【故障处理】ORA-19809 错误处理

1.1 BLOG 文档结构图

1.2 前言部分

1.2.1 导读和注意事项

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

① ORA-19809: limit exceeded for recovery files 错误的处理方法

```
RMAN-03009: failure of backup command on ORA_DISK_1 channel at 07/26/2016 17:35:35
ORA-19809: limit exceeded for recovery files
ORA-19804: cannot reclaim 68157440 bytes disk space from 4385144832 limit
```

② 闪回恢复区占用大小的查询

Tips：

① 本文在 ITpub（http://blog.itpub.net/26736162）、博客园（http://www.cnblogs.com/lhrbest）和微信公众号（xiaomaimiaolhr）有同步更新

② 文章中用到的所有代码，相关软件，相关资料请前往小麦苗的云盘下载

（http://blog.itpub.net/26736162/viewspace-1624453/）

③ 若文章代码格式有错乱，推荐使用搜狗、360 或 QQ 浏览器，也可以下载 pdf 格式的文档来查看，pdf 文档下载地址：http://blog.itpub.net/26736162/viewspace-1624453/

④ 本篇 BLOG 中命令的输出部分需要特别关注的地方我都用灰色背景和粉红色字体来表示，比如下边的例子中，thread 1 的最大归档日志号为 33，thread 2 的最大归档日志号为 43 是需要特别关注的地方；而命令一般使用黄色背景和红色字体标注；对代码或代码输出部分的注释一般采用蓝色字体表示。

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

[ZHLHRDB1:root]:/>lsvg -o
T_XDESK_APP1_vg
rootvg
[ZHLHRDB1:root]:/>
00:27:22 SQL> alter tablespace idxtbs read write;

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

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

1.3 故障分析及解决过程

1.3.1 故障环境介绍

项目	source db
db 类型	RAC
db version	11.2.0.4

db 存储	ASM
OS 版本及 kernel 版本	AIX 64 位 6.1.0.0

1.3.2 故障发生现象及报错信息

rman 执行 0 级全备的时候报错：

```
[ZFXDESKDB2:root]:/>su - oracle
[ZFXDESKDB2:oracle]:/oracle>ORACLE_SID=raclhr2
[ZFXDESKDB2:oracle]:/oracle>rman target /

Recovery Manager: Release 11.2.0.4.0 - Production on Tue Jul 26 17:35:15 2016

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connected to target database: RACLHR (DBID=4156381309)

RMAN>  backup incremental level 0 database;

Starting backup at 2016-07-26 17:35:19
using target database control file instead of recovery catalog
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=70 instance=raclhr2 device type=DISK
channel ORA_DISK_1: starting incremental level 0 datafile backup set
channel ORA_DISK_1: specifying datafile(s) in backup set
input datafile file number=00002 name=+DATA/raclhr/datafile/sysaux.365.916601225
input datafile file number=00001 name=+DATA/raclhr/datafile/system.359.916601225
input datafile file number=00005 name=+DATA/raclhr/datafile/example.351.916601377
input datafile file number=00003 name=+DATA/raclhr/datafile/undotbs1.364.916601225
input datafile file number=00006 name=+DATA/raclhr/datafile/undotbs2.343.916601713
input datafile file number=00004 name=+DATA/raclhr/datafile/users.363.916601225
input datafile file number=00007 name=+DATA/raclhr/datafile/rsa_cm_data.519.917516173
input datafile file number=00008 name=+DATA/raclhr/datafile/rsa_cm_data.520.917516173
input datafile file number=00009 name=+DATA/raclhr/datafile/rsa_cm_data.521.917516173
input datafile file number=00010 name=+DATA/raclhr/datafile/ts_lhr.522.917516295
input datafile file number=00011 name=+DATA/raclhr/datafile/ts_lhr.523.917516295
input datafile file number=00012 name=+DATA/raclhr/datafile/ts_lhr.524.917516295
input datafile file number=00013 name=+DATA/raclhr/datafile/test.525.917516413
input datafile file number=00014 name=+DATA/raclhr/datafile/test.526.917516413
input datafile file number=00015 name=+DATA/raclhr/datafile/test.527.917516413
channel ORA_DISK_1: starting piece 1 at 2016-07-26 17:35:20
RMAN-03009: failure of backup command on ORA_DISK_1 channel at 07/26/2016 17:35:35
ORA-19809: limit exceeded for recovery files
ORA-19804: cannot reclaim 68157440 bytes disk space from 4385144832 limit
continuing other job steps, job failed will not be re-run
channel ORA_DISK_1: starting incremental level 0 datafile backup set
channel ORA_DISK_1: specifying datafile(s) in backup set
including current control file in backup set
including current SPFILE in backup set
channel ORA_DISK_1: starting piece 1 at 2016-07-26 17:35:37
channel ORA_DISK_1: finished piece 1 at 2016-07-26 17:35:38
piece handle=+DATA/raclhr/backupset/2016_07_26/ncsnn0_tag20160726t173520_0.568.918236137
tag=TAG20160726T173520 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:00:01
RMAN-00571: ===========================================================
RMAN-00569: =============== ERROR MESSAGE STACK FOLLOWS ===============
RMAN-00571: ===========================================================

RMAN-03009: failure of backup command on ORA_DISK_1 channel at 07/26/2016 17:35:35
ORA-19809: limit exceeded for recovery files
ORA-19804: cannot reclaim 68157440 bytes disk space from 4385144832 limit
```

1.3.3 故障分析及解决过程

看着这个错误听陌生的，之前没有遇到过，oerr 看一下解释：

```
[ZFXDESKDB2:oracle]:/oracle>oerr rman 3009
3009, 1, "failure of %s command on %s channel at %s"
// *Cause:  This message should be accompanied by other error message(s)
//         indicating the cause of the error.
// *Action: Check the accompanying errors.
[ZFXDESKDB2:oracle]:/oracle>oerr ora 19809
19809, 00000, "limit exceeded for recovery files"
//*Cause: The limit for recovery files specified by the
//        DB_RECOVERY_FILE_DEST_SIZE was exceeded.
// *Action: There are five possible solutions:
//         1) Take frequent backup of recovery area using RMAN.
//         2) Consider changing RMAN retention policy.
//         3) Consider changing RMAN archived log deletion policy.
//         4) Add disk space and increase DB_RECOVERY_FILE_DEST_SIZE.
//         5) Delete files from recovery area using RMAN.
[ZFXDESKDB2:oracle]:/oracle>oerr ora 19804
19804, 00000, "cannot reclaim %s bytes disk space from %s limit"
// *Cause: Oracle cannot reclaim disk space of specified bytes from the
//        DB_RECOVERY_FILE_DEST_SIZE limit.
// *Action: There are five possible solutions:
//         1) Take frequent backup of recovery area using RMAN.
//         2) Consider changing RMAN retention policy.
//         3) Consider changing RMAN archived log deletion policy.
//         4) Add disk space and increase DB_RECOVERY_FILE_DEST_SIZE.
//         5) Delete files from recovery area using RMAN.
```

由 oerr 的解释可以看出该错误是由于闪回恢复区大小参数 DB_RECOVERY_FILE_DEST 设置过小导致的，下边我们来修复该错误：

```
[ZFXDESKDB2:oracle]:/oracle>ORACLE_SID=raclhr2
[ZFXDESKDB2:oracle]:/oracle>sqlplus / as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Mon Aug 1 15:38:13 2016

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

SYS@raclhr2> show parameter DB_RECOVERY_FILE_DEST_SIZE

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
db_recovery_file_dest_size           big integer 4182M
SYS@raclhr2> alter system set db_recovery_file_dest_size=10G sid='*';

System altered.

SYS@raclhr2> exit
Disconnected from Oracle Database 11g Enterprise Edition Release 11.2.0.4.0 - 64bit Production
With the Partitioning, Real Application Clusters, Automatic Storage Management, OLAP,
Data Mining and Real Application Testing options
[ZFXDESKDB2:oracle]:/oracle>rman target /

Recovery Manager: Release 11.2.0.4.0 - Production on Mon Aug 1 15:46:58 2016

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connected to target database: RACLHR (DBID=4156381309)
```

```
RMAN> backup incremental level 0 database;

Starting backup at 2016-08-01 15:47:10
using target database control file instead of recovery catalog
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=67 instance=raclhr2 device type=DISK
channel ORA_DISK_1: starting incremental level 0 datafile backup set
channel ORA_DISK_1: specifying datafile(s) in backup set
input datafile file number=00002 name=+DATA/raclhr/datafile/sysaux.365.916601225
input datafile file number=00001 name=+DATA/raclhr/datafile/system.359.916601225
input datafile file number=00005 name=+DATA/raclhr/datafile/example.351.916601377
input datafile file number=00003 name=+DATA/raclhr/datafile/undotbs1.364.916601225
input datafile file number=00006 name=+DATA/raclhr/datafile/undotbs2.343.916601713
input datafile file number=00004 name=+DATA/raclhr/datafile/users.363.916601225
input datafile file number=00007 name=+DATA/raclhr/datafile/rsa_cm_data.519.917516173
input datafile file number=00008 name=+DATA/raclhr/datafile/rsa_cm_data.520.917516173
input datafile file number=00009 name=+DATA/raclhr/datafile/rsa_cm_data.521.917516173
input datafile file number=00010 name=+DATA/raclhr/datafile/ts_lhr.522.917516295
input datafile file number=00011 name=+DATA/raclhr/datafile/ts_lhr.523.917516295
input datafile file number=00012 name=+DATA/raclhr/datafile/ts_lhr.524.917516295
input datafile file number=00013 name=+DATA/raclhr/datafile/test.525.917516413
input datafile file number=00014 name=+DATA/raclhr/datafile/test.526.917516413
input datafile file number=00015 name=+DATA/raclhr/datafile/test.527.917516413
channel ORA_DISK_1: starting piece 1 at 2016-08-01 15:47:12
channel ORA_DISK_1: finished piece 1 at 2016-08-01 15:47:57
piece handle=+DATA/raclhr/backupset/2016_08_01/nnndn0_tag20160801t154711_0.597.918748035
tag=TAG20160801T154711 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:00:45
channel ORA_DISK_1: starting incremental level 0 datafile backup set
channel ORA_DISK_1: specifying datafile(s) in backup set
including current control file in backup set
including current SPFILE in backup set
channel ORA_DISK_1: starting piece 1 at 2016-08-01 15:47:59
channel ORA_DISK_1: finished piece 1 at 2016-08-01 15:48:00
piece handle=+DATA/raclhr/backupset/2016_08_01/ncsnn0_tag20160801t154711_0.598.918748079
tag=TAG20160801T154711 comment=NONE
channel ORA_DISK_1: backup set complete, elapsed time: 00:00:01
Finished backup at 2016-08-01 15:48:00

RMAN> list backupset summary;


List of Backups
===============
Key     TY LV S Device Type Completion Time     #Pieces #Copies Compressed Tag
------- -- -- - ----------- ------------------- ------- ------- ---------- ---
1       B  0  A DISK        2016-07-26 17:35:37 1       1       NO         TAG20160726T173520
2       B  0  A DISK        2016-08-01 15:47:51 1       1       NO         TAG20160801T154711
3       B  0  A DISK        2016-08-01 15:47:59 1       1       NO         TAG20160801T154711
```

1.4 故障处理总结

```
ORA-19809: limit exceeded for recovery files
ORA-19804: cannot reclaim 68157440 bytes disk space from 4385144832 limit
```

ORA-19809 错误是由于闪回恢复区设置过小导致，只需要修改参数 db_recovery_file_dest_size 设置为更大的值即可解决问题，要想更深入分析该问题就得分析闪回恢复区里存放了哪些内容。

1.5 如何查看闪回恢复区大小的占用情况

DB_healthcheck_by_lhr_22.188.194.66_RACLHR_2_11.2.0.4.0_20160801160125.html

我们从健康检查的脚本可以看出：

巡检服务概要			
数据库总体概况	数据库基本信息	数据库大小	资源使用情况
参数文件	所有的初始化参数	关键的初始化参数	隐含参数
表空间情况	表空间状况信息	闪回空间使用情况	临时表空间使用情况
	数据文件状况	控制文件	
ASM磁盘监控	ASM磁盘使用情况	ASM磁盘组使用情况	ASM磁盘组参数配置情况
JOB情况	作业运行状况	数据库job报错信息	

巡检服务明细			
RMAN信息	RMAN备份状况	RMAN配置情况	RMAN所有备份
	spfile文件备份	RMAN归档文件备份	数据库闪回
归档信息	归档日志设置	归档日志生成情况	归档日志占用率
	日志组大小		
SGA信息	SGA使用情况	SGA配置信息	SGA建议配置
文件IO信息	文件IO分析	文件IO时间分析	全表扫描情况
	逻辑读TOP10的SQL	物理读TOP10的SQL	执行时间TOP10的SQL

点击连接可以跳转到相应的部分：

数据库闪回空间使用情况

- 数据库闪回空间总体使用情况

NAME	LIMIT	USED_GB	USED%	RECLAIM	NUMBER_OF_FILES
+DATA	10G	5.953G	59.531%	4.154G	144

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- 数据库闪回空间详细使用情况

FILE_TYPE	USED_GB	PERCENT_SPACE_USED	PERCENT_SPACE_RECLAIMABLE	RECLAIM_GB	NUMBER_OF_FILES
ARCHIVED LOG	4.185	41.85	41.46	4.146	138
BACKUP PIECE	1.619	16.19	.08	.008	3

CONTROL FILE	0	0	0	0	0
FLASHBACK LOG	0	0	0	0	0
FOREIGN ARCHIVED LOG	0	0	0	0	0
IMAGE COPY	0	0	0	0	0
REDO LOG	.149	1.49	0	0	3
Total:	5.953	59.53	41.54	4.154	144

[回到目录]

可以看出，闪回空间目前是 10G，使用了将近 60%，共 144 个文件，每种文件的占用情况参考如上的表格，可以看出

主要是归档文件和备份集占用空间比较大。

有关健康检查报告中的用到的脚本如下：

闪回恢复区总大小：

```
SELECT NAME,
       round(space_limit / 1024 / 1024 / 1024, 3) "LIMIT_GB",
       round(space_used / 1024 / 1024 / 1024, 3) "USED_GB",
       round(space_used / space_limit * 100, 3) "USED%",
       round(space_reclaimable / 1024 / 1024 / 1024, 3) "RECLAIM_GB",
       number_of_files
FROM   v$recovery_file_dest v
WHERE v.SPACE_LIMIT<>0;
```

闪回恢复区详细使用大小：

```
SELECT nvl(frau.file_type,'<font color="#990000"><b>Total:</b></font>') file_type,
       sum(round(frau.percent_space_used / 100 * rfd.space_limit / 1024 / 1024 / 1024,3))
USED_GB,
       sum(frau.percent_space_used) percent_space_used,
       sum(frau.percent_space_reclaimable) percent_space_reclaimable,
       sum(round(frau.percent_space_reclaimable / 100 * rfd.space_limit / 1024 / 1024 /
1024,3)) RECLAIM_GB,
       sum(frau.number_of_files) number_of_files
FROM   v$flash_recovery_area_usage frau,
       v$recovery_file_dest       rfd
 GROUP  BY ROLLUP(file_type)
;
```

1.6 用到的 SQL 集合

```
0 级全备：backup incremental level 0 database;
oerr 查看错误：oerr rman 3009  、oerr ora 19809
设置闪回恢复区的大小：alter system set db_recovery_file_dest_size=10G sid='*';
------闪回恢复区总大小：
 SELECT NAME,
      round(space_limit / 1024 / 1024 / 1024, 3) "LIMIT_GB",
```

```
      round(space_used / 1024 / 1024 / 1024, 3) "USED_GB",
      round(space_used / space_limit * 100, 3) "USED%",
      round(space_reclaimable / 1024 / 1024 / 1024, 3) "RECLAIM_GB",
      number_of_files
FROM   v$recovery_file_dest v
WHERE v.SPACE_LIMIT<>0;
-----闪回恢复区详细使用大小：
SELECT nvl(frau.file_type,'<font color="#990000"><b>Total:</b></font>') file_type,
      sum(round(frau.percent_space_used / 100 * rfd.space_limit / 1024 / 1024 / 1024,3)) USED_GB,
      sum(frau.percent_space_used) percent_space_used,
      sum(frau.percent_space_reclaimable) percent_space_reclaimable,
      sum(round(frau.percent_space_reclaimable / 100 * rfd.space_limit / 1024 / 1024 / 1024,3))
RECLAIM_GB,
      sum(frau.number_of_files) number_of_files
FROM   v$flash_recovery_area_usage frau,
      v$recovery_file_dest       rfd
 GROUP  BY ROLLUP(file_type)
;
```

About Me

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- 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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