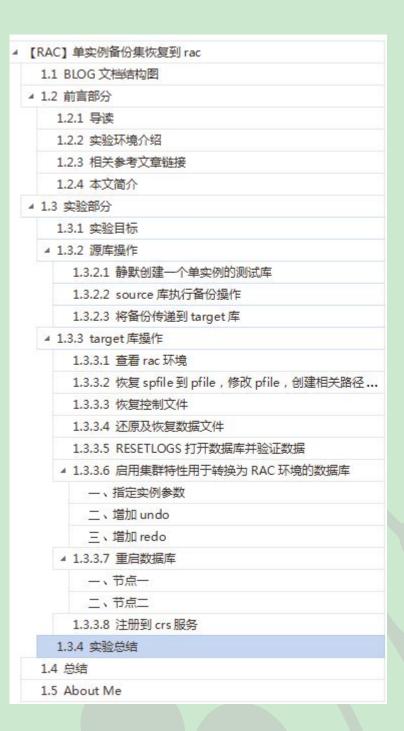# 【RAC】将单实例备份集恢复为 rac 数据库

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 单实例环境的备份集如何恢复到 rac 环境(重点)

② rman 恢复数据库的一般步骤

③ rac 环境的简单操作

注意：本篇 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
```

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　RHEL6.5 单实例

目标库：11.2.0.1　RHEL6.5　rac 环境

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 安装系列：

【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/

1.2.4　**本文简介**

本文基于如何将单实例的数据库备份恢复到 rac 环境下，至于 rac 环境的备份集如何恢复到单实例及 rac 环境的备份集恢复到 rac 环境的实验请参考相关文章链接部分。

实验的一些数据库环境参考如下表格：

项目	source db	target db
db 类型	单实例	rac 环境
db version	11.2.0.1	11.2.0.1
ORACLE_SID	orastrac	orastrac1 和 orastrac2
db_name	orastrac	orastrac
主机 IP 地址：	192.168.59.129	192.168.1.31 192.168.1.32

先描述下大致步骤：

源端创建备份集；

目标端安装数据库软件和集群件，并配置好共享存储（安装 rac 的时候一般已经配置好了）；

复制源端备份集到目标端；

<mark>目录端任意节点执行正常恢复</mark>，恢复时注意要将 spfile,controlfile,datafile,redofile 等路径改到<mark>共享存储上</mark>，恢复完后这会儿仍然是个单实例数据库；

修改初始化参数、增加 UNDO 表空间、增加 REDOLOG 线程组，重建密钥文件，目标端任意节点执行；

目标端各个节点配置监听及网络服务名；

将新建的数据库配置到 crs，目标端任意节点执行即可。

1.3 实验部分

1.3.1 实验目标

将单实例的备份集成功的恢复到 rac 环境下，并添加数据库到 crs 环境。

1.3.2 源库操作

source 库上需要做的操作主要是备份和创建测试用户。

1.3.2.1 静默创建一个单实例的测试库

首先修改归档模式，这样创建的数据库默认为归档模式，然后我们在源库上静默创建一个单实例的库，sid 为 orastrac，为 oracle single instance to rac，关于静默安装数据库参考：

<mark>静默安装系列</mark>	
【推荐】 【DBCA -SILENT】静默方式安装 11gR2 oracle 数据库软件	http://blog.itpub.net/26736162/viewspace-1589769/
【推荐】 【DBCA -SILENT】静默安装之 rac 数据库安装	http://blog.itpub.net/26736162/viewspace-1586352/
【推荐】 【DBCA -SILENT】静默安装如何启用归档模式	http://blog.itpub.net/26736162/viewspace-1585925/
【推荐】 DBCA 静默方式建库	http://blog.itpub.net/26736162/viewspace-1448220/

```
[oracle@orcltest ~]$ echo $ORACLE_HOME
/u01/app/oracle/product/11.2.0/dbhome_1
[oracle@orcltest ~]$ sqlplus -v

SQL*Plus: Release 11.2.0.1.0 Production

[oracle@orcltest ~]$ strings $ORACLE_HOME/assistants/dbca/templates/General_Purpose.dbc | grep -i arch
        <archiveLogMode>false</archiveLogMode>
[oracle@orcltest ~]$ vi $ORACLE_HOME/assistants/dbca/templates/General_Purpose.dbc
```

```
<?xml version = '1.0'?>
<DatabaseTemplate name="General_Purpose" description="" version="11.1.0.0.0">
    <CommonAttributes>
        <option name="OMS" value="false"/>
        <option name="JSERVER" value="true"/>
        <option name="SPATIAL" value="true"/>
        <option name="IMEDIA" value="true"/>
        <option name="XDB_PROTOCOLS" value="true">
            <tablespace id="SYSAUX"/>
        </option>
        <option name="ORACLE_TEXT" value="true">
            <tablespace id="SYSAUX"/>
        </option>
        <option name="SAMPLE_SCHEMA" value="false"/>
        <option name="CWMLITE" value="true">
            <tablespace id="SYSAUX"/>
        </option>
        <option name="EM_REPOSITORY" value="true">
            <tablespace id="SYSAUX"/>
        </option>
        <option name="APEX" value="true"/>
        <option name="OWB" value="true"/>
        <option name="DV" value="false"/>
    </CommonAttributes>
    <Variables/>
    <CustomScripts Execute="false"/>
    <InitParamAttributes>
        <InitParams>
            <initParam name="db_name" value=""/>
            <initParam name="dispatchers" value="(PROTOCOL=TCP) (SERVICE={SID}XDB)"/>
            <initParam name="audit_file_dest" value="{ORACLE_BASE}/admin/{DB_UNIQUE_NAME}/adump"/>
            <initParam name="compatible" value="11.2.0.0.0"/>
            <initParam name="remote_login_passwordfile" value="EXCLUSIVE"/>
            <initParam name="processes" value="150"/>
            <initParam name="undo_tablespace" value="UNDOTBS1"/>
            <initParam name="control_files" value="(&quot;{ORACLE_BASE}/oradata/{DB_UNIQUE_NAME}/control01.ctl&quot;, &quot;{ORACLE_BASE}/flash_recovery_area/{DB_UNIQUE_NAME}/control02.ctl&quot;)"/>
            <initParam name="diagnostic_dest" value="{ORACLE_BASE}"/>
            <initParam name="db_recovery_file_dest" value="{ORACLE_BASE}/flash_recovery_area"/>
            <initParam name="audit_trail" value="db"/>
            <initParam name="memory_target" value="250" unit="MB"/>
            <initParam name="db_block_size" value="8" unit="KB"/>
            <initParam name="open_cursors" value="300"/>
            <initParam name="db_recovery_file_dest_size" value="" unit="MB"/>
        </InitParams>
        <MiscParams>
            <databaseType>MULTIPURPOSE</databaseType>
            <maxUserConn>20</maxUserConn>
            <percentageMemTOSGA>40</percentageMemTOSGA>
            <customSGA>false</customSGA>
            <archiveLogMode>true</archiveLogMode>
            <initParamFileName>{ORACLE_BASE}/admin/{DB_UNIQUE_NAME}/pfile/init.ora</initParamFileName>
        </MiscParams>
        <SPfile useSPfile="true">{ORACLE_HOME}/dbs/spfile{SID}.ora</SPfile>
    </InitParamAttributes>
    <StorageAttributes>
        <DataFiles>
"/u01/app/oracle/product/11.2.0/dbhome_1/assistants/dbca/templates/General_Purpose.dbc" 95L, 4985C written
[oracle@orcltest ~]$ strings $ORACLE_HOME/assistants/dbca/templates/General_Purpose.dbc | grep -i arch
            <archiveLogMode>true</archiveLogMode>
[oracle@orcltest ~]$ dbca -silent -createDatabase -templateName General_Purpose.dbc -gdbname orastrac -sid orastrac -sysPassword lhr -systemPassword lhr -responseFile NO_VALUE -datafileDestination /u01/app/oracle/oradata -redoLogFileSize 50 -recoveryAreaDestination /u01/app/oracle/flash_recovery_area -storageType FS -characterSet ZHS16GBK -nationalCharacterSet AL16UTF16 -sampleSchema true -memoryPercentage 30 -totalMemory 200 -databaseType OLTP -emConfiguration NONE  -automaticMemoryManagement true
Copying database files
1% complete
3% complete
10% complete
17% complete
```

```
24% complete
35% complete
Creating and starting Oracle instance
37% complete
42% complete
47% complete
52% complete
53% complete
56% complete
58% complete
Registering database with Oracle Restart
64% complete
Completing Database Creation
68% complete
71% complete
75% complete
85% complete
86% complete
96% complete
100% complete
Look at the log file "/u01/app/oracle/cfgtoollogs/dbca/orastrac/orastrac.log" for further details.
[oracle@orcltest ~]$
[oracle@orcltest ~]$ ORACLE_SID=orastrac
[oracle@orcltest ~]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.1.0 Production on Mon Jun 1 11:09:02 2015

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


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

SQL> show parameter name

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
db_file_name_convert                 string
db_name                              string      orastrac
db_unique_name                       string      orastrac
global_names                         boolean     FALSE
instance_name                        string      orastrac
lock_name_space                      string
log_file_name_convert                string
service_names                        string      orastrac
SQL> create user lhr identified by lhr;

User created.

SQL> grant dba to lhr;

Grant succeeded.

SQL> create table lhr.test_rac as select * from dba_objects;

Table created.

SQL> select count(1) FROM LHR.TEST_RAC;

  COUNT(1)
----------
     72468


SQL>
SQL> archive log list;
Database log mode              Archive Mode
```

```
Automatic archival            Enabled
Archive destination           USE_DB_RECOVERY_FILE_DEST
Oldest online log sequence    3
Next log sequence to archive  5
Current log sequence          5
SQL>

SQL> show parameter spfile

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
spfile                               string      /u01/app/oracle/product/11.2.0
                                                 /dbhome_1/dbs/spfileorastrac.o
                                                 ra
SQL>
```

1.3.2.2   source 库执行备份操作

备份脚本如下，注意控制文件需要最后备份：

```
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@orcltest ~]$ rman target /

Recovery Manager: Release 11.2.0.1.0 - Production on Mon Jun 1 11:12:15 2015

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

connected to target database: ORASTRAC (DBID=1317814272)

RMAN> 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=142 device type=DISK

allocated channel: c2
channel c2: SID=20 device type=DISK

Starting backup at 2015-06-01 11:12:28
channel c1: starting full datafile backup set
channel c1: specifying datafile(s) in backup set
input datafile file number=00001 name=/u01/app/oracle/oradata/orastrac/system01.dbf
input datafile file number=00004 name=/u01/app/oracle/oradata/orastrac/users01.dbf
channel c1: starting piece 1 at 2015-06-01 11:12:29
channel c2: starting full datafile backup set
channel c2: specifying datafile(s) in backup set
input datafile file number=00002 name=/u01/app/oracle/oradata/orastrac/sysaux01.dbf
input datafile file number=00005 name=/u01/app/oracle/oradata/orastrac/example01.dbf
input datafile file number=00003 name=/u01/app/oracle/oradata/orastrac/undotbs01.dbf
channel c2: starting piece 1 at 2015-06-01 11:12:29
channel c2: finished piece 1 at 2015-06-01 11:15:26
piece handle=/home/oracle/rman_back/full_ORASTRAC_20150601_881233949_2_1.bak tag=TAG20150601T111228 comment=NONE
channel c2: backup set complete, elapsed time: 00:02:59
channel c2: starting full datafile backup set
channel c2: specifying datafile(s) in backup set
including current control file in backup set
channel c2: starting piece 1 at 2015-06-01 11:15:48
channel c2: finished piece 1 at 2015-06-01 11:15:49
piece handle=/home/oracle/rman_back/full_ORASTRAC_20150601_881234138_3_1.bak tag=TAG20150601T111228 comment=NONE
channel c2: backup set complete, elapsed time: 00:00:01
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 2015-06-01 11:15:50
channel c2: finished piece 1 at 2015-06-01 11:15:51
piece handle=/home/oracle/rman_back/full_ORASTRAC_20150601_881234150_4_1.bak tag=TAG20150601T111228 comment=NONE
channel c2: backup set complete, elapsed time: 00:00:01
channel c1: finished piece 1 at 2015-06-01 11:15:53
piece handle=/home/oracle/rman_back/full_ORASTRAC_20150601_881233948_1_1.bak tag=TAG20150601T111228 comment=NONE
channel c1: backup set complete, elapsed time: 00:03:24
Finished backup at 2015-06-01 11:15:53

sql statement: alter system archive log current

Starting backup at 2015-06-01 11:16:05
current log archived
channel c1: starting archived log backup set
channel c1: specifying archived log(s) in backup set
input archived log thread=1 sequence=5 RECID=1 STAMP=881234164
channel c1: starting piece 1 at 2015-06-01 11:16:05
channel c2: starting archived log backup set
channel c2: specifying archived log(s) in backup set
input archived log thread=1 sequence=6 RECID=2 STAMP=881234165
channel c2: starting piece 1 at 2015-06-01 11:16:06
channel c1: finished piece 1 at 2015-06-01 11:16:09
piece handle=/home/oracle/rman_back/arch_ORASTRAC_20150601_5_1.bak tag=TAG20150601T111605 comment=NONE
channel c1: backup set complete, elapsed time: 00:00:04
channel c1: deleting archived log(s)
archived log file name=/u01/app/oracle/flash_recovery_area/ORASTRAC/archivelog/2015_06_01/o1_mf_1_5_bpqmmhbp_.arc RECID=1 STAMP=881234164
channel c2: finished piece 1 at 2015-06-01 11:16:10
piece handle=/home/oracle/rman_back/arch_ORASTRAC_20150601_6_1.bak tag=TAG20150601T111605 comment=NONE
channel c2: backup set complete, elapsed time: 00:00:04
channel c2: deleting archived log(s)
archived log file name=/u01/app/oracle/flash_recovery_area/ORASTRAC/archivelog/2015_06_01/o1_mf_1_6_bpqmmo4t_.arc RECID=2 STAMP=881234165
Finished backup at 2015-06-01 11:16:10

Starting backup at 2015-06-01 11:16:10
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 2015-06-01 11:16:11
channel c1: finished piece 1 at 2015-06-01 11:16:12
piece handle=/home/oracle/rman_back/ctl_ORASTRAC_20150601_7_1.bak tag=TAG20150601T111610 comment=NONE
channel c1: backup set complete, elapsed time: 00:00:01
Finished backup at 2015-06-01 11:16:12

released channel: c1

released channel: c2

RMAN> list backupset;


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


BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ -------------------
1       Full    501.84M    DISK        00:02:42     2015-06-01 11:15:11
        BP Key: 1   Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111228
        Piece Name: /home/oracle/rman_back/full_ORASTRAC_20150601_881233949_2_1.bak
  List of Datafiles in backup set 1
  File LV Type Ckp SCN    Ckp Time            Name
  ---- -- ---- ---------- ------------------- ----
  2       Full 1027268    2015-06-01 11:12:29 /u01/app/oracle/oradata/orastrac/sysaux01.dbf
  3       Full 1027268    2015-06-01 11:12:29 /u01/app/oracle/oradata/orastrac/undotbs01.dbf
  5       Full 1027268    2015-06-01 11:12:29 /u01/app/oracle/oradata/orastrac/example01.dbf

BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ -------------------
2       Full    9.33M      DISK        00:00:10     2015-06-01 11:15:48
        BP Key: 2   Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111228
        Piece Name: /home/oracle/rman_back/full_ORASTRAC_20150601_881234138_3_1.bak
  Control File Included: Ckp SCN: 1027334      Ckp time: 2015-06-01 11:15:38

BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ -------------------
3       Full    80.00K     DISK        00:00:00     2015-06-01 11:15:50
        BP Key: 3   Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111228
        Piece Name: /home/oracle/rman_back/full_ORASTRAC_20150601_881234150_4_1.bak
  SPFILE Included: Modification time: 2015-06-01 11:12:28
  SPFILE db_unique_name: ORASTRAC

BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ -------------------
4       Full    599.97M    DISK        00:03:24     2015-06-01 11:15:52
        BP Key: 4   Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111228
        Piece Name: /home/oracle/rman_back/full_ORASTRAC_20150601_881233948_1_1.bak
  List of Datafiles in backup set 4
  File LV Type Ckp SCN    Ckp Time            Name
  ---- -- ---- ---------- ------------------- ----
  1       Full 1027267    2015-06-01 11:12:29 /u01/app/oracle/oradata/orastrac/system01.dbf
  4       Full 1027267    2015-06-01 11:12:29 /u01/app/oracle/oradata/orastrac/users01.dbf

BS Key  Size       Device Type Elapsed Time Completion Time
------- ---------- ----------- ------------ -------------------
5       41.16M     DISK        00:00:02     2015-06-01 11:16:07
        BP Key: 5   Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111605
        Piece Name: /home/oracle/rman_back/arch_ORASTRAC_20150601_5_1.bak

  List of Archived Logs in backup set 5
  Thrd Seq     Low SCN    Low Time            Next SCN   Next Time
  ---- ------- ---------- ------------------- ---------- ---------
  1    5       1012317    2015-06-01 11:04:50 1027356    2015-06-01 11:15:59
```

```
BS Key  Size       Device Type Elapsed Time Completion Time
------- ---------- ----------- ------------ ---------------
6       2.00K      DISK        00:00:02     2015-06-01 11:16:07
        BP Key: 6   Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111605
        Piece Name: /home/oracle/rman_back/arch_ORASTRAC_20150601_6_1.bak

  List of Archived Logs in backup set 6
  Thrd Seq     Low SCN    Low Time            Next SCN   Next Time
  ---- ------- ---------- ------------------- ---------- ---------
  1    6       1027356    2015-06-01 11:15:59 1027365    2015-06-01 11:16:05

BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ ---------------
7       Full    9.33M      DISK        00:00:02     2015-06-01 11:16:12
        BP Key: 7   Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111610
        Piece Name: /home/oracle/rman_back/ctl_ORASTRAC_20150601_7_1.bak
  Control File Included: Ckp SCN: 1027386      Ckp time: 2015-06-01 11:16:10

RMAN> list backupset summary;


List of Backups
===============
Key     TY LV S Device Type Completion Time     #Pieces #Copies Compressed Tag
------- -- -- - ----------- ------------------- ------- ------- ---------- ---
1       B  F  A DISK        2015-06-01 11:15:11 1       1       NO         TAG20150601T111228
2       B  F  A DISK        2015-06-01 11:15:48 1       1       NO         TAG20150601T111228
3       B  F  A DISK        2015-06-01 11:15:50 1       1       NO         TAG20150601T111228
4       B  F  A DISK        2015-06-01 11:15:52 1       1       NO         TAG20150601T111228
5       B  A  A DISK        2015-06-01 11:16:07 1       1       NO         TAG20150601T111605
6       B  A  A DISK        2015-06-01 11:16:07 1       1       NO         TAG20150601T111605
7       B  F  A DISK        2015-06-01 11:16:12 1       1       NO         TAG20150601T111610

RMAN>
```

1.3.2.3　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 直接传递到 rac 环境的第一个节点。

源库 scp 操作：

```
[oracle@orcltest ~]$ cd rman_back/
[oracle@orcltest rman_back]$ ll
total 1189660
-rw-r----- 1 oracle asmadmin  43154944 Jun  1 11:16 arch_ORASTRAC_20150601_5_1.bak
-rw-r----- 1 oracle asmadmin      2560 Jun  1 11:16 arch_ORASTRAC_20150601_6_1.bak
-rw-r----- 1 oracle asmadmin   9797632 Jun  1 11:16 ctl_ORASTRAC_20150601_7_1.bak
-rw-r----- 1 oracle asmadmin 629121024 Jun  1 11:15 full_ORASTRAC_20150601_881233948_1_1.bak
-rw-r----- 1 oracle asmadmin 526229504 Jun  1 11:14 full_ORASTRAC_20150601_881233949_2_1.bak
-rw-r----- 1 oracle asmadmin   9797632 Jun  1 11:15 full_ORASTRAC_20150601_881234138_3_1.bak
-rw-r----- 1 oracle asmadmin     98304 Jun  1 11:15 full_ORASTRAC_20150601_881234150_4_1.bak
[oracle@orcltest rman_back]$ ll -h
total 1.2G
-rw-r----- 1 oracle asmadmin  42M Jun  1 11:16 arch_ORASTRAC_20150601_5_1.bak
-rw-r----- 1 oracle asmadmin 2.5K Jun  1 11:16 arch_ORASTRAC_20150601_6_1.bak
-rw-r----- 1 oracle asmadmin 9.4M Jun  1 11:16 ctl_ORASTRAC_20150601_7_1.bak
-rw-r----- 1 oracle asmadmin 600M Jun  1 11:15 full_ORASTRAC_20150601_881233948_1_1.bak
```

```
-rw-r----- 1 oracle asmadmin 502M Jun  1 11:14 full_ORASTRAC_20150601_881233949_2_1.bak
-rw-r----- 1 oracle asmadmin 9.4M Jun  1 11:15 full_ORASTRAC_20150601_881234138_3_1.bak
-rw-r----- 1 oracle asmadmin  96K Jun  1 11:15 full_ORASTRAC_20150601_881234150_4_1.bak
[oracle@orcltest rman_back]$
[oracle@orcltest rman_back]$ scp -r /home/oracle/rman_back  oracle@192.168.1.31:/home/oracle
oracle@192.168.1.31's password:
ctl_ORASTRAC_20150601_7_1.bak                                                  100%  9.4MB  17.7MB/s   00:01
arch_ORASTRAC_20150601_5_1.bak                                                 100%   42MB  27.0MB/s   00:03
arch_ORASTRAC_20150601_6_1.bak                                                 100%  2.5KB  16.5MB/s   00:02
full_ORASTRAC_20150601_881233948_1_1.bak                                       100%   18MB  17.7MB/s   00:01
full_ORASTRAC_20150601_881233949_2_1.bak                                       100%  618MB  12.4MB/s   00:50
full_ORASTRAC_20150601_881234138_3_1.bak                                       100%  500MB  15.2MB/s   00:33
full_ORASTRAC_20150601_881234150_4_1.bak                                       100%   96KB  96.0KB/s   00:00
[oracle@node2 rman_back]$
```

target 库查看备份文件：

```
[oracle@node1 rman_back]$ ll -h
total 1.2G
-rw-r----- 1 oracle oinstall  42M Jun  1 11:19 arch_ORASTRAC_20150601_5_1.bak
-rw-r----- 1 oracle oinstall 2.5K Jun  1 11:23 arch_ORASTRAC_20150601_6_1.bak
-rw-r----- 1 oracle oinstall 9.4M Jun  1 11:21 ctl_ORASTRAC_20150601_7_1.bak
-rw-r----- 1 oracle oinstall 600M Jun  1 11:23 full_ORASTRAC_20150601_881233948_1_1.bak
-rw-r----- 1 oracle oinstall 502M Jun  1 11:21 full_ORASTRAC_20150601_881233949_2_1.bak
-rw-r----- 1 oracle oinstall 9.4M Jun  1 11:21 full_ORASTRAC_20150601_881234138_3_1.bak
-rw-r----- 1 oracle oinstall  96K Jun  1 11:23 full_ORASTRAC_20150601_881234150_4_1.bak
[oracle@node1 rman_back]$
```

1.3.3   target 库操作

以下操作若无特殊说明均在节点一操作。

1.3.3.1   查看 rac 环境

target 库已经有 3 个库，都处于 close 状态。

```
[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 ~]# crsstat | grep ora.database.type
ora.db.db                         ora.database.type       OFFLINE   OFFLINE
ora.jmrac.db                      ora.database.type       OFFLINE   OFFLINE
ora.ora11g.db                     ora.database.type       OFFLINE   OFFLINE
[root@node2 ~]#
```

查看磁盘组的情况，确保有足够的空间来还原数据库：

```
[root@node2 ~]# su - grid
[grid@node2 ~]$ asmcmd
ASMCMD>
ASMCMD> lsdg
State    Type    Rebal  Sector  Block       AU  Total_MB  Free_MB  Req_mir_free_MB  Usable_file_MB  Offline_disks  Voting_files  Name
MOUNTED  EXTERN  N         512   4096  1048576      9999     8905                0            8905              0                N  ARCH/
MOUNTED  EXTERN  N         512   4096  1048576     19999    11604                0           11604              0                N  DATA/
MOUNTED  EXTERN  N         512   4096  1048576      3099     2703                0            2703              0                N  OVDISK/
MOUNTED  EXTERN  N         512   4096  1048576      1024      929                0             929              0                N  TEST/
ASMCMD>
```

```
[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 ~]#
```

1.3.3.2   恢复 spfile 到 pfile，修改 pfile，创建相关路径：

首先利用 rman 恢复 spfile：

```
[oracle@node1 rman_back]$ ORACLE_SID=orastrac
[oracle@node1 rman_back]$ rman target /

Recovery Manager: Release 11.2.0.1.0 - Production on Mon Jun 1 13:25:33 2015

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connected to target database (not started)

RMAN> set dbid 1317814272

executing command: SET DBID

RMAN> startup nomount;

startup failed: ORA-01078: failure in processing system parameters
LRM-00109: could not open parameter file '/u01/app/oracle/product/11.2.0/dbhome_1/dbs/initorastrac.ora'

starting Oracle instance without parameter file for retrieval of spfile
Oracle instance started

Total System Global Area     158662656 bytes

Fixed Size                     2211448 bytes
Variable Size                 96469384 bytes
Database Buffers              54525952 bytes
Redo Buffers                   5455872 bytes
```

```
RMAN> restore spfile to pfile '?/dbs/initorastrac.ora' from '/home/oracle/rman_back/full_ORASTRAC_20150601_881234150_4_1.bak';

Starting restore at 01-JUN-2015 13:25:59
using target database control file instead of recovery catalog
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=25 device type=DISK

channel ORA_DISK_1: restoring spfile from AUTOBACKUP /home/oracle/rman_back/full_ORASTRAC_20150601_881234150_4_1.bak
channel ORA_DISK_1: SPFILE restore from AUTOBACKUP complete
Finished restore at 01-JUN-2015 13:26:00

RMAN>
RMAN> exit


Recovery Manager complete.
[oracle@node1 rman_back]$ ll /u01/app/oracle/product/11.2.0/dbhome_1/dbs/initorastrac.ora
-rw-r--r-- 1 oracle asmadmin 997 Jun  1 13:25 /u01/app/oracle/product/11.2.0/dbhome_1/dbs/initorastrac.ora
[oracle@node1 rman_back]$
[oracle@node1 rman_back]$ more /u01/app/oracle/product/11.2.0/dbhome_1/dbs/initorastrac.ora
orastrac.__db_cache_size=121634816
orastrac.__java_pool_size=4194304
orastrac.__large_pool_size=4194304
orastrac.__oracle_base='/u01/app/oracle'#ORACLE_BASE set from environment
orastrac.__pga_aggregate_target=167772160
orastrac.__sga_target=243269632
orastrac.__shared_io_pool_size=0
orastrac.__shared_pool_size=100663296
orastrac.__streams_pool_size=0
*.audit_file_dest='/u01/app/oracle/admin/orastrac/adump'
*.audit_trail='db'
*.compatible='11.2.0.0.0'
*.control_files='/u01/app/oracle/oradata/orastrac/control01.ctl','/u01/app/oracle/flash_recovery_area/orastrac/control02.ctl'
*.db_block_size=8192
*.db_domain=''
*.db_name='orastrac'
*.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=orastracXDB)'
*.log_archive_format='%t_%s_%r.dbf'
*.memory_target=408944640
*.open_cursors=300
*.processes=150
*.remote_login_passwordfile='EXCLUSIVE'
*.undo_tablespace='UNDOTBS1'
[oracle@node1 rman_back]$
```

修改与路径相关的参数，修改后如下：

```
[oracle@node1 dbs]$ more initorastrac.ora
*.audit_file_dest='/u01/app/oracle/admin/orastrac/adump'
*.audit_trail='db'
*.compatible='11.2.0.0.0'
*.control_files='+DATA/orastrac/controlfile/control01.ctl'
*.db_block_size=8192
*.db_domain=''
*.db_name='orastrac'
*.db_recovery_file_dest='+ARCH'
*.db_recovery_file_dest_size=4070572032
*.diagnostic_dest='/u01/app/oracle'
*.dispatchers='(PROTOCOL=TCP) (SERVICE=orastracXDB)'
*.log_archive_format='%t_%s_%r.dbf'
```

```
*.memory_target=408944640
*.open_cursors=300
*.processes=150
*.remote_login_passwordfile='EXCLUSIVE'
*.undo_tablespace='UNDOTBS1'
```

插曲：注意，这里如果想让控制文件的格式为 ASM 格式，可以这样设置控制文件的路径：

pfile 文件中的 control_files 这样写： *.control_files='+DATA','+ARCH' ，然后还原的时候就可以直接还原为 asm 格式的文件了，我这里由于是后边补上的，所以就不采用如下的形式

了，如下：

```
RMAN> restore controlfile   from '/home/oracle/rman_back/ctl_ORASTRAC_20150601_7_1.bak';

Starting restore at 01-JUN-2015 17:59:39
using channel ORA_DISK_1

channel ORA_DISK_1: restoring control file
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
output file name=+DATA/orastrac/controlfile/current.357.881258379
output file name=+ARCH/orastrac/controlfile/current.369.881258379
Finished restore at 01-JUN-2015 17:59:40

RMAN>
```

创建 os 文件路径，注意在节点一和节点二都执行：

```
[oracle@node1 ~]$ mkdir -p /u01/app/oracle/admin/orastrac/adump
[oracle@node1 ~]$
```

注意哟，创建的 spfile 可是要放到共享存储上去的：

```
[oracle@node1 dbs]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.1.0 Production on Mon Jun 1 15:49:22 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> create spfile='+DATA' from pfile;

File created.

SQL>
File created.
SQL> show parameter spfile
```

```
NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
spfile                               string
SQL>
```

查看新创建的 spfile 的文件名：

```
ASMCMD> pwd
+DATA/orastrac/PARAMETERFILE
ASMCMD> ls
spfile.335.881250575
ASMCMD>
```

```
[oracle@node1 dbs]$ cp initorastrac.ora initorastrac.ora_bk2
[oracle@node1 dbs]$ echo "SPFILE='+DATA/ORASTRAC/PARAMETERFILE/spfile.335.881250575'" > $ORACLE_HOME/dbs/initorastrac.ora
[oracle@node1 dbs]$
[oracle@node1 dbs]$ more initorastrac.ora
SPFILE='+DATA/ORASTRAC/PARAMETERFILE/spfile.335.881250575'
[oracle@node1 dbs]$
```

1.3.3.3　恢复控制文件

```
[oracle@node1 dbs]$ rman target /

Recovery Manager: Release 11.2.0.1.0 - Production on Mon Jun 1 15:46:55 2015

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

connected to target database (not started)

RMAN> startup nomount force;

Oracle instance started

Total System Global Area     409194496 bytes

Fixed Size                     2213856 bytes
Variable Size                272631840 bytes
Database Buffers             130023424 bytes
Redo Buffers                   4325376 bytes

RMAN> restore controlfile   from '/home/oracle/rman_back/ctl_ORASTRAC_20150601_7_1.bak';

Starting restore at 01-JUN-2015 15:47:14
using target database control file instead of recovery catalog
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=29 device type=DISK

channel ORA_DISK_1: restoring control file
channel ORA_DISK_1: restore complete, elapsed time: 00:00:07
output file name=+DATA/orastrac/controlfile/control01.ctl
Finished restore at 01-JUN-2015 15:47:21

RMAN> alter database mount;
```

```
database mounted
released channel: ORA_DISK_1

RMAN>
```

1.3.3.4   还原及恢复数据文件

首先得到运行的脚本：

```
[oracle@node1 dbs]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.1.0 Production on Mon Jun 1 15:58:47 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> 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/orastrac/system01.dbf              SYSTEM  READ WRITE
datafile             2 /u01/app/oracle/oradata/orastrac/sysaux01.dbf              ONLINE  READ WRITE
datafile             3 /u01/app/oracle/oradata/orastrac/undotbs01.dbf             ONLINE  READ WRITE
datafile             4 /u01/app/oracle/oradata/orastrac/users01.dbf               ONLINE  READ WRITE
datafile             5 /u01/app/oracle/oradata/orastrac/example01.dbf             ONLINE  READ WRITE
tempfile             1 /u01/app/oracle/oradata/orastrac/temp01.dbf                ONLINE  READ WRITE
logfile              3 /u01/app/oracle/oradata/orastrac/redo03.log
logfile              2 /u01/app/oracle/oradata/orastrac/redo02.log
logfile              1 /u01/app/oracle/oradata/orastrac/redo01.log
controlfile            +DATA/orastrac/controlfile/control01.ctl

10 rows selected.

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 "/u01/app/oracle/oradata/orastrac/system01.dbf";
set newname for datafile 2 to "/u01/app/oracle/oradata/orastrac/sysaux01.dbf";
set newname for datafile 3 to "/u01/app/oracle/oradata/orastrac/undotbs01.dbf";
set newname for datafile 4 to "/u01/app/oracle/oradata/orastrac/users01.dbf";
set newname for datafile 5 to "/u01/app/oracle/oradata/orastrac/example01.dbf";
set newname for tempfile 1 to "/u01/app/oracle/oradata/orastrac/temp01.dbf";
SQL "ALTER DATABASE RENAME FILE ''/u01/app/oracle/oradata/orastrac/redo03.log''  to ''/u01/app/oracle/oradata/orastrac/redo03.log'' ";
SQL "ALTER DATABASE RENAME FILE ''/u01/app/oracle/oradata/orastrac/redo02.log''  to ''/u01/app/oracle/oradata/orastrac/redo02.log'' ";
SQL "ALTER DATABASE RENAME FILE ''/u01/app/oracle/oradata/orastrac/redo01.log''  to ''/u01/app/oracle/oradata/orastrac/redo01.log'' ";

9 rows selected.

SQL>
```

查看备份集及还原数据库：

```
RMAN> list backupset;


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


BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ --------------------
1       Full    501.84M    DISK        00:02:42     01-JUN-2015 11:15:11
        BP Key: 1   Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111228
        Piece Name: /home/oracle/rman_back/full_ORASTRAC_20150601_881233949_2_1.bak
  List of Datafiles in backup set 1
  File LV Type Ckp SCN    Ckp Time             Name
  ---- -- ---- ---------- -------------------- ----
  2       Full 1027268    01-JUN-2015 11:12:29 /u01/app/oracle/oradata/orastrac/sysaux01.dbf
  3       Full 1027268    01-JUN-2015 11:12:29 /u01/app/oracle/oradata/orastrac/undotbs01.dbf
  5       Full 1027268    01-JUN-2015 11:12:29 /u01/app/oracle/oradata/orastrac/example01.dbf

BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ --------------------
2       Full    9.33M      DISK        00:00:10     01-JUN-2015 11:15:48
        BP Key: 2   Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111228
        Piece Name: /home/oracle/rman_back/full_ORASTRAC_20150601_881234138_3_1.bak
  Control File Included: Ckp SCN: 1027334     Ckp time: 01-JUN-2015 11:15:38

BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ --------------------
3       Full    80.00K     DISK        00:00:00     01-JUN-2015 11:15:50
        BP Key: 3   Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111228
        Piece Name: /home/oracle/rman_back/full_ORASTRAC_20150601_881234150_4_1.bak
  SPFILE Included: Modification time: 01-JUN-2015 11:12:28
  SPFILE db_unique_name: ORASTRAC

BS Key  Type LV Size       Device Type Elapsed Time Completion Time
------- ---- -- ---------- ----------- ------------ --------------------
4       Full    599.97M    DISK        00:03:24     01-JUN-2015 11:15:52
        BP Key: 4   Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111228
        Piece Name: /home/oracle/rman_back/full_ORASTRAC_20150601_881233948_1_1.bak
  List of Datafiles in backup set 4
  File LV Type Ckp SCN    Ckp Time             Name
```

```
 ---- -- ---- ----------- -------------------- ----
  1       Full 1027267    01-JUN-2015 11:12:29 /u01/app/oracle/oradata/orastrac/system01.dbf
  4       Full 1027267    01-JUN-2015 11:12:29 /u01/app/oracle/oradata/orastrac/users01.dbf

BS Key  Size       Device Type Elapsed Time Completion Time
------- ----------- ----------- ------------ --------------------
5       41.16M      DISK        00:00:02     01-JUN-2015 11:16:07
        BP Key: 5    Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111605
        Piece Name: /home/oracle/rman_back/arch_ORASTRAC_20150601_5_1.bak

  List of Archived Logs in backup set 5
  Thrd Seq     Low SCN    Low Time             Next SCN   Next Time
  ---- ------- ---------- -------------------- ---------- ---------
  1    5       1012317    01-JUN-2015 11:04:50 1027356    01-JUN-2015 11:15:59

BS Key  Size       Device Type Elapsed Time Completion Time
------- ----------- ----------- ------------ --------------------
6       2.00K       DISK        00:00:02     01-JUN-2015 11:16:07
        BP Key: 6    Status: AVAILABLE  Compressed: NO  Tag: TAG20150601T111605
        Piece Name: /home/oracle/rman_back/arch_ORASTRAC_20150601_6_1.bak

  List of Archived Logs in backup set 6
  Thrd Seq     Low SCN    Low Time             Next SCN   Next Time
  ---- ------- ---------- -------------------- ---------- ---------
  1    6       1027356    01-JUN-2015 11:15:59 1027365    01-JUN-2015 11:16:05

RMAN>
RMAN> run {
2> ALLOCATE CHANNEL c1 DEVICE TYPE DISK;
3> set newname for datafile 1 to "+DATA";
4> set newname for datafile 2 to "+DATA";
5> set newname for datafile 3 to "+DATA";
6> set newname for datafile 4 to "+DATA";
7> set newname for datafile 5 to "+DATA";
8> set newname for tempfile 1 to "+DATA";
9> SQL "ALTER DATABASE RENAME FILE ''/u01/app/oracle/oradata/orastrac/redo03.log''  to  ''+DATA'' ";
10> SQL "ALTER DATABASE RENAME FILE ''/u01/app/oracle/oradata/orastrac/redo02.log''  to  ''+DATA'' ";
11> SQL "ALTER DATABASE RENAME FILE ''/u01/app/oracle/oradata/orastrac/redo01.log''  to  ''+DATA'' ";
12> restore database;
13> SWITCH DATAFILE ALL;
14> SWITCH TEMPFILE ALL;
15> release channel c1;
16> }

allocated channel: c1
channel c1: SID=27 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

sql statement: ALTER DATABASE RENAME FILE ''/u01/app/oracle/oradata/orastrac/redo03.log''  to  ''+DATA''

sql statement: ALTER DATABASE RENAME FILE ''/u01/app/oracle/oradata/orastrac/redo02.log''  to  ''+DATA''

sql statement: ALTER DATABASE RENAME FILE ''/u01/app/oracle/oradata/orastrac/redo01.log''  to  ''+DATA''

Starting restore at 01-JUN-2015 16:04:19
Starting implicit crosscheck backup at 01-JUN-2015 16:04:19
```

```
Crosschecked 6 objects
Finished implicit crosscheck backup at 01-JUN-2015 16:04:19

Starting implicit crosscheck copy at 01-JUN-2015 16:04:19
Finished implicit crosscheck copy at 01-JUN-2015 16:04:19

searching for all files in the recovery area
cataloging files...
no files cataloged


channel c1: starting datafile backup set restore
channel c1: specifying datafile(s) to restore from backup set
channel c1: restoring datafile 00002 to +DATA
channel c1: restoring datafile 00003 to +DATA
channel c1: restoring datafile 00005 to +DATA
channel c1: reading from backup piece /home/oracle/rman_back/full_ORASTRAC_20150601_881233949_2_1.bak
channel c1: piece handle=/home/oracle/rman_back/full_ORASTRAC_20150601_881233949_2_1.bak tag=TAG20150601T111228
channel c1: restored backup piece 1
channel c1: restore complete, elapsed time: 00:00:48
channel c1: starting datafile backup set restore
channel c1: specifying datafile(s) to restore from backup set
channel c1: restoring datafile 00001 to +DATA
channel c1: restoring datafile 00004 to +DATA
channel c1: reading from backup piece /home/oracle/rman_back/full_ORASTRAC_20150601_881233948_1_1.bak
channel c1: piece handle=/home/oracle/rman_back/full_ORASTRAC_20150601_881233948_1_1.bak tag=TAG20150601T111228
channel c1: restored backup piece 1
channel c1: restore complete, elapsed time: 00:00:49
Finished restore at 01-JUN-2015 16:05:58

datafile 1 switched to datafile copy
input datafile copy RECID=7 STAMP=881251559 file name=+DATA/orastrac/datafile/system.330.881251509
datafile 2 switched to datafile copy
input datafile copy RECID=8 STAMP=881251559 file name=+DATA/orastrac/datafile/sysaux.331.881251461
datafile 3 switched to datafile copy
input datafile copy RECID=9 STAMP=881251559 file name=+DATA/orastrac/datafile/undotbs1.329.881251463
datafile 4 switched to datafile copy
input datafile copy RECID=10 STAMP=881251559 file name=+DATA/orastrac/datafile/users.327.881251511
datafile 5 switched to datafile copy
input datafile copy RECID=11 STAMP=881251559 file name=+DATA/orastrac/datafile/example.332.881251463

renamed tempfile 1 to +DATA in control file

released channel: c1

RMAN>

RMAN> RUN
2> {
3> set until sequence 6;
4> recover database;
5> }

executing command: SET until clause

Starting recover at 01-JUN-2015 16:08:53
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=27 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=1 sequence=5
channel ORA_DISK_1: reading from backup piece /home/oracle/rman_back/arch_ORASTRAC_20150601_5_1.bak
channel ORA_DISK_1: piece handle=/home/oracle/rman_back/arch_ORASTRAC_20150601_5_1.bak tag=TAG20150601T111605
channel ORA_DISK_1: restored backup piece 1
```

```
channel ORA_DISK_1: restore complete, elapsed time: 00:00:03
archived log file name=+ARCH/orastrac/archivelog/2015_06_01/thread_1_seq_5.350.881251737 thread=1 sequence=5
channel default: deleting archived log(s)
archived log file name=+ARCH/orastrac/archivelog/2015_06_01/thread_1_seq_5.350.881251737 RECID=3 STAMP=881251739
media recovery complete, elapsed time: 00:00:02
Finished recover at 01-JUN-2015 16:09:01

RMAN>
```

告警日志：

```
ALTER DATABASE RENAME FILE '/u01/app/oracle/oradata/orastrac/redo03.log' to '+DATA'
Completed: ALTER DATABASE RENAME FILE '/u01/app/oracle/oradata/orastrac/redo03.log' to '+DATA'
ALTER DATABASE RENAME FILE '/u01/app/oracle/oradata/orastrac/redo02.log' to '+DATA'
Completed: ALTER DATABASE RENAME FILE '/u01/app/oracle/oradata/orastrac/redo02.log' to '+DATA'
ALTER DATABASE RENAME FILE '/u01/app/oracle/oradata/orastrac/redo01.log' to '+DATA'
Completed: ALTER DATABASE RENAME FILE '/u01/app/oracle/oradata/orastrac/redo01.log' to '+DATA'
SUCCESS: diskgroup ARCH was mounted
Mon Jun 01 16:04:40 2015
Full restore complete of datafile 5 to datafile copy +DATA/orastrac/datafile/example.332.881251463.  Elapsed time: 0:00:14
  checkpoint is 1027268
  last deallocation scn is 965277
Full restore complete of datafile 3 to datafile copy +DATA/orastrac/datafile/undotbs1.329.881251463.  Elapsed time: 0:00:18
  checkpoint is 1027268
  last deallocation scn is 983226
Mon Jun 01 16:05:05 2015
Full restore complete of datafile 2 to datafile copy +DATA/orastrac/datafile/sysaux.331.881251461.  Elapsed time: 0:00:43
  checkpoint is 1027268
  last deallocation scn is 1026156
Full restore complete of datafile 4 to datafile copy +DATA/orastrac/datafile/users.327.881251511.  Elapsed time: 0:00:03
  checkpoint is 1027267
Mon Jun 01 16:05:49 2015
Full restore complete of datafile 1 to datafile copy +DATA/orastrac/datafile/system.330.881251509.  Elapsed time: 0:00:39
  checkpoint is 1027267
  last deallocation scn is 1025383
Mon Jun 01 16:05:59 2015
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-19625: error identifying file /u01/app/oracle/oradata/orastrac/system01.dbf
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Switch of datafile 1 complete to datafile copy
  checkpoint is 1027267
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-19625: error identifying file /u01/app/oracle/oradata/orastrac/sysaux01.dbf
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Switch of datafile 2 complete to datafile copy
  checkpoint is 1027268
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-19625: error identifying file /u01/app/oracle/oradata/orastrac/undotbs01.dbf
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Switch of datafile 3 complete to datafile copy
  checkpoint is 1027268
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
```

```
ORA-19625: error identifying file /u01/app/oracle/oradata/orastrac/users01.dbf
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Switch of datafile 4 complete to datafile copy
  checkpoint is 1027267
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-19625: error identifying file /u01/app/oracle/oradata/orastrac/example01.dbf
ORA-27037: unable to obtain file status
Linux-x86_64 Error: 2: No such file or directory
Additional information: 3
Switch of datafile 5 complete to datafile copy
  checkpoint is 1027268
Mon Jun 01 16:06:02 2015
Signalling error 1152 for datafile 1!
Signalling error 1152 for datafile 2!
Signalling error 1152 for datafile 3!
Signalling error 1152 for datafile 4!
Signalling error 1152 for datafile 5!
Checker run found 5 new persistent data failures
```

1.3.3.5 RESETLOGS 打开数据库并验证数据

```
RMAN> alter database open resetlogs;

database opened

RMAN>
```

告警日志：

```
Mon Jun 01 16:09:51 2015
alter database open resetlogs
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 1 of thread 1
ORA-00312: online log 1 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 1 of thread 1
ORA-00312: online log 1 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 2 of thread 1
ORA-00312: online log 2 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 2 of thread 1
ORA-00312: online log 2 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 3 of thread 1
ORA-00312: online log 3 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
```

```
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 3 of thread 1
ORA-00312: online log 3 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
RESETLOGS after incomplete recovery UNTIL CHANGE 1027356
Resetting resetlogs activation ID 1317842432 (0x4e8cae00)
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 1 of thread 1
ORA-00312: online log 1 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 1 of thread 1
ORA-00312: online log 1 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 2 of thread 1
ORA-00312: online log 2 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 2 of thread 1
ORA-00312: online log 2 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 3 of thread 1
ORA-00312: online log 3 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_ora_19721.trc:
ORA-00313: open failed for members of log group 3 of thread 1
ORA-00312: online log 3 thread 1: '+DATA'
ORA-17503: ksfdopn:2 Failed to open file +DATA
ORA-15045: ASM file name '+DATA' is not in reference form
Mon Jun 01 16:09:54 2015
Setting recovery target incarnation to 3
Mon Jun 01 16:09:54 2015
Assigning activation ID 1317780902 (0x4e8bbda6)
LGWR: STARTING ARCH PROCESSES
Mon Jun 01 16:09:54 2015
ARC0 started with pid=33, OS id=20083
ARC0: Archival started
LGWR: STARTING ARCH PROCESSES COMPLETE
ARC0: STARTING ARCH PROCESSES
Thread 1 opened at log sequence 1
  Current log# 1 seq# 1 mem# 0: +ARCH/orastrac/onlinelog/group_1.350.881251793
Successful open of redo thread 1
MTTR advisory is disabled because FAST_START_MTTR_TARGET is not set
Mon Jun 01 16:09:57 2015
ARC1 started with pid=34, OS id=20087
Mon Jun 01 16:09:57 2015
SMON: enabling cache recovery
Mon Jun 01 16:09:57 2015
ARC2 started with pid=35, OS id=20091
Mon Jun 01 16:09:57 2015
ARC3 started with pid=36, OS id=20095
ARC1: Archival started
ARC2: Archival started
ARC2: Becoming the 'no FAL' ARCH
ARC2: Becoming the 'no SRL' ARCH
ARC1: Becoming the heartbeat ARCH
ARC3: Archival started
ARC0: STARTING ARCH PROCESSES COMPLETE
Mon Jun 01 16:10:03 2015
```

```
Successfully onlined Undo Tablespace 2.
Dictionary check beginning
Mon Jun 01 16:10:03 2015
Errors in file /u01/app/oracle/diag/rdbms/orastrac/orastrac/trace/orastrac_dbw0_19220.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: '+DATA'
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 +DATA as +DATA/orastrac/tempfile/temp.333.881251803
Database Characterset is ZHS16GBK
No Resource Manager plan active
replication_dependency_tracking turned off (no async multimaster replication found)
Starting background process QMNC
Mon Jun 01 16:10:12 2015
QMNC started with pid=37, OS id=20118
Mon Jun 01 16:10:13 2015
LOGSTDBY: Validating controlfile with logical metadata
LOGSTDBY: Validation complete
Mon Jun 01 16:10:25 2015
Completed: alter database open resetlogs
Mon Jun 01 16:10:26 2015
db_recovery_file_dest_size of 3882 MB is 3.94% used. This is a
user-specified limit on the amount of space that will be used by this
database for recovery-related files, and does not reflect the amount of
space available in the underlying filesystem or ASM diskgroup.
Mon Jun 01 16:10:28 2015
Starting background process CJQ0
Mon Jun 01 16:10:28 2015
CJQ0 started with pid=41, OS id=20162
```

此时的数据库还是单实例的，需要启用集群特性来转换为 rac 数据库。

1.3.3.6　启用集群特性用于转换为 RAC 环境的数据库

需要修改如下几类参数：

一、　指定实例参数

```
[oracle@node1 dbs]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.1.0 Production on Mon Jun 1 16:12:03 2015

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


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> col parameter format a50
SQL> set line 9999
SQL>  select * from v$option where parameter = 'Real Application Clusters';

PARAMETER                                          VALUE
-------------------------------------------------- ----------------------------------------------------------
Real Application Clusters                          TRUE

SQL> show parameter cluster

NAME                                     TYPE        VALUE
---------------------------------------- ----------- ------------------------------
cluster_database                         boolean     FALSE
cluster_database_instances               integer     1
cluster_interconnects                    string
SQL>
```

由上述返回结果可知，RAC 特性是支持的，不过尚未启用集群数据库，因此接下来首先要改的，就是 enable CLUSTER DATABASE，操作如下：

```
SQL> show parameter spfile

NAME                                     TYPE        VALUE
---------------------------------------- ----------- ------------------------------
spfile                                   string      +DATA/orastrac/parameterfile/s
                                                     pfile.335.881250575
SQL> alter system set cluster_database=true scope=spfile;

System altered.

SQL>

SQL> alter system set cluster_database_instances=2 scope=spfile;

System altered.

SQL>  alter system set instance_number=1 scope=spfile sid='orastrac1';

System altered.

SQL>  alter system set instance_number=2 scope=spfile sid='orastrac2';

System altered.

SQL> alter system set thread=1 scope=spfile sid='orastrac1';

System altered.

SQL> alter system set thread=2 scope=spfile sid='orastrac2';

System altered.

SQL>
```

二、　增加 undo

新建一组 UNDO 表空间和线程 2 使用的两组 REDO 文件：

```
SQL> select * from v$tablespace;
```

```
        TS# NAME                          INC BIG FLA ENC
---------- ----------------------------- --- --- --- ---
          0 SYSTEM                        YES NO  YES
          1 SYSAUX                        YES NO  YES
          2 UNDOTBS1                      YES NO  YES
          4 USERS                         YES NO  YES
          3 TEMP                          NO  NO  YES
          6 EXAMPLE                       YES NO  YES

6 rows selected.

SQL>  create undo tablespace undotbs2 datafile '+DATA' SIZE 50m;

Tablespace created.

SQL> alter system set undo_tablespace='undotbs1' scope=spfile sid='orastrac1';

System altered.

SQL> alter system set undo_tablespace='undotbs2' scope=spfile sid='orastrac2';

System altered.
```

三、 增加 redo

```
SQL> select * from v$log;

    GROUP#    THREAD#  SEQUENCE#     BYTES  BLOCKSIZE  MEMBERS ARC STATUS           FIRST_CHANGE# FIRST_TIM NEXT_CHANGE# NEXT_TIME
---------- ---------- ---------- ---------- ---------- -------- --- ---------------- ------------- --------- ------------ ---------
         1          1          1   52428800        512        1 NO  CURRENT               1027357 01-JUN-15   2.8147E+14
         2          1          0   52428800        512        1 YES UNUSED                      0                        0
         3          1          0   52428800        512        1 YES UNUSED                      0                        0

SQL> alter database add logfile thread 2 group 4 '+arch' size 50M;

Database altered.

SQL> alter database add logfile thread 2 group 5 '+arch' size 50M;

Database altered.

SQL> alter database add logfile thread 2 group 6 '+arch' size 50M;

Database altered.

SQL> select * from v$log;

    GROUP#    THREAD#  SEQUENCE#     BYTES  BLOCKSIZE  MEMBERS ARC STATUS           FIRST_CHANGE# FIRST_TIM NEXT_CHANGE# NEXT_TIME
---------- ---------- ---------- ---------- ---------- -------- --- ---------------- ------------- --------- ------------ ---------
         1          1          1   52428800        512        1 NO  CURRENT               1027357 01-JUN-15   2.8147E+14
         2          1          0   52428800        512        1 YES UNUSED                      0                        0
         3          1          0   52428800        512        1 YES UNUSED                      0                        0
         4          2          0   52428800        512        1 YES UNUSED                      0                        0
         5          2          0   52428800        512        1 YES UNUSED                      0                        0
         6          2          0   52428800        512        1 YES UNUSED                      0                        0

6 rows selected.

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

```
   THREAD# INSTANCE STATUS ENABLED
---------- -------- ------ --------
        1 orastrac OPEN   PUBLIC
        2 UNNAMED_ CLOSED DISABLED
          INSTANCE
          _2


SQL> alter database enable thread 2 ;

Database altered.

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

   THREAD# INSTANCE STATUS ENABLED
---------- -------- ------ --------
        1 orastrac OPEN   PUBLIC
        2 UNNAMED_ CLOSED PRIVATE
          INSTANCE
          _2


SQL>
```

1.3.3.7　重启数据库

重启数据库，在每个节点上修改 pfile 文件：

一、　节点一

```
SQL> shutdown immediate;
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL> exit
Disconnected from 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
[oracle@node1 dbs]$ ORACLE_SID=orastrac1
[oracle@node1 dbs]$ echo "SPFILE='+DATA/ORASTRAC/PARAMETERFILE/spfile.335.881250575'" > $ORACLE_HOME/dbs/initorastrac1.ora
[oracle@node1 dbs]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.1.0 Production on Mon Jun 1 16:32:38 2015

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

Connected to an idle instance.

SQL> startup
ORACLE instance started.

Total System Global Area  409194496 bytes
Fixed Size                  2213856 bytes
Variable Size             314574880 bytes
Database Buffers           88080384 bytes
Redo Buffers                4325376 bytes
```

```
Database mounted.
Database opened.
SQL>
SQL> show parameter cluster

NAME                                 TYPE         VALUE
------------------------------------ ------------ ------------------------------
cluster_database                     boolean      TRUE
cluster_database_instances           integer      2
cluster_interconnects                string
SQL> set line 9999
col HOST_NAME format a10
select INSTANCE_NAME,HOST_NAME,VERSION,STARTUP_TIME,STATUS,ACTIVE_STATE,INSTANCE_ROLE,DATABASE_STATUS from gv$INSTANCE;

INSTANCE_NAME      HOST_NAME  VERSION          STARTUP_T STATUS       ACTIVE_ST INSTANCE_ROLE      DATABASE_STATUS
------------------ ---------- ---------------- --------- ------------ --------- ------------------ ------------------
orastrac1          node1      11.2.0.1.0       01-JUN-15 OPEN         NORMAL    PRIMARY_INSTANCE   ACTIVE

SQL> select INST_ID,name , open_mode, log_mode,force_logging from gv$database;

   INST_ID NAME      OPEN_MODE            LOG_MODE     FOR
---------- --------- -------------------- ------------ ---
         1 ORASTRAC  READ WRITE           ARCHIVELOG   NO

SQL>
SQL>  select count(1) FROM LHR.TEST_RAC;

  COUNT(1)
----------
     72468

SQL>
```

二、 节点二

```
[oracle@node1 dbs]$ ORACLE_SID=orastrac2
[oracle@node1 dbs]$ echo "SPFILE='+DATA/ORASTRAC/PARAMETERFILE/spfile.335.881250575'" > $ORACLE_HOME/dbs/initorastrac2.ora
[oracle@node1 dbs]$ sqlplus / as sysdba
[oracle@node2 ~]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.1.0 Production on Mon Jun 1 17:14:00 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> startup
ORACLE instance started.

Total System Global Area  409194496 bytes
Fixed Size                  2213856 bytes
Variable Size             314574880 bytes
Database Buffers           88080384 bytes
Redo Buffers                4325376 bytes
Database mounted.
Database opened.
```

```
SQL> show parameter spfile

NAME                                 TYPE          VALUE
------------------------------------ ------------- ------------------------------
spfile                               string        +DATA/orastrac/parameterfile/s
                                                   pfile.335.881250575
SQL>

SQL> show parameter cluster

NAME                                 TYPE          VALUE
------------------------------------ ------------- ------------------------------
cluster_database                     boolean       TRUE
cluster_database_instances           integer       2
cluster_interconnects                string
SQL> set line 9999
SQL> col HOST_NAME format a10
SQL> select INSTANCE_NAME,HOST_NAME,VERSION,STARTUP_TIME,STATUS,ACTIVE_STATE,INSTANCE_ROLE,DATABASE_STATUS from gv$INSTANCE;

INSTANCE_NAME    HOST_NAME  VERSION            STARTUP_T STATUS      ACTIVE_ST INSTANCE_ROLE       DATABASE_STATUS
---------------- ---------- ------------------ --------- ----------- --------- ------------------- ------------------
orastrac1        node1      11.2.0.1.0         01-JUN-15 OPEN        NORMAL    PRIMARY_INSTANCE    ACTIVE
orastrac2        node2      11.2.0.1.0         01-JUN-15 OPEN        NORMAL    PRIMARY_INSTANCE    ACTIVE

SQL> select INST_ID,name , open_mode,  log_mode,force_logging from gv$database;

   INST_ID NAME       OPEN_MODE            LOG_MODE     FOR
---------- ---------- -------------------- ------------ ---
         1 ORASTRAC   READ WRITE           ARCHIVELOG   NO
         2 ORASTRAC   READ WRITE           ARCHIVELOG   NO

SQL>
SQL>  select count(1) FROM LHR.TEST_RAC;

  COUNT(1)
----------
     72468

SQL>
```

数据已经恢复，下边把新恢复的数据库注册到 crs。

1.3.3.8 　注册到 crs 服务

```
[oracle@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           ONLINE    OFFLINE
ora.eons                         ora.eons.type               ONLINE    ONLINE    node1
ora.gsd                          ora.gsd.type                OFFLINE   OFFLINE
ora.jmrac.db                     ora.database.type           ONLINE    OFFLINE
ora.jmrac.haha.svc               ora.service.type            ONLINE    OFFLINE
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
[oracle@node2 ~]$ crsstat | grep ora.database.type
ora.db.db                        ora.database.type           ONLINE    OFFLINE
ora.jmrac.db                     ora.database.type           ONLINE    OFFLINE
ora.ora11g.db                    ora.database.type           OFFLINE   OFFLINE
[oracle@node2 ~]$
[oracle@node2 ~]$ srvctl add database -d orastrac -h

Adds a database configuration to the Oracle Clusterware.

Usage: srvctl add database -d <db_unique_name> -o <oracle_home> [-m <domain_name>] [-p <spfile>] [-r {PRIMARY | PHYSICAL_STANDBY | LOGICAL_STANDBY | SNAPSHOT_STANDBY}] [-s <start_options>] [-t <stop_options>]
[-n <db_name>] [-y {AUTOMATIC | MANUAL}] [-g "<serverpool_list>"] [-x <node_name>] [-a "<diskgroup_list>"]
    -d <db_unique_name>      Unique name for the database
    -o <oracle_home>         ORACLE_HOME path
    -x <node_name>           Node name. -x option is specified for single-instance databases
    -m <domain>              Domain for database. Must be set if database has DB_DOMAIN set.
    -p <spfile>              Server parameter file path
    -r <role>                Role of the database (primary, physical_standby, logical_standby, snapshot_standby)
    -s <start_options>       Startup options for the database. Examples of startup options are open, mount, or nomount.
    -t <stop_options>        Stop options for the database. Examples of shutdown options are normal, transactional, immediate, or abort.
    -n <db_name>          Database name (DB_NAME), if different from the unique name given by the -d option
    -y <dbpolicy>            Management policy for the database (AUTOMATIC or MANUAL)
    -g "<serverpool_list>"   Comma separated list of database server pool names
    -a "<diskgroup_list>"    Comma separated list of disk groups
    -h                       Print usage
[oracle@node2 ~]$ srvctl add database -d orastrac -o $ORACLE_HOME -p +DATA/orastrac/parameterfile/spfile.335.881250575
[oracle@node2 ~]$ srvctl config database -d orastrac
Database unique name: orastrac
Database name:
Oracle home: /u01/app/oracle/product/11.2.0/dbhome_1
Oracle user: oracle
Spfile: +DATA/orastrac/parameterfile/spfile.335.881250575
Domain:
Start options: open
Stop options: immediate
Database role: PRIMARY
Management policy: AUTOMATIC
Server pools: orastrac
Database instances:
Disk Groups:
Services:
Database is administrator managed
[oracle@node2 ~]$ srvctl add instance -d orastrac -i orastrac1 -n node1
[oracle@node2 ~]$ srvctl add instance -d orastrac -i orastrac2 -n node2
```

```
[oracle@node2 ~]$ srvctl config database -d orastrac
Database unique name: orastrac
Database name:
Oracle home: /u01/app/oracle/product/11.2.0/dbhome_1
Oracle user: oracle
Spfile: +DATA/orastrac/parameterfile/spfile.335.881250575
Domain:
Start options: open
Stop options: immediate
Database role: PRIMARY
Management policy: AUTOMATIC
Server pools: orastrac
Database instances: orastrac1,orastrac2
Disk Groups:
Services:
Database is administrator managed
[oracle@node2 ~]$
[oracle@node2 ~]$ crsstat | grep ora.database.type
ora.db.db                    ora.database.type        ONLINE      OFFLINE
ora.jmrac.db                 ora.database.type        ONLINE      OFFLINE
ora.ora11g.db                ora.database.type        OFFLINE     OFFLINE
ora.orastrac.db              ora.database.type        OFFLINE     OFFLINE
[oracle@node2 ~]$
[oracle@node2 ~]$ srvctl status database -d orastrac
Instance orastrac1 is not running on node node1
Instance orastrac2 is not running on node node2
[oracle@node2 ~]$ srvctl start database -d orastrac
[oracle@node2 ~]$ srvctl status database -d orastrac
Instance orastrac1 is running on node node1
Instance orastrac2 is running on node node2
[oracle@node2 ~]$
[oracle@node2 ~]$ crsstat | grep ora.database.type
ora.db.db                    ora.database.type        ONLINE      OFFLINE
ora.jmrac.db                 ora.database.type        ONLINE      OFFLINE
ora.ora11g.db                ora.database.type        OFFLINE     OFFLINE
ora.orastrac.db              ora.database.type        ONLINE      ONLINE      node1
[oracle@node2 ~]$
```

上述 3 条命令分别配置了数据库和两个实例，此时 3 项服务刚刚配置完成，crs 中尚未同步其状态，因此需要执行一下 srvctl start database，然后再通过 crs_stat 即可查看正确的状态了。

OK，现在已经是集群的数据库了，整个恢复工作基本完成。剩下的比如修改监听、配置网络服务名，创建密钥文件等操作相信大家已经熟悉的不能再熟悉，这里不再演示相关操作了(注意密钥文件也是建议创建到共享存储端，否则的话就得在各个节点分别创建一份)。

1.3.4　实验总结

单实例的数据库备份集恢复到 rac 环境下其实很简单，和一般的恢复步骤都一样的，不过在恢复 spfile、control file 及 datafile 的时候需要放在共享存储里边，另外恢复完成后需要修改一些集群相关的参数才可以转换为集群数据库。

1.4 **总结**

到此所有的处理算是基本完毕，过程很简单，但是不同的场景处理方式有很多种，我们应该学会灵活变通。

1.5 **About Me**

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