thread 1: '/u01/app/oracle/oradata/jmrac/redo01_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 1 thread 1: '/u01/app/oracle/oradata/jmrac/redo01_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 1 of thread 1
ORA-00312: online log 1 thread 1: '/u01/app/oracle/oradata/jmrac/redo01_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 1 thread 1: '/u01/app/oracle/oradata/jmrac/redo01_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 2 of thread 1
ORA-00312: online log 2 thread 1: '/u01/app/oracle/oradata/jmrac/redo02_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 2 thread 1: '/u01/app/oracle/oradata/jmrac/redo02_1.log'
ORA-27037: unable to obtain file status
```

```
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 2 of thread 1
ORA-00312: online log 2 thread 1: '/u01/app/oracle/oradata/jmrac/redo02_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 2 thread 1: '/u01/app/oracle/oradata/jmrac/redo02_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 3 of thread 2
ORA-00312: online log 3 thread 2: '/u01/app/oracle/oradata/jmrac/redo03_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 3 thread 2: '/u01/app/oracle/oradata/jmrac/redo03_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 3 of thread 2
ORA-00312: online log 3 thread 2: '/u01/app/oracle/oradata/jmrac/redo03_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 3 thread 2: '/u01/app/oracle/oradata/jmrac/redo03_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 4 of thread 2
ORA-00312: online log 4 thread 2: '/u01/app/oracle/oradata/jmrac/redo04_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 4 thread 2: '/u01/app/oracle/oradata/jmrac/redo04_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 4 of thread 2
ORA-00312: online log 4 thread 2: '/u01/app/oracle/oradata/jmrac/redo04_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 4 thread 2: '/u01/app/oracle/oradata/jmrac/redo04_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
RESETLOGS after incomplete recovery UNTIL CHANGE 1625245
Resetting resetlogs activation ID 1916751680 (0x723f4f40)
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 1 of thread 1
ORA-00312: online log 1 thread 1: '/u01/app/oracle/oradata/jmrac/redo01_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 1 thread 1: '/u01/app/oracle/oradata/jmrac/redo01_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 1 of thread 1
ORA-00312: online log 1 thread 1: '/u01/app/oracle/oradata/jmrac/redo01_2.log'
```

```
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 1 thread 1: '/u01/app/oracle/oradata/jmrac/redo01_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 2 of thread 1
ORA-00312: online log 2 thread 1: '/u01/app/oracle/oradata/jmrac/redo02_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 2 thread 1: '/u01/app/oracle/oradata/jmrac/redo02_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 2 of thread 1
ORA-00312: online log 2 thread 1: '/u01/app/oracle/oradata/jmrac/redo02_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 2 thread 1: '/u01/app/oracle/oradata/jmrac/redo02_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 3 of thread 2
ORA-00312: online log 3 thread 2: '/u01/app/oracle/oradata/jmrac/redo03_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 3 thread 2: '/u01/app/oracle/oradata/jmrac/redo03_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 3 of thread 2
ORA-00312: online log 3 thread 2: '/u01/app/oracle/oradata/jmrac/redo03_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 3 thread 2: '/u01/app/oracle/oradata/jmrac/redo03_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 4 of thread 2
ORA-00312: online log 4 thread 2: '/u01/app/oracle/oradata/jmrac/redo04_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 4 thread 2: '/u01/app/oracle/oradata/jmrac/redo04_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_ora_14414.trc:
ORA-00313: open failed for members of log group 4 of thread 2
ORA-00312: online log 4 thread 2: '/u01/app/oracle/oradata/jmrac/redo04_2.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
ORA-00312: online log 4 thread 2: '/u01/app/oracle/oradata/jmrac/redo04_1.log'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
```

```
Fri May 29 15:31:08 2015
Setting recovery target incarnation to 3
Fri May 29 15:31:08 2015
Assigning activation ID 1920208641 (0x72740f01)
LGWR: STARTING ARCH PROCESSES
Fri May 29 15:31:09 2015
ARC0 started with pid=22, OS id=14444
ARC0: Archival started
LGWR: STARTING ARCH PROCESSES COMPLETE
ARC0: STARTING ARCH PROCESSES
Fri May 29 15:31:10 2015
ARC1 started with pid=26, OS id=14446
Fri May 29 15:31:10 2015
ARC2 started with pid=27, OS id=14448
ARC1: Archival started
Fri May 29 15:31:10 2015
ARC3 started with pid=28, OS id=14450
ARC2: Archival started
ARC1: Becoming the 'no FAL' ARCH
ARC1: Becoming the 'no SRL' ARCH
ARC2: Becoming the heartbeat ARCH
Thread 1 opened at log sequence 1
  Current log# 1 seq# 1 mem# 0: /u01/app/oracle/oradata/jmrac/redo01_1.log
  Current log# 1 seq# 1 mem# 1: /u01/app/oracle/oradata/jmrac/redo01_2.log
Successful open of redo thread 1
Fri May 29 15:31:10 2015
MTTR advisory is disabled because FAST_START_MTTR_TARGET is not set
Fri May 29 15:31:10 2015
SMON: enabling cache recovery
Redo thread 2 internally disabled at seq 1 (CKPT)
ARC3: Archival started
ARC0: STARTING ARCH PROCESSES COMPLETE
ARC1: Archiving disabled thread 2 sequence 1
Archived Log entry 76 added for thread 2 sequence 1 ID 0x0 dest 1:
Successfully onlined Undo Tablespace 2.
Dictionary check beginning
Fri May 29 15:31:14 2015
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_dbw0_14084.trc:
ORA-01157: cannot identify/lock data file 201 - see DBWR trace file
ORA-01110: data file 201: '/u01/app/oracle/oradata/jmrac/temp01.dbf'
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Errors in file /u01/app/oracle/diag/rdbms/jmrac/jmrac/trace/jmrac_dbw0_14084.trc:
ORA-01186: file 201 failed verification tests
ORA-01157: cannot identify/lock data file 201 - see DBWR trace file
ORA-01110: data file 201: '/u01/app/oracle/oradata/jmrac/temp01.dbf'
File 201 not verified due to error ORA-01157
Dictionary check complete
Verifying file header compatibility for 11g tablespace encryption..
Verifying 11g file header compatibility for tablespace encryption completed
SMON: enabling tx recovery
Re-creating tempfile /u01/app/oracle/oradata/jmrac/temp01.dbf
Database Characterset is ZHS16GBK
No Resource Manager plan active
replication_dependency_tracking turned off (no async multimaster replication found)
Fri May 29 15:31:22 2015
Starting background process QMNC
Fri May 29 15:31:22 2015
QMNC started with pid=29, OS id=14454
LOGSTDBY: Validating controlfile with logical metadata
LOGSTDBY: Validation complete
Completed: alter database open resetlogs
Fri May 29 15:31:33 2015
Starting background process CJQ0
Fri May 29 15:31:33 2015
CJQ0 started with pid=35, OS id=14472
```

验证数据：

```
[oracle@orcltest dbs]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.1.0 Production on Fri May 29 15:33:02 2015

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Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production
With the Partitioning, Automatic Storage Management, OLAP, Data Mining
and Real Application Testing options

SQL> show parameter name

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
db_file_name_convert                 string
db_name                              string      jmrac
db_unique_name                       string      jmrac
global_names                         boolean     FALSE
instance_name                        string      jmrac
lock_name_space                      string
log_file_name_convert                string
service_names                        string      jmrac
SQL> archive log list;
Database log mode              Archive Mode
Automatic archival             Enabled
Archive destination            USE_DB_RECOVERY_FILE_DEST
Oldest online log sequence     1
Next log sequence to archive   1
Current log sequence           1
SQL> set line 9999 pagesize 9999
SQL> col FILE_NAME format a60
SQL> select 'datafile' file_type, file#,name FILE_NAME,status,enabled from v$datafile
  2  union all
  3  select 'tempfile',file#,name FILE_NAME,status,enabled from v$tempfile
  4  union all
  5  select 'logfile',group# file#,member FILE_NAME,status,'' from v$logfile
  6  union all
  7  select 'controlfile', to_number('') ,name FILE_NAME,status,'' from v$controlfile
  8  ;

FILE_TYPE        FILE# FILE_NAME                                                  STATUS  ENABLED
---------- ---------- ------------------------------------------------------------ ------- ----------
datafile            1 /u01/app/oracle/oradata/jmrac/system01.dbf                   SYSTEM  READ WRITE
datafile            2 /u01/app/oracle/oradata/jmrac/sysaux01.dbf                   ONLINE  READ WRITE
datafile            3 /u01/app/oracle/oradata/jmrac/undotbs01.dbf                  ONLINE  READ WRITE
datafile            4 /u01/app/oracle/oradata/jmrac/users01.dbf                    ONLINE  READ WRITE
datafile            5 /u01/app/oracle/oradata/jmrac/example01.dbf                  ONLINE  READ WRITE
datafile            6 /u01/app/oracle/oradata/jmrac/undotbs02.dbf                  ONLINE  READ WRITE
tempfile            1 /u01/app/oracle/oradata/jmrac/temp01.dbf                     ONLINE  READ WRITE
logfile             2 /u01/app/oracle/oradata/jmrac/redo02_1.log
logfile             2 /u01/app/oracle/oradata/jmrac/redo02_2.log
logfile             1 /u01/app/oracle/oradata/jmrac/redo01_1.log
logfile             1 /u01/app/oracle/oradata/jmrac/redo01_2.log
logfile             3 /u01/app/oracle/oradata/jmrac/redo03_1.log
logfile             3 /u01/app/oracle/oradata/jmrac/redo03_2.log
logfile             4 /u01/app/oracle/oradata/jmrac/redo04_1.log
logfile             4 /u01/app/oracle/oradata/jmrac/redo04_2.log
controlfile           /u01/app/oracle/oradata/jmrac/control01.ctl
```

```
controlfile             /u01/app/oracle/oradata/jmrac/control02.ctl

17 rows selected.

SQL> select count(1) from lhr.rac_to_single_test ;

  COUNT(1)
----------
     72510

SQL>
```

可以看到数据已经恢复。

1.3.3.5 后续收尾操作

做到这步，都还没有完啊，只是说目的基本达成，最后还需要收尾的工作。清除未使用线程的 redo 日志组，操作如下：

一、 清除未使用的 redo

```
SQL> col instance format a8
SQL> select thread#,instance,status,enabled from v$thread;

   THREAD# INSTANCE STATUS ENABLED
---------- -------- ------ --------
         1 jmrac    OPEN   PUBLIC
         2 jmrac2   CLOSED PUBLIC

SQL> select group#,thread#,archived,status from v$log;

    GROUP#    THREAD# ARC STATUS
---------- ---------- --- ----------------
         1          1 NO  CURRENT
         2          1 YES UNUSED
         3          2 YES ACTIVE
         4          2 YES UNUSED

SQL> alter database disable thread 2 ;

Database altered.

SQL> alter database drop logfile group 3 ;

Database altered.


SQL> alter database drop logfile group 4 ;

Database altered.

SQL>

SQL>  select thread#,instance,status,enabled from v$thread;
```

```
   THREAD# INSTANCE STATUS ENABLED
---------- -------- ------ --------
         1 jmrac    OPEN   PUBLIC

SQL>
SQL> select group#,thread#,archived,status from v$log;

    GROUP#    THREAD# ARC STATUS
---------- ---------- --- ----------------
         1          1 NO  CURRENT
         2          1 YES UNUSED

SQL>
```

生产环境可以再增加一些日志组。

二、 清除多余的 undo 文件

我们知道 rac 中每个节点使用的都是自己的 undo，所以有 2 个 undo 文件，这里可以清除，也可以不用清除，因为有的时候 undo 坏了可以很迅速的切换到另外的 undo 空间，清理过程如下：

```
SQL> select name from v$tablespace where name like 'UNDO%';

NAME
------------------------------
UNDOTBS1
UNDOTBS2

SQL>  show parameter undo_tablespace;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
undo_tablespace                      string      UNDOTBS1
SQL>  drop tablespace undotbs2 including contents and datafiles;

Tablespace dropped.

SQL>
```

1.3.4 实验总结

rac 数据库迁移到单实例环境下的步骤和单实例的数据库迁移到单实例环境基本是一样的，只是在最后还原的时候需要设置 2 个 thread 即可。

1.4 总结

至此，rac 数据库迁移到单实例环境下的操作步骤基本完毕，至于配置监听和 tns 等工作都是基本的，大家自己完成即可，这里就不再演示了，另外实验中需要关注的几个地方，我都特别做了说明。

1.5 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

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