**一 数据库版本**

SQL> select \*from v$version;

BANNER

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OracleDatabase 10g Enterprise Edition Release 10.2.0.4.0 - 64bi

PL/SQL Release10.2.0.4.0 - Production

CORE 10.2.0.4.0    Production

TNS for Linux:Version 10.2.0.4.0 - Production

NLSRTL Version 10.2.0.4.0 -Production

**二 工具**

**1.Rman**：Oracle 8i开始就在使用的oracle专业备份恢复工具，这也是广大DBA同志接触最多的备份工具，不仅可以备份单实例还可以在RAC模式下备份，俗话说RMAN在手烦恼没有，下面我们开始深入浅出来讲讲Rman的使用方法和备份策略。

Rman能够干什么：（1）全库备份，是一切恢复的源泉

                （2）增量备份，目的减少备份的数据量，分为差异和累计

                （3）细粒度备份，表空间，数据文件，控制文件，参数文件，归档日志

                （4）数据库克隆，使用备份来迁移数据库

                （5）设计备份策略

                （6）管理备份集

                （7）自定义Rman脚本

                （8）生成Rman报告

如何学习Rman：很多人见了Rman不知道按照什么规则备份，因为Rman里面有很多参数需要设置，搞不好还会备份错误，备份策略如何设计等等一系列问题。在这里我要说，遇到一个工具最快的掌握方法就是先用起来，用的好用的坏那是另一回事。其实Rman原理并不复杂，就是复制数据库一系列文件打个包放在磁盘or磁带上，需要恢复的时候在拷贝回来。Rman实践要比原理重要的多，因此“实操族”是Rman的最爱。

注意：通过RMAN来备份和恢复数据库时，都必须先启动实例并加载数据库才行，这是给刚入门的朋友一点提示，如果你是大侠请自动忽视吧。

**2.登陆RMAN和退出RMAN**

RMAN连接本地数据库

[oracle@linuxdbbase]$ rman target /                    一气呵成法

还可以先登陆rman，进入后在连接数据库

[oracle@linuxdbbase]$ rman

RMAN>connect target /

connectedto target database: BASE (DBID=1845289414)     每个数据库都有一个唯一dbid

RMAN连接远程数据库

[oracle@linuxdbbase]$ rman target sys/oracle@base179    后缀连接串即可

connectedto target database: BASE (DBID=1843237732)

退出RMAN

RMAN>exit

RMAN>quit

**三 备份恢复前的一些准备工作**

有备无患是DBA们的口头禅，如果你想做一个赏心悦目的DBA那就要把功课做充分，从下面入手

**1. control\_file\_record\_keep\_time**

control\_file\_record\_keep\_time初始化参数：rman元数据在控制文件中保留的最小有效天数，默认为7天。

官方文档中描述它是控制文件保留rman元数据有效的最小天数，如果新增加一条记录到控制文件可重用区reusable，这时最老的记录尚没有超出最小保留天数，那么记录将控制文件的这一部分扩展。如果将该参数设置为0，那么控制文件可重用区将永远不会扩展。

注意：这个参数只应用于控制文件中可循环利用的部分，如归档日志文件，各种备份记录。不应用于诸如数据文件，表空间，重做日志等，这些内容只有当其从对应的表空间中删除后才能重用。

最小天数的理解：假设我们设置为7天，那如果我有10天前（甚至更早）的datafile backup和controlfile backup+至今的全部日志，就不能完全恢复了嘛？这是否定的，因为rman元数据保留在控制文件可重用区，如果7天内的备份记录没有把可重用区装满，就算过了7天你的备份记录还是存在的，可以正常完全恢复。如果7天内可重用区被装满了，控制文件会拿最老的备份记录来覆盖（但会保证最小天数内的记录是有效的）。

我们根据以往经验，把这个值设置为30天

语法：alter system set control\_file\_record\_keep\_time=30;

初始化参数control\_file\_record\_keep\_time是动态参数可以直接修改，不用重启数据库

SQL>show parameter control

NAME                                 TYPE        VALUE

----------------------------------------------- -------------------------------------------

control\_file\_record\_keep\_time             integer      30

**2.启动归档模式**

SYS@base>archive log list

Databaselog mode             No Archive Mode

Automaticarchival             Disabled

Archivedestination             USE\_DB\_RECOVERY\_FILE\_DEST

Oldestonline log sequence      10

Currentlog sequence           12

首先我们先要创建一个存放archive log的目录

Oracle10g&11g默认归档、闪回、备份都存放在flash\_recovery\_area中，默认大小2G，一般在生产环境中为了更方便管理这些重要文件，为其专门创建目录存放。

[oracle@linuxdboracle]$ mkdir archdata                    创建一个archive log目录

路径：/opt/oracle/archdata

登陆sqlplus，设置归档路径

[oracle@linuxdbarchdata]$ sqlplus / as sysdba

SYS@base> alter system setlog\_archive\_dest\_1='location=/opt/oracle/archdata' scope=both;  已经生效

System altered.

SQL> selectdest\_name,destination,status,error from v$archive\_dest wheredest\_name='LOG\_ARCHIVE\_DEST\_1';

DEST\_NAME            DESTINATION             STATUS    ERROR

---------------------------------------------------------------

LOG\_ARCHIVE\_DEST\_1   /opt/oracle/archdata    VALID

已经生效

重启数据库mount状态，开启归档

SYS@base> shutdown immediate

Database closed.

Database dismounted.

ORACLE instance shut down.

SYS@base> startup mount

ORACLE instance started.

Total System Global Area1610612736 bytes

Fixed Size                  2084296 bytes

Variable Size             385876536 bytes

Database Buffers         1207959552 bytes

Redo Buffers               14692352 bytes

Database mounted.

SYS@base> alter databasearchivelog;          开启归档模式

Database altered.

SYS@base> alter databaseopen;                打开数据库

Database altered.

凡是alter database操作都是修改“控制文件”内容，走到那说到那嘿

[oracle@linuxdbarchdata]$ ll           刚刚开启归档还没有生成日志，我们手工切换一下

总用量 0

SQL> alter systemswitch logfile;              手动切换不会触发checkpoint，自动切换会触发checkpoint

System altered

[oracle@linuxdbarchdata]$ ll           这时已经有归档日志生成了

总用量 22208

-rw-r-----1 oracle oinstall 22736384 5月  8 15:35 1\_13\_814444678.dbf

-rw-r-----1 oracle oinstall     1024 5月   8 15:35 1\_14\_814444678.dbf

SQL> selectsequence#,name,archived,applied from v$archived\_log;                  数据库层面查看

SEQUENCE# NAME                                             ARCHIVED APPLIED

----------------------------------------------------------- -------- -------

        13 /opt/oracle/archdata/1\_13\_814444678.dbf           YES      NO

        14 /opt/oracle/archdata/1\_14\_814444678.dbf           YES      NO

SYS@base> archivelog list;

Database logmode              Archive Mode                  归档模式

Automaticarchival             Enabled                       自动归档启动

Archivedestination           /opt/oracle/archdata          归档日志目录

Oldest online logsequence     13                            旧在线日志序号，已经归档完的

Next log sequence toarchive   15                            下一个将要归档的日志序号

Current logsequence           15                            当前在线日志序号

写的很清楚，从这里我们就可以判断归档日志的情况了，有多少归档，现在是几号日志，已经完成归档是几号等等。

**3.安装rlwrap-0.37-1.el5.x86\_64.rpm包**

大家有没有在sqlplus中不能使用键盘的上下左右键，打错了连删除字符都不行，没天理啊，作为一名“键盘族”这是忍受不了的，熟可忍熟不可忍。那有没有什么法宝可以解决这个看似小问题其实大问题的问题（周鸿祎说过任何理由都应该与用户体验为准绳）

rlwrap-0.37-1.el5.x86\_64.rpm包就可以解决这个问题，但在安装这个包之前需要先安装2个依赖包

one：readline-devel-6.0-4.el6.x86\_64.rpm

two：ncurses-devel-5.7-3.20090208.el6.x86\_64.rpm

oracle用户环境变量中添加

[oracle@linuxdb~]$ vim .bash\_profile

alias  sqlplus="rlwrap sqlplus"                   添加一个别名

[oracle@linuxdb~]$ . .bash\_profile                环境变量生效

**4.RMAN环境变量**

因RMAN配置信息都是放在数据库控制文件中的，因此我们先要连接到目标库才能显示环境变量

[oracle@linuxdb~]$ rman target /

connected to target database: BASE (DBID=1845289414)        有dbid证明已连接到目标库

RMAN>show all;

using target database control file instead of recovery catalog     使用控制文件来代替恢复目录数据库存放rman信息

RMANconfiguration parameters are:

CONFIGURERETENTION POLICY TO REDUNDANCY 1; # default

CONFIGUREBACKUP OPTIMIZATION OFF; # default

CONFIGUREDEFAULT DEVICE TYPE TO DISK; # default

CONFIGURECONTROLFILE AUTOBACKUP OFF; # default

CONFIGURECONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '%F'; # default

CONFIGUREDEVICE TYPE DISK PARALLELISM 1 BACKUP TYPE TO BACKUPSET; # default

CONFIGUREDATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default

CONFIGUREARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default

CONFIGUREMAXSETSIZE TO UNLIMITED; # default

CONFIGUREENCRYPTION FOR DATABASE OFF; # default

CONFIGUREENCRYPTION ALGORITHM 'AES128'; # default

CONFIGUREARCHIVELOG DELETION POLICY TO NONE; # default

CONFIGURESNAPSHOT CONTROLFILE NAME TO'/opt/oracle/product/10.2.0/db\_1/dbs/snapcf\_base.f'; # default

这只是一部分，如想多多学习请参考**【参】Books-> Backup and Recovery Reference -> CONFIGURE**

（1）配置RMAN默认备份介质保存目录 /opt/oracle/backup

[oracle@linuxdboracle]$ mkdir backup       创建保存目录

RMAN> configure channel device type disk format'/opt/oracle/backup/DB\_%U';

usingtarget database control file instead of recovery catalog

使用目标库“控制文件”代替“恢复目录数据库”存放rman信息

old RMANconfiguration parameters:

CONFIGURECHANNEL DEVICE TYPE DISK FORMAT  '/opt/oracle/backup/DB\_%U';

new RMANconfiguration parameters:

CONFIGURECHANNEL DEVICE TYPE DISK FORMAT  '/opt/oracle/backup/DB\_%U';

new RMANconfiguration parameters are successfully stored

新RMAN配置参数生效

（2）配置控制文件自动备份并保存到 /opt/oracle/backup/control

注：当控制文件内容有变化时会自动触发备份

[oracle@linuxdbbackup]$ mkdir control      创建保存目录

RMAN> configure controlfile autobackup on;  启动控制文件自动备份

new RMANconfiguration parameters:

CONFIGURECONTROLFILE AUTOBACKUP ON;

new RMANconfiguration parameters are successfully stored

RMAN> configure controlfile autobackup format for device type diskto '/opt/oracle/backup/control/cf\_%F';  配置控制文件自动备份保存目录和格式

new RMANconfiguration parameters:

CONFIGURECONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO'/opt/oracle/backup/control/cf\_%F';

new RMANconfiguration parameters are successfully stored

（3）配置备份介质保留期为7天

RMAN> configure retention policy to recovery window of 7 days;

new RMANconfiguration parameters:

CONFIGURERETENTION POLICY TO RECOVERY WINDOW OF 7 DAYS;

new RMANconfiguration parameters are successfully stored

设置好后我们再来看一下rman环境变量

RMAN>show all;

RMANconfiguration parameters are:

CONFIGURE RETENTION POLICY TO RECOVERY WINDOW OF 7 DAYS;        恢复窗口7天

CONFIGUREBACKUP OPTIMIZATION OFF; # default

CONFIGUREDEFAULT DEVICE TYPE TO DISK; # default

CONFIGURE CONTROLFILE AUTOBACKUP ON;                          启动控制文件自动备份，目录和格式

CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO'/opt/oracle/backup/control/cf\_%F';

CONFIGUREDEVICE TYPE DISK PARALLELISM 1 BACKUP TYPE TO BACKUPSET; # default

CONFIGUREDATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default

CONFIGUREARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default

CONFIGURE CHANNEL DEVICE TYPE DISK FORMAT   '/opt/oracle/backup/DB\_%U';    备份介质保存目录

CONFIGUREMAXSETSIZE TO UNLIMITED; # default

CONFIGUREENCRYPTION FOR DATABASE OFF; # default

CONFIGUREENCRYPTION ALGORITHM 'AES128'; # default

CONFIGUREARCHIVELOG DELETION POLICY TO NONE; # default

CONFIGURESNAPSHOT CONTROLFILE NAME TO '/opt/oracle/product/10.2.0/db\_1/dbs/snapcf\_base.f';# default

我们目前配置这4个变量就可以了，其它的什么时候用什么时候做或者直接在命令行中指定。

**四 备份与恢复实例**

**1. 用RMAN分别作数据库，表空间和数据文件的备份和数据库，表空间和数据文件损坏后的恢复实例**

数据库级备份与恢复

全库压缩备份与全库非压缩备份应用场景：

如果你的系统有专用“备份磁阵”或者有足够的磁盘空间来让您随心所欲的用，那说明你很幸运，遇到一个不差钱的boss，往往事与愿违，我们可以自由支配的磁盘空间非常有限，这也验证了国人勤俭节约的优良传统。在有限的空间里如何装下更多的备份呢，这里就用上了压缩属性，把原来很大的文件尽可能压缩，提高空间利用率，当然备份和恢复的时间窗口会长一些，这就是时间换空间的精髓。

Come on 我们先来备个全库吧

全库压缩备份脚本

backup as compressed backupset full database format                    命令行中直接指定压缩选项即可

'/opt/oracle/backup/full\_bk1\_%u%p%s.rmn'include current controlfile

plus

archivelogformat '/opt/oracle/backup/arch\_bk1\_%u%p%s.rmn' delete all input;

全库非压缩备份脚本

backupfull database format

'/opt/oracle/backup/full\_bk1\_%u%p%s.rmn'include current controlfile

plus

archivelog format '/opt/oracle/backup/arch\_bk1\_%u%p%s.rmn'delete all input;

全库使用默认通道默认配置备份脚本，同时删除备份过的归档日志

backup as compressed backupset full databaseinclude current controlfile plus archivelog delete all input;

上面有三种不同情况的备份脚本，我们用第二个，这个我想应该是大众最常用的。

备份之前检查archive log ，有三个归档日志

[oracle@linuxdb archdata]$ ll

总用量 64644

-rw-r----- 1 oracle oinstall 22736384 5月   8 15:35 1\_13\_814444678.dbf

-rw-r----- 1 oracle oinstall     1024 5月  8 15:35 1\_14\_814444678.dbf

-rw-r----- 1 oracle oinstall 43454464 5月   9 12:36 1\_15\_814444678.dbf

[oracle@linuxdb ~]$ rman target /                                  进入rman

connected to target database: BASE(DBID=1845289414)                一定要连接到数据库才行哦

RMAN> backup full database format

2>'/opt/oracle/backup/full\_bk1\_%u%p%s.rmn' include current controlfile

3> plus

4> archivelog format '/opt/oracle/backup/arch\_bk1\_%u%p%s.rmn'delete all input;

Starting backup at 09-MAY-13                           备份开始时间

current log archived                                   一般都从归档日志备份

using target database control file instead ofrecovery catalog

allocated channel: ORA\_DISK\_1                          分配默认通道

channel ORA\_DISK\_1: sid=145 devtype=DISK

channel ORA\_DISK\_1: starting archive logbackupset

channel ORA\_DISK\_1: specifying archive log(s)in backup set        归档日志列表 13~16

input archive log thread=1 sequence=13recid=1 stamp=814894510

input archive log thread=1sequence=14 recid=2 stamp=814894549

input archive log thread=1sequence=15 recid=3 stamp=814970205

input archive log thread=1sequence=16 recid=4 stamp=814982236

channel ORA\_DISK\_1: starting piece 1 at09-MAY-13

channel ORA\_DISK\_1: finished piece 1 at09-MAY-13              备份片名称arch\_bk1\_01o9792t11.rmn

piecehandle=/opt/oracle/backup/arch\_bk1\_01o9792t11.rmn tag=TAG20130509T155717comment=NONE

channel ORA\_DISK\_1: backup set complete,elapsed time: 00:00:02  用时2秒

channel ORA\_DISK\_1: deleting archive log(s)                    删除备份过的归档日志13~16

archive logfilename=/opt/oracle/archdata/1\_13\_814444678.dbf recid=1 stamp=814894510

archive logfilename=/opt/oracle/archdata/1\_14\_814444678.dbf recid=2 stamp=814894549

archive logfilename=/opt/oracle/archdata/1\_15\_814444678.dbf recid=3 stamp=814970205

archive logfilename=/opt/oracle/archdata/1\_16\_814444678.dbf recid=4 stamp=814982236

Finished backup at 09-MAY-13

Starting backup at 09-MAY-13

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting full datafilebackupset              备份数据文件

channel ORA\_DISK\_1: specifying datafile(s) inbackupset           数据文件列表 1~6

input datafile fno=00005name=/opt/oracle/oradata/base/sinojfs\_01.dbf

input datafile fno=00006name=/opt/oracle/oradata/base/sinojfs2\_01.dbf

input datafile fno=00001 name=/opt/oracle/oradata/base/system01.dbf

input datafile fno=00002name=/opt/oracle/oradata/base/undotbs01.dbf

input datafile fno=00003name=/opt/oracle/oradata/base/sysaux01.dbf

input datafile fno=00004name=/opt/oracle/oradata/base/users01.dbf

channel ORA\_DISK\_1: starting piece 1 at09-MAY-13

channel ORA\_DISK\_1: finished piece 1 at09-MAY-13              备份片名称full\_bk1\_02o9793012.rmn

piecehandle=/opt/oracle/backup/full\_bk1\_02o9793012.rmn tag=TAG20130509T155720comment=NONE

channel ORA\_DISK\_1: backup set complete,elapsed time: 00:00:03  用时3秒

channel ORA\_DISK\_1: starting full datafilebackupset

channel ORA\_DISK\_1: specifying datafile(s) inbackupset

including current control file inbackupset                       同时随便把控制文件和参数文件也备份了

channel ORA\_DISK\_1: starting piece 1 at09-MAY-13

channel ORA\_DISK\_1: finished piece 1 at09-MAY-13              备份片名称full\_bk1\_03o9793313.rmn

piecehandle=/opt/oracle/backup/full\_bk1\_03o9793313.rmn tag=TAG20130509T155720comment=NONE

channel ORA\_DISK\_1: backup set complete,elapsed time: 00:00:02  用时2秒

Finished backup at 09-MAY-13

Starting backup at 09-MAY-13

current log archived

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting archive logbackupset

channel ORA\_DISK\_1: specifying archive log(s)in backup set        最后收尾在做一次归档日志备份

input archive log thread=1sequence=17 recid=5 stamp=814982245  这里面存放着数据库最后动作的信息

channel ORA\_DISK\_1: starting piece 1 at09-MAY-13

channel ORA\_DISK\_1: finished piece 1 at09-MAY-13               备份片名称arch\_bk1\_04o9793514.rmn

piecehandle=/opt/oracle/backup/arch\_bk1\_04o9793514.rmn tag=TAG20130509T155725comment=NONE

channel ORA\_DISK\_1: backup set complete,elapsed time: 00:00:02   用时2秒

channel ORA\_DISK\_1: deleting archive log(s)                     删除17号归档

archive logfilename=/opt/oracle/archdata/1\_17\_814444678.dbf recid=5 stamp=814982245

Finished backup at 09-MAY-13

当数据库结构有变化时，自动触发控制文件和参数文件备份

Starting Control File and SPFILEAutobackup at 09-MAY-13

piece handle=/opt/oracle/backup/control/cf\_c-1845289414-20130509-00comment=NONE

Finished Control File and SPFILE Autobackupat 09-MAY-13

操作系统层面看看有没有这些文件，删除没删除“备份过的旧归档日志”

[oracle@linuxdbbackup]$ ll                            四个备份集全都有

总用量 382264

-rw-r-----1 oracle oinstall  72907264 5月   9 15:57arch\_bk1\_01o9792t11.rmn

-rw-r-----1 oracle oinstall      3584 5月   9 15:57arch\_bk1\_04o9793514.rmn

drwxr-xr-x2 oracle oinstall      4096 5月   9 15:57 control

-rw-r-----1 oracle oinstall 242302976 5月  9 15:57 full\_bk1\_02o9793012.rmn

-rw-r-----1 oracle oinstall  76218368 5月   9 15:57full\_bk1\_03o9793313.rmn

[oracle@linuxdbcontrol]$ ll                            控制文件自动备份也有了

总用量 74464

-rw-r-----1 oracle oinstall 76251136 5月  9 15:57 cf\_c-1845289414-20130509-00

[oracle@linuxdbarchdata]$ ll                           归档日志全删了

总用量 0

SYS@base>archive log list       新归档日志从18号开始，17号之前都已经备份并删除

Databaselog mode            Archive Mode

Automaticarchival             Enabled

Archivedestination             /opt/oracle/archdata

Oldestonline log sequence      16

Next logsequence to archive     18

Currentlog sequence           18

一切准备就绪后，我们开始搞破坏吧：）全部改名

[oracle@linuxdbbase]$ mv system01.dbf system01.dbf.bak

[oracle@linuxdbbase]$ mv sinojfs\_01.dbf sinojfs\_01.dbf.bak

[oracle@linuxdbbase]$ mv sinojfs2\_01.dbf sinojfs2\_01.dbf.bak

[oracle@linuxdbbase]$ mv sysaux01.dbf sysaux01.dbf.bak

SYS@base>shutdown abort             强制关库

ORACLEinstance shut down.

SYS@base>startup                    启动

ORACLEinstance started.

TotalSystem Global Area 1610612736 bytes

FixedSize                  2084296 bytes

VariableSize             385876536 bytes

DatabaseBuffers         1207959552 bytes

RedoBuffers               14692352 bytes

Databasemounted.

ORA-01157:cannot identify/lock data file 1 - see DBWR trace file

ORA-01110:data file 1: '/opt/oracle/oradata/base/system01.dbf

提示找不到1号文件，oracle都是先从1号文件开始访问

Good 破坏完毕，赶集恢复，我这是用试运行项目数据库做测试的，而且备份仅此一份，这要是出了岔子就不好玩了，如有雷同纯属巧合。

SYS@base>select status from v$instance;                   启动数据库到mount状态

STATUS

------------

MOUNTED

进入RMAN看一看备份集，这些信息都是从control file读出的。

RMAN>list backupset;

usingtarget database control file instead of recovery catalog

List of Backup Sets

第一个备份片  大小   保存设备    用时   备份日期

BSKey  Size       Device Type Elapsed Time Completion Time

----------------- ----------- ------------ ---------------

1       69.53M     DISK       00:00:02     09-MAY-13

        BP Key: 1   Status: AVAILABLE Compressed: NO  Tag: TAG20130509T155717     如果压缩这会是YES

        Piece Name: /opt/oracle/backup/arch\_bk1\_01o9792t11.rmn     备份片路径和名称

  List of Archived Logs in backup set 1                               包含的文件

  Thrd Seq    Low SCN    Low Time  Next SCN  Next Time

  ---- ------- ---------- --------- -------------------

  1   13      335077     07-MAY-13 362020     08-MAY-13

  1   14      362020     08-MAY-13 362034     08-MAY-13

  1   15      362034     08-MAY-13 398238     09-MAY-13

  1   16      398238     09-MAY-13 403789     09-MAY-13

第二个备份片信息，由于保存的是数据文件，明显容量很大

BSKey  Type LV Size       Device Type Elapsed Time Completion Time

----------- -- ---------- ----------- ------------ ---------------

2       Full   231.07M   DISK        00:00:03     09-MAY-13

        BP Key: 2   Status: AVAILABLE  Compressed: NO  Tag: TAG20130509T155720

        Piece Name:/opt/oracle/backup/full\_bk1\_02o9793012.rmn    备份片路径和名称

  List of Datafiles in backup set 2

  File LV Type Ckp SCN    Ckp Time Name      文件列表

  ---- -- ---- ---------- --------- ----

  1      Full 403795     09-MAY-13/opt/oracle/oradata/base/system01.dbf

  2      Full 403795     09-MAY-13/opt/oracle/oradata/base/undotbs01.dbf

  3      Full 403795     09-MAY-13/opt/oracle/oradata/base/sysaux01.dbf

  4      Full 403795     09-MAY-13/opt/oracle/oradata/base/users01.dbf

  5      Full 403795     09-MAY-13/opt/oracle/oradata/base/sinojfs\_01.dbf

  6      Full 403795     09-MAY-13/opt/oracle/oradata/base/sinojfs2\_01.dbf

第三个备份片信息，保存的是控制文件

BSKey  Type LV Size       Device Type Elapsed Time Completion Time

----------- -- ---------- ----------- ------------ ---------------

3       Full   72.67M    DISK        00:00:01     09-MAY-13

        BP Key: 3   Status: AVAILABLE  Compressed: NO  Tag: TAG20130509T155720

        Piece Name:/opt/oracle/backup/full\_bk1\_03o9793313.rmn

  Control File Included: Ckp SCN: 403796       Ckp time: 09-MAY-13

第四个备份片信息，保存的是收尾的归档日志

BSKey  Size       Device Type Elapsed Time Completion Time

----------------- ----------- ------------ ---------------

4       3.00K      DISK        00:00:01     09-MAY-13

        BP Key: 4   Status: AVAILABLE  Compressed: NO  Tag: TAG20130509T155725

        Piece Name:/opt/oracle/backup/arch\_bk1\_04o9793514.rmn

  List of Archived Logs in backup set 4

  Thrd Seq    Low SCN    Low Time  Next SCN  Next Time

  ---- ------- ---------- --------- -------------------

  1   17      403789     09-MAY-13 403800     09-MAY-13

第五个备份片信息，保存的是控制文件和参数文件自动备份

BSKey  Type LV Size       Device Type Elapsed Time Completion Time

----------- -- ---------- ----------- ------------ ---------------

5       Full   72.70M    DISK        00:00:01     09-MAY-13

        BP Key: 5   Status: AVAILABLE  Compressed: NO  Tag: TAG20130509T155728

        Piece Name:/opt/oracle/backup/control/cf\_c-1845289414-20130509-00

  Control File Included: Ckp SCN: 403806       Ckp time: 09-MAY-13

  SPFILE Included: Modification time: 08-MAY-13

万事俱备只欠东风，我们来恢复吧！请关注备份集的大小，这是影响恢复快慢的重要指标

RMAN>restore database;

Startingrestore at 09-MAY-13

allocatedchannel: ORA\_DISK\_1

channelORA\_DISK\_1: sid=155 devtype=DISK

channelORA\_DISK\_1: starting datafile backupset restore              利用备份已经复制回来数据文件了

channelORA\_DISK\_1: specifying datafile(s) to restore from backup set

restoring datafile 00001 to /opt/oracle/oradata/base/system01.dbf

restoring datafile 00002 to /opt/oracle/oradata/base/undotbs01.dbf

restoring datafile 00003 to /opt/oracle/oradata/base/sysaux01.dbf

restoring datafile 00004 to /opt/oracle/oradata/base/users01.dbf

restoring datafile 00005 to /opt/oracle/oradata/base/sinojfs\_01.dbf

restoring datafile 00006 to /opt/oracle/oradata/base/sinojfs2\_01.dbf

channelORA\_DISK\_1: reading from backup piece /opt/oracle/backup/full\_bk1\_02o9793012.rmn

channelORA\_DISK\_1: restored backup piece 1

piecehandle=/opt/oracle/backup/full\_bk1\_02o9793012.rmn tag=TAG20130509T155720

channelORA\_DISK\_1: restore complete, elapsed time: 00:01:46

Finishedrestore at 09-MAY-13

###########################################################################################

[oracle@linuxdbbase]$ ll

-rw-r----- 1 oracle oinstall 10737426432 5月  9 18:11 sinojfs\_01.dbf

-rw-r-----1 oracle oinstall 10737426432 5月  9 17:28 sinojfs\_01.dbf.bak

-rw-r----- 1 oracle oinstall 10737426432 5月  9 18:10 sinojfs2\_01.dbf

-rw-r-----1 oracle oinstall 10737426432 5月   9 15:57 sinojfs2\_01.dbf.bak

-rw-r----- 1 oracle oinstall  125837312 5月   9 18:11 sysaux01.dbf

-rw-r-----1 oracle oinstall   125837312 5月   9 17:27 sysaux01.dbf.bak

-rw-r----- 1 oracle oinstall  314580992 5月   9 18:11 system01.dbf

-rw-r-----1 oracle oinstall   314580992 5月   9 17:28 system01.dbf.bak

操作系统层面都是可以看到的对不对

###########################################################################################

RMAN>recover database;                     不仅要restore还需要应用archive和redo log进行介质恢复

Startingrecover at 09-MAY-13

usingchannel ORA\_DISK\_1

starting media recovery

mediarecovery complete, elapsed time: 00:00:07

Finishedrecover at 09-MAY-13

RMAN>alter database open;                  把数据库恢复到最新状态才能顺利open

databaseopened

SYS@base>select status from v$instance;

STATUS

------------

OPEN

SYS@base>archive log list                    因为我们应用到最后一个日志，因此日志会接着前面继续顺延

Databaselog mode             Archive Mode

Automaticarchival             Enabled

Archivedestination             /opt/oracle/archdata

Oldestonline log sequence      17

Next logsequence to archive     19

Currentlog sequence           19

###########################################################################################

**表空间级别备份和恢复**

使用默认通道默认备份介质保存目录

RMAN>backup tablespace sinojfs2;

Startingbackup at 09-MAY-13

usingchannel ORA\_DISK\_1

channelORA\_DISK\_1: starting full datafile backupset

channelORA\_DISK\_1: specifying datafile(s) in backupset

inputdatafile fno=00006 name=/opt/oracle/oradata/base/sinojfs2\_01.dbf    这个表空间就包含一个数据文件

channelORA\_DISK\_1: starting piece 1 at 09-MAY-13

channelORA\_DISK\_1: finished piece 1 at 09-MAY-13  备份片路径和名称

piecehandle=/opt/oracle/backup/DB\_06o97i9d\_1\_1 tag=TAG20130509T183421 comment=NONE

channelORA\_DISK\_1: backup set complete, elapsed time: 00:00:01

Finishedbackup at 09-MAY-13

看又自动备份控制文件和参数文件了

StartingControl File and SPFILE Autobackup at 09-MAY-13

piecehandle= /opt/oracle/backup/control/cf\_c-1845289414-20130509-01 comment=NONE

FinishedControl File and SPFILE Autobackup at 09-MAY-13

操作系统层面查看

[oracle@linuxdbbackup]$ ll

总用量 383112

-rw-r-----1 oracle oinstall  72907264 5月   9 15:57arch\_bk1\_01o9792t11.rmn

-rw-r-----1 oracle oinstall      3584 5月   9 15:57arch\_bk1\_04o9793514.rmn

drwxr-xr-x2 oracle oinstall      4096 5月   9 18:34 control

-rw-r----- 1 oracle oinstall   868352 5月   9 18:34 DB\_06o97i9d\_1\_1          表空间的备份集

-rw-r-----1 oracle oinstall 242302976 5月  9 15:57 full\_bk1\_02o9793012.rmn

-rw-r-----1 oracle oinstall  76218368 5月   9 15:57full\_bk1\_03o9793313.rmn

[oracle@linuxdbcontrol]$ ll

总用量 148928

-rw-r-----1 oracle oinstall 76251136 5月  9 15:57 cf\_c-1845289414-20130509-00

-rw-r----- 1 oracle oinstall 76251136 5月  9 18:34 cf\_c-1845289414-20130509-01 这是第二次自动备份集

如果没有指定保存目录，使用RMAN参数中默认的备份介质保存目录/opt/oracle/backup

###########################################################################################

进入sqlplus删除sinojfs2表空间

SYS@base>drop tablespace sinojfs2 including contents and datafiles;    删除sinojfs2表空间

Tablespacedropped.

SYS@base>select \* from v$tablespace;                            已经删除了吧

      TS# NAME                          INC BIG FLA ENC

---------------------------------------- --- --- --- ---

         0 SYSTEM                         YES NO  YES

         1 UNDOTBS1                       YES NO  YES

         2 SYSAUX                         YES NO YES

         3 TEMP                           NO  NO  YES

         4 USERS                          YES NO  YES

         5 SINOJFS                        YES NO  YES

6 rowsselected.

利用表空间备份进行恢复，进入RMAN

RMAN>restore tablespace sinojfs2;

Startingrestore at 09-MAY-13

usingtarget database control file instead of recovery catalog

allocatedchannel: ORA\_DISK\_1

channelORA\_DISK\_1: sid=155 devtype=DISK

RMAN-00571:===========================================================

RMAN-00569:=============== ERROR MESSAGE STACK FOLLOWS ===============

RMAN-00571:===========================================================

RMAN-03002: failure of restore command at 05/09/2013 19:14:39

RMAN-20202: tablespace not found in the recovery catalog

RMAN-06019: could not translate tablespace name "SINOJFS2"

大家知道为什么找不到sinojfs2表空间吗？数据库结构是不是存放在控制文件中的，刚才我们是怎么破坏的表空间的？使用了drop tablespace sinojfs2 includingcontents and datafiles; 这条语句，它做的动作是删除表空间同时把控制文件中的表空间信息也一并删除，因此后来在使用控制文件恢复表空间时报找不到信息。怎么办，这个不行那就换一种方法。

首先重新恢复数据库到原来状态，过程省略，刚才已经讲过了，再来一遍估计就要抛砖啦！

重新创建一个新sinojfs2表空间

SQL> createtablespace sinojfs2 datafile '/opt/oracle/oradata/base/sinojfs2\_01.dbf' size10G autoextend off;

Tablespace created

SQL> selectfile#,name,status from v$datafile where file#=6;

     FILE# NAME                                                                            STATUS

-------------------------------------------------------------------------------------------------

         6/opt/oracle/oradata/base/sinojfs2\_01.dbf                                         ONLINE

在备份一次表空间

RMAN>backup tablespace sinojfs2;

Startingbackup at 09-MAY-13

usingchannel ORA\_DISK\_1

channelORA\_DISK\_1: starting full datafile backupset

channelORA\_DISK\_1: specifying datafile(s) in backupset

inputdatafile fno=00006 name=/opt/oracle/oradata/base/sinojfs2\_01.dbf

channelORA\_DISK\_1: starting piece 1 at 09-MAY-13

channelORA\_DISK\_1: finished piece 1 at 09-MAY-13

piecehandle=/opt/oracle/backup/DB\_0fo97o6p\_1\_1 tag=TAG20130509T201521comment=NONE

channelORA\_DISK\_1: backup set complete, elapsed time: 00:00:01

Finishedbackup at 09-MAY-13

StartingControl File and SPFILE Autobackup at 09-MAY-13

piecehandle=/opt/oracle/backup/control/cf\_c-1845289414-20130509-03 comment=NONE

FinishedControl File and SPFILE Autobackup at 09-MAY-13

我们这回直接删除表空间对应的数据文件

[oracle@linuxdbbase]$ rm -rf sinojfs2\_01.dbf

SYS@base>alter tablespace sinojfs2 offline;                     让表空间offline

altertablespace sinojfs2 offline

\*

ERROR atline 1:

ORA-01116:error in opening database file 6

ORA-01110:data file 6: '/opt/oracle/oradata/base/sinojfs2\_01.dbf'    找不到对应数据文件

ORA-27041:unable to open file

Linux-x86\_64Error: 2: No such file or directory

Additionalinformation: 3

SYS@base>alter database datafile 6 offline;                       先脱机数据文件

Databasealtered.

此时可以在数据库open状态下恢复sinojfs2表空间

RMAN>restore tablespace sinojfs2;                              复制文件

Startingrestore at 09-MAY-13

usingchannel ORA\_DISK\_1

channelORA\_DISK\_1: starting datafile backupset restore

channelORA\_DISK\_1: specifying datafile(s) to restore from backup set

restoringdatafile 00006 to /opt/oracle/oradata/base/sinojfs2\_01.dbf

channelORA\_DISK\_1: reading from backup piece /opt/oracle/backup/DB\_0fo97o6p\_1\_1

channelORA\_DISK\_1: restored backup piece 1

piecehandle=/opt/oracle/backup/DB\_0fo97o6p\_1\_1 tag=TAG20130509T201521

channelORA\_DISK\_1: restore complete, elapsed time: 00:00:55

Finishedrestore at 09-MAY-13

RMAN>recover tablespace sinojfs2;                             介质恢复

Startingrecover at 09-MAY-13

usingchannel ORA\_DISK\_1

startingmedia recovery

mediarecovery complete, elapsed time: 00:00:01

Finishedrecover at 09-MAY-13

SQL> selectfile#,name,status from v$datafile where file#=6;

     FILE# NAME                                                                             STATUS

-------------------------------------------------------------------------------------------------

         6/opt/oracle/oradata/base/sinojfs2\_01.dbf                                         OFFLINE

SYS@base> alter databasedatafile 6 online;                          把offline启动成online

Database altered.

SQL> selectfile#,name,status from v$datafile where file#=6;

     FILE# NAME                                                                            STATUS

-------------------------------------------------------------------------------------------------

         6/opt/oracle/oradata/base/sinojfs2\_01.dbf                                         ONLINE

到此表空间sinojfs2完整恢复回来，真是惊心动魄啊！数据文件恢复也是如此，命令如下这里就不演示了

restore datafile 6;

recover datafile 6;

来一点小提示，我们备份了这么多备份集，如何检查rman元数据和操作系统上的备份集对应关系呢

RMAN> crosscheck backupset;           交叉校验，看看对象数是否一致，我们这里一共9个备份集，再看看操作系统上即可

using channel ORA\_DISK\_1

crosschecked backup piece: found to be 'AVAILABLE'

backup piece handle=/opt/oracle/backup/arch\_bk1\_09o97nhr19.rmn recid=7stamp=814997052

crosschecked backup piece: found to be 'AVAILABLE'

backup piece handle=/opt/oracle/backup/full\_bk1\_0ao97nhu110.rmn recid=8stamp=814997055

crosschecked backup piece: found to be 'AVAILABLE'

backup piece handle=/opt/oracle/backup/full\_bk1\_0bo97ni5111.rmn recid=9stamp=814997061

crosschecked backup piece: found to be 'AVAILABLE'

backup piece handle=/opt/oracle/backup/arch\_bk1\_0co97ni7112.rmn recid=10stamp=814997064

crosschecked backup piece: found to be 'AVAILABLE'

backup piece handle=/opt/oracle/backup/control/cf\_c-1845289414-20130509-01recid=11 stamp=814997066

crosschecked backup piece: found to be 'AVAILABLE'

backup piece handle=/opt/oracle/backup/control/cf\_c-1845289414-20130509-02recid=12 stamp=814997575

crosschecked backup piece: found to be 'AVAILABLE'

backup piece handle=/opt/oracle/backup/DB\_0fo97o6p\_1\_1 recid=13stamp=814997721

crosschecked backup piece: found to be 'AVAILABLE'

backup piece handle=/opt/oracle/backup/control/cf\_c-1845289414-20130509-03recid=14 stamp=814997723

crosschecked backup piece: found to be 'AVAILABLE'

backup piece handle=/opt/oracle/backup/control/cf\_c-1845289414-20130509-04recid=15 stamp=814998546

Crosschecked 9 objects

delete backup          删除所有备份

delete expired backup  删除所有过期备份

小结：我们成功进行了数据库级别、表空间、数据文件级别的备份与恢复，当你数据库处于稳定状态时一定要记住做一个全备“以备后患”。Good 今天就讲到这里。

[RMAN 备份与恢复深入解析（二）](http://blog.itpub.net/26686207/viewspace-760871/) 2013-05-12 10:41:54

分类： Linux

**RMAN 备份与恢复深入解析（一）** <http://space.itpub.net/26686207/viewspace-760869>

**更多精彩内容尽在** [www.leonarding.com](http://www.leonarding.com/" \t "http://blog.itpub.net/26686207/viewspace-760871/_blank)

**《RMAN备份与恢复深入解析》**

**2.用示例说明两种增量备份的差别**

大家早上好，早上的阳光真是明媚，新的一天即将开始，下面我们来研究研究增量备份的奥妙：）

Incremental增量备份：中心思想就是减少备份的数据量，我们不需要在从头开始备份了，只需要备份自上次已备份之后的数据块即可。

关于Incremental增量备份级别：

Oracle 9i  共有五种级别 0 1 2 3 4，0级最高-4级最低，0级是1级的基础以此类推。

Oracle 10g官方文档明确指出增量备份只有0和1两种级别（太多增量级别其实没有太大的意义），不过实际执行增量操作时，仍然能够指定多个级别，最大能够支持4级增量备份。

Oracle 11g 增量备份只有0和1两种级别。

Level 0级就是对数据库一个全库备份，增量备份必须从0级开始，也就是说必须要有一个全库备份当基础。

如果你是用“backup full database”命令做全库备份oracle也不认为这是level 0的全库备份，尽管是一样的也要单独做一次level 0。有了level 0当基础才能有后面的level 1 level 2 level 3 level 4。如果你一上来比较冲动直接发出level 1备份，oracle会自动在level1前面加一个level 0，顺序是先进行level 0备份再做level 1备份，一共做两次备份。

关于Incremental增量备份类型：

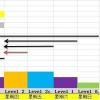
（1）差异增量备份：备份上级及同级备份以来所有变化的数据块，差异增量是默认增量备份方式

特点：触发条件小于等于当前级别<=N     备份时间快，恢复时间慢

[](http://blog.itpub.net/batch.download.php?aid=37954)

（2）累积增量备份：备份上级备份以来所有变化的块。

特点：小于当前级别<n  span="" c：代表累积<=""  ="" 备份时间慢，恢复时间快 =""   ="">

[](http://blog.itpub.net/batch.download.php?aid=37955)

我们系统的备份策略（周策略），仅供参考，如有雷同心心相印，欧巴~阿加西  
日期               差异增量          累积增量  
星期天                 0                      0  
星期一                 2                      2  
星期二                 2                      2  
星期三                 1                      1  
星期四                 2                      2  
星期五                 2                      2  
星期六                 2                      2  
星期日                 0                      0  
  
下面我们实验差异增量备份与累积增量备份~备份时间与恢复窗口优略性

差异增量备份

零级备份

backupincremental level 0 database;

创建表空间test1

创建表test1

一级差异备份

backupincremental level 1 database;

创建表空间test2

创建表test2

一级差异备份

backupincremental level 1 database;

记住当前的scn号（10000），我们删除表test1和表test2，然后恢复到scn=10000那一刻，检查表test1和表test2是否完整恢复回来，恢复窗口：恢复三个备份集 0+1+1+redo

begin go

0级全库备份

RMAN> backup incremental level 0 database;

Starting backup at 10-MAY-13

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting incremental level 0 datafile backup set  数据文件列表

channel ORA\_DISK\_1: specifying datafile(s) in backup set

input datafile file number=00001name=/u02/app/oracle/oradata/LEO1/system01.dbf

input datafile file number=00002name=/u02/app/oracle/oradata/LEO1/sysaux01.dbf

input datafile file number=00003name=/u02/app/oracle/oradata/LEO1/undotbs01.dbf

input datafile file number=00005name=/u02/app/oracle/oradata/LEO1/leo1.dbf

input datafile file number=00004name=/u02/app/oracle/oradata/LEO1/users01.dbf

channel ORA\_DISK\_1: starting piece 1 at 10-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 10-MAY-13

piece handle= /u02/app/oracle/backup/DB\_0lo99q5p\_1\_1 tag=TAG20130510T150112 comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:01:25

Finished backup at 10-MAY-13

控制文件自动备份

Starting Control File and SPFILE Autobackup at 10-MAY-13

piece handle= /u02/app/oracle/backup/control/cf\_c-1692458681-20130510-00 comment=NONE

Finished Control File and SPFILE Autobackup at 10-MAY-13

操作系统侧面检查，顺利备份没有问题 good

[oracle@leonarding1 backup]$ ll

total 983928

drwxr-xr-x 2 oracle oinstall      4096 May 10 15:02 control

-rw-r----- 1 oracle asmadmin 1007534080 May 10 15:02 DB\_0lo99q5p\_1\_1

[oracle@leonarding1 control]$ ll

total 9632

-rw-r----- 1 oracle asmadmin 9863168 May 10 15:02cf\_c-1692458681-20130510-00

创建test1表空间

SYS@LEO1>create tablespace test1 datafile'/u02/app/oracle/oradata/LEO1/test1\_01.dbf' size 20m autoextend off;

Tablespace created.

创建test1表

SYS@LEO1>conn leo1/leo1

Connected.

LEO1@LEO1>create table test1 tablespace test1 as select \* fromdba\_objects;

Table created.

LEO1@LEO1>select checkpoint\_change# from v$database;       每做完一个动作我们都记录下SCN号

CHECKPOINT\_CHANGE#

------------------

           1079203

1级差异备份

RMAN> backup incremental level 1 database;

Starting backup at 10-MAY-13

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting incremental level 1 datafile backup set

channel ORA\_DISK\_1: specifying datafile(s) in backup set

input datafile file number=00001name=/u02/app/oracle/oradata/LEO1/system01.dbf

input datafile file number=00002name=/u02/app/oracle/oradata/LEO1/sysaux01.dbf

input datafile file number=00003 name=/u02/app/oracle/oradata/LEO1/undotbs01.dbf

input datafile file number=00005name=/u02/app/oracle/oradata/LEO1/leo1.dbf

input datafile file number=00006name=/u02/app/oracle/oradata/LEO1/test1\_01.dbf       这次多了test1表空间

input datafile file number=00004name=/u02/app/oracle/oradata/LEO1/users01.dbf

channel ORA\_DISK\_1: starting piece 1 at 10-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 10-MAY-13

piece handle=/u02/app/oracle/backup/DB\_0no99r4r\_1\_1 tag=TAG20130510T151746comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:02:15

Finished backup at 10-MAY-13

Starting Control File and SPFILE Autobackup at 10-MAY-13

piece handle=/u02/app/oracle/backup/control/cf\_c-1692458681-20130510-01comment=NONE

Finished Control File and SPFILE Autobackup at 10-MAY-13

创建test2表空间

LEO1@LEO1>create tablespace test2 datafile'/u02/app/oracle/oradata/LEO1/test2\_01.dbf' size 20m autoextend off;

Tablespace created.

创建test2表

LEO1@LEO1>create table test2 tablespace test2 as select \* fromdba\_objects;

Table created.

LEO1@LEO1>select checkpoint\_change# from v$database;

CHECKPOINT\_CHANGE#

------------------

           1079213

再次1级差异备份

RMAN> backup incremental level 1 database;

Starting backup at 10-MAY-13

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting incremental level 1 datafile backup set

channel ORA\_DISK\_1: specifying datafile(s) in backup set

input datafile file number=00001name=/u02/app/oracle/oradata/LEO1/system01.dbf

input datafile file number=00002name=/u02/app/oracle/oradata/LEO1/sysaux01.dbf

input datafile file number=00003name=/u02/app/oracle/oradata/LEO1/undotbs01.dbf

input datafile file number=00005name=/u02/app/oracle/oradata/LEO1/leo1.dbf

input datafile file number=00006name=/u02/app/oracle/oradata/LEO1/test1\_01.dbf

input datafile file number=00007 name=/u02/app/oracle/oradata/LEO1/test2\_01.dbf    这次又多了test1表空间

input datafile file number=00004name=/u02/app/oracle/oradata/LEO1/users01.dbf

channel ORA\_DISK\_1: starting piece 1 at 10-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 10-MAY-13

piece handle=/u02/app/oracle/backup/DB\_0qo99s79\_1\_1 tag=TAG20130510T153609comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:02:05

Finished backup at 10-MAY-13

Starting Control File and SPFILE Autobackup at 10-MAY-13

piece handle=/u02/app/oracle/backup/control/cf\_c-1692458681-20130510-03comment=NONE

Finished Control File and SPFILE Autobackup at 10-MAY-13

SYS@LEO1>select checkpoint\_change# from v$database;

CHECKPOINT\_CHANGE#

------------------

           1084254

SYS@LEO1>alter system switch logfile;         我们做一次日志切换从2 -> 3

System altered.

SYS@LEO1>archive log list

Database log mode             Archive Mode

Automatic archival            Enabled

Archive destination           /u02/app/oracle/archdata

Oldest online log sequence     1

Next log sequence to archive   3

Current log sequence           3

SYS@LEO1>alter system switch logfile;         为了保险我们再切一次，当前日志序号为4

System altered.

SYS@LEO1>conn leo1/leo1

Connected.

LEO1@LEO1>drop table test1 purge;             我们删除test1和test2表

Table dropped.

LEO1@LEO1>drop table test2 purge;

Table dropped.

现在我们想恢复到没删除之前的状态，有2种方法（1）恢复到scn=1084254 （2）恢复到sequence=3

检查一下备份集集

RMAN> list backupset;

List of Backup Sets

===================

BS Key  Type LV Size       Device Type Elapsed Time Completion Time

------- ---- -- ---------- ----------- ------------ ---------------

19      Incr 0  960.85M   DISK        00:01:21     10-MAY-13

        BP Key: 19   Status: AVAILABLE  Compressed: NO  Tag: TAG20130510T150112

        Piece Name:/u02/app/oracle/backup/DB\_0lo99q5p\_1\_1

  List of Datafiles in backup set 19

  File LV Type Ckp SCN    Ckp Time Name

  ---- -- ---- ---------- -------------

  1    0 Incr 1081294    10-MAY-13/u02/app/oracle/oradata/LEO1/system01.dbf

  2    0 Incr 1081294    10-MAY-13/u02/app/oracle/oradata/LEO1/sysaux01.dbf

  3    0 Incr 1081294    10-MAY-13/u02/app/oracle/oradata/LEO1/undotbs01.dbf

  4    0 Incr 1081294    10-MAY-13/u02/app/oracle/oradata/LEO1/users01.dbf

  5    0 Incr 1081294    10-MAY-13/u02/app/oracle/oradata/LEO1/leo1.dbf

BS Key  Type LV Size       Device Type Elapsed Time Completion Time

------- ---- -- ---------- ----------- ------------ ---------------

20      Full    9.39M     DISK        00:00:01     10-MAY-13

        BP Key: 20   Status: AVAILABLE  Compressed: NO  Tag: TAG20130510T150238

        Piece Name:/u02/app/oracle/backup/control/cf\_c-1692458681-20130510-00

  SPFILE Included: Modificationtime: 30-APR-13

  SPFILE db\_unique\_name: LEO1

  Control File Included: Ckp SCN:1081329      Ckp time: 10-MAY-13

BS Key  Type LV Size       Device Type Elapsed Time Completion Time

------- ---- -- ---------- ----------- ------------ ---------------

21      Incr 1  19.38M    DISK        00:02:08     10-MAY-13

        BP Key: 21   Status: AVAILABLE  Compressed: NO  Tag: TAG20130510T151746

        Piece Name:/u02/app/oracle/backup/DB\_0no99r4r\_1\_1

  List of Datafiles in backup set 21

  File LV Type Ckp SCN    Ckp Time Name

  ---- -- ---- ---------- -------------

  1    1 Incr 1083510    10-MAY-13/u02/app/oracle/oradata/LEO1/system01.dbf

  2    1 Incr 1083510    10-MAY-13/u02/app/oracle/oradata/LEO1/sysaux01.dbf

  3    1 Incr 1083510    10-MAY-13/u02/app/oracle/oradata/LEO1/undotbs01.dbf

  4    1 Incr 1083510    10-MAY-13/u02/app/oracle/oradata/LEO1/users01.dbf

  5    1 Incr 1083510    10-MAY-13/u02/app/oracle/oradata/LEO1/leo1.dbf

  6    1 Incr 1083510    10-MAY-13/u02/app/oracle/oradata/LEO1/test1\_01.dbf

BS Key  Type LV Size       Device Type Elapsed Time Completion Time

------- ---- -- ---------- ----------- ------------ ---------------

22      Full    9.39M     DISK        00:00:01     10-MAY-13

        BP Key: 22   Status: AVAILABLE  Compressed: NO  Tag: TAG20130510T152002

        Piece Name: /u02/app/oracle/backup/control/cf\_c-1692458681-20130510-01

  SPFILE Included: Modificationtime: 10-MAY-13

  SPFILE db\_unique\_name: LEO1

  Control File Included: Ckp SCN:1083563      Ckp time: 10-MAY-13

BS Key  Type LV Size       Device Type Elapsed Time Completion Time

------- ---- -- ---------- ----------- ------------ ---------------

23      Full    9.39M     DISK        00:00:02     10-MAY-13

        BP Key: 23   Status: AVAILABLE  Compressed: NO  Tag: TAG20130510T152849

        Piece Name: /u02/app/oracle/backup/control/cf\_c-1692458681-20130510-02

  SPFILE Included: Modificationtime: 10-MAY-13

  SPFILE db\_unique\_name: LEO1

  Control File Included: Ckp SCN:1084027      Ckp time: 10-MAY-13

BS Key  Type LV Size       Device Type Elapsed Time Completion Time

------- ---- -- ---------- ----------- ------------ ---------------

24      Incr 1  9.90M     DISK        00:02:00     10-MAY-13

        BP Key: 24   Status: AVAILABLE  Compressed: NO  Tag: TAG20130510T153609

        Piece Name:/u02/app/oracle/backup/DB\_0qo99s79\_1\_1

  List of Datafiles in backup set 24

  File LV Type Ckp SCN    Ckp Time Name

  ---- -- ---- ---------- -------------

  1    1 Incr 1084375    10-MAY-13/u02/app/oracle/oradata/LEO1/system01.dbf

  2    1 Incr 1084375    10-MAY-13 /u02/app/oracle/oradata/LEO1/sysaux01.dbf

  3    1 Incr 1084375    10-MAY-13/u02/app/oracle/oradata/LEO1/undotbs01.dbf

  4    1 Incr 1084375    10-MAY-13/u02/app/oracle/oradata/LEO1/users01.dbf

  5    1 Incr 1084375    10-MAY-13/u02/app/oracle/oradata/LEO1/leo1.dbf

  6    1 Incr 1084375    10-MAY-13/u02/app/oracle/oradata/LEO1/test1\_01.dbf

  7    1 Incr 1084375    10-MAY-13/u02/app/oracle/oradata/LEO1/test2\_01.dbf

BS Key  Type LV Size       Device Type Elapsed Time Completion Time

------- ---- -- ---------- ----------- ------------ ---------------

25      Full    9.39M     DISK        00:00:01     10-MAY-13

        BP Key: 25   Status: AVAILABLE  Compressed: NO  Tag: TAG20130510T153814

        Piece Name:/u02/app/oracle/backup/control/cf\_c-1692458681-20130510-03

  SPFILE Included: Modificationtime: 10-MAY-13

  SPFILE db\_unique\_name: LEO1

  Control File Included: Ckp SCN:1084436      Ckp time: 10-MAY-13

从这个size大小上就可以看出 960.85M->19.38M->9.90M咱们做的都是增量备份，那么好现在开始恢复

SYS@LEO1>shutdown immediate

Database closed.

Database dismounted.

ORACLE instance shut down.

SYS@LEO1>startup mount                                启动mount状态恢复

ORACLE instance started.

Total System Global Area  471830528bytes

Fixed Size                  2214456bytes

Variable Size             184550856 bytes

Database Buffers          276824064bytes

Redo Buffers                8241152bytes

Database mounted.

RMAN  进行基于SCN号不完全恢复

RMAN> restore database until scn 1084254;

Starting restore at 10-MAY-13

using target database control file instead of recovery catalog

allocated channel: ORA\_DISK\_1

channel ORA\_DISK\_1: SID=10 device type=DISK

creating datafile file number=7name=/u02/app/oracle/oradata/LEO1/test2\_01.dbf

channel ORA\_DISK\_1: starting datafile backup set restore

channel ORA\_DISK\_1: specifying datafile(s) to restore from backup set

channel ORA\_DISK\_1: restoring datafile 00001 to/u02/app/oracle/oradata/LEO1/system01.dbf

channel ORA\_DISK\_1: restoring datafile 00002 to/u02/app/oracle/oradata/LEO1/sysaux01.dbf

channel ORA\_DISK\_1: restoring datafile 00003 to/u02/app/oracle/oradata/LEO1/undotbs01.dbf

channel ORA\_DISK\_1: restoring datafile 00004 to/u02/app/oracle/oradata/LEO1/users01.dbf

channel ORA\_DISK\_1: restoring datafile 00005 to/u02/app/oracle/oradata/LEO1/leo1.dbf

channel ORA\_DISK\_1: reading from backup piece /u02/app/oracle/backup/DB\_0lo99q5p\_1\_1    从0级备份开始恢复

channel ORA\_DISK\_1: piece handle=/u02/app/oracle/backup/DB\_0lo99q5p\_1\_1tag=TAG20130510T150112

channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:01:45

channel ORA\_DISK\_1: starting datafile backup set restore

channel ORA\_DISK\_1: specifying datafile(s) to restore from backup set

channel ORA\_DISK\_1: restoring datafile 00006 to/u02/app/oracle/oradata/LEO1/test1\_01.dbf

channel ORA\_DISK\_1: reading from backup piece /u02/app/oracle/backup/DB\_0no99r4r\_1\_1    再恢复1级

channel ORA\_DISK\_1: piece handle=/u02/app/oracle/backup/DB\_0no99r4r\_1\_1tag=TAG20130510T151746

channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:00:01

Finished restore at 10-MAY-13

RMAN> recover database until scn 1084254;                    同步scn号

Starting recover at 10-MAY-13

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting incremental datafile backup set restore

channel ORA\_DISK\_1: specifying datafile(s) to restore from backup set

destination for restore of datafile 00001:/u02/app/oracle/oradata/LEO1/system01.dbf

destination for restore of datafile 00002:/u02/app/oracle/oradata/LEO1/sysaux01.dbf

destination for restore of datafile 00003:/u02/app/oracle/oradata/LEO1/undotbs01.dbf

destination for restore of datafile 00004:/u02/app/oracle/oradata/LEO1/users01.dbf

destination for restore of datafile 00005:/u02/app/oracle/oradata/LEO1/leo1.dbf

channel ORA\_DISK\_1: reading from backup piece/u02/app/oracle/backup/DB\_0no99r4r\_1\_1

channel ORA\_DISK\_1: piece handle=/u02/app/oracle/backup/DB\_0no99r4r\_1\_1tag=TAG20130510T151746

channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:00:03

starting media recovery

archived log for thread 1 with sequence 1 is already on disk as file/u02/app/oracle/archdata/1\_1\_814107939.dbf

archived log file name=/u02/app/oracle/archdata/1\_1\_814107939.dbf thread=1sequence=1

media recovery complete, elapsed time: 00:00:02

Finished recover at 10-MAY-13

RMAN> alter database open resetlogs;         非一致性打开

database opened

累积增量备份

零级备份

backup incremental level 0 cumulative database;

创建表空间test3

创建表test3

一级累积备份

backup incremental level 1 cumulative database;

创建表空间test4

创建表test4

一级累积备份

backup incremental level 1 cumulative database;

记住当前的sequence号，我们删除表test3和表test4，然后恢复到sequence那一刻，检查表test3和表test4是否完整恢复回来，恢复窗口：恢复两个备份集 0+1(最后一次备份)+redo

下面我们就做的快一点啦

RMAN> backup incremental level 0 cumulative database;                 0级累积增量备份

Starting backup at 10-MAY-13

using channel ORA\_DISK\_1

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=00001 name=/u02/app/oracle/oradata/LEO1/system01.dbf

input datafile file number=00002name=/u02/app/oracle/oradata/LEO1/sysaux01.dbf

input datafile file number=00003name=/u02/app/oracle/oradata/LEO1/undotbs01.dbf

input datafile file number=00005name=/u02/app/oracle/oradata/LEO1/leo1.dbf

input datafile file number=00006name=/u02/app/oracle/oradata/LEO1/test1\_01.dbf

input datafile file number=00007name=/u02/app/oracle/oradata/LEO1/test2\_01.dbf

input datafile file number=00004name=/u02/app/oracle/oradata/LEO1/users01.dbf

channel ORA\_DISK\_1: starting piece 1 at 10-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 10-MAY-13

piece handle=/u02/app/oracle/backup/DB\_0to99v4v\_1\_1 tag=TAG20130510T162607comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:01:25

Finished backup at 10-MAY-13

Starting Control File and SPFILE Autobackup at 10-MAY-13

piece handle=/u02/app/oracle/backup/control/cf\_c-1692458681-20130510-05comment=NONE

Finished Control File and SPFILE Autobackup at 10-MAY-13

创建表空间和表test3

LEO1@LEO1>create tablespace test3 datafile'/u02/app/oracle/oradata/LEO1/test3\_01.dbf' size 20m autoextend off;

Tablespace created.

LEO1@LEO1>create table test3 tablespace test3 as select \* fromdba\_objects;

Table created.

1级累积备份

RMAN> backup incremental level 1 cumulative database;

Starting backup at 10-MAY-13

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting incremental level 1 datafile backup set

channel ORA\_DISK\_1: specifying datafile(s) in backup set

input datafile file number=00001name=/u02/app/oracle/oradata/LEO1/system01.dbf

input datafile file number=00002name=/u02/app/oracle/oradata/LEO1/sysaux01.dbf

input datafile file number=00003name=/u02/app/oracle/oradata/LEO1/undotbs01.dbf

input datafile file number=00005name=/u02/app/oracle/oradata/LEO1/leo1.dbf

input datafile file number=00006name=/u02/app/oracle/oradata/LEO1/test1\_01.dbf

input datafile file number=00007name=/u02/app/oracle/oradata/LEO1/test2\_01.dbf

input datafile file number=00008name=/u02/app/oracle/oradata/LEO1/test3\_01.dbf

input datafile file number=00004 name=/u02/app/oracle/oradata/LEO1/users01.dbf

channel ORA\_DISK\_1: starting piece 1 at 10-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 10-MAY-13

piece handle= /u02/app/oracle/backup/DB\_0vo99vgi\_1\_1 tag=TAG20130510T163217 comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:02:05

Finished backup at 10-MAY-13

Starting Control File and SPFILE Autobackup at 10-MAY-13

piece handle=/u02/app/oracle/backup/control/cf\_c-1692458681-20130510-06comment=NONE

Finished Control File and SPFILE Autobackup at 10-MAY-13

创建表空间和表test4

LEO1@LEO1>create tablespace test4 datafile'/u02/app/oracle/oradata/LEO1/test4\_01.dbf' size 20m autoextend off;

Tablespace created.

LEO1@LEO1>create table test4 tablespace test4 as select \* fromdba\_objects;

Table created.

再一次1级累积备份

RMAN> backup incremental level 1 cumulative database;

Starting backup at 10-MAY-13

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting incremental level 1 datafile backup set

channel ORA\_DISK\_1: specifying datafile(s) in backup set

input datafile file number=00001name=/u02/app/oracle/oradata/LEO1/system01.dbf

input datafile file number=00002name=/u02/app/oracle/oradata/LEO1/sysaux01.dbf

input datafile file number=00003name=/u02/app/oracle/oradata/LEO1/undotbs01.dbf

input datafile file number=00005 name=/u02/app/oracle/oradata/LEO1/leo1.dbf

input datafile file number=00006name=/u02/app/oracle/oradata/LEO1/test1\_01.dbf

input datafile file number=00007name=/u02/app/oracle/oradata/LEO1/test2\_01.dbf

input datafile file number=00008 name=/u02/app/oracle/oradata/LEO1/test3\_01.dbf

input datafile file number=00009name=/u02/app/oracle/oradata/LEO1/test4\_01.dbf

input datafile file number=00004name=/u02/app/oracle/oradata/LEO1/users01.dbf

channel ORA\_DISK\_1: starting piece 1 at 10-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 10-MAY-13

piece handle= /u02/app/oracle/backup/DB\_11o99vpa\_1\_1 tag=TAG20130510T163657 comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:01:55

Finished backup at 10-MAY-13

Starting Control File and SPFILE Autobackup at 10-MAY-13

piece handle=/u02/app/oracle/backup/control/cf\_c-1692458681-20130510-07comment=NONE

Finished Control File and SPFILE Autobackup at 10-MAY-13

SYS@LEO1>drop table test3 purge;

SYS@LEO1>drop table test4 purge;

切换2次日志

SYS@LEO1>alter system switch logfile;

System altered.

SYS@LEO1>alter system switch logfile;

System altered.

SYS@LEO1>archive log list

Database log mode             Archive Mode

Automatic archival            Enabled

Archive destination           /u02/app/oracle/archdata

Oldest online log sequence     3

Next log sequence to archive   5

Current log sequence           5

我们只需恢复到sequence=4即可

RMAN  进行基于sequence号不完全恢复

SYS@LEO1>shutdown immediate

SYS@LEO1>startup mount

RMAN> restore database until sequence 4 thread 1;                一直恢复到4号归档日志

Starting restore at 10-MAY-13

using target database control file instead of recovery catalog

allocated channel: ORA\_DISK\_1

channel ORA\_DISK\_1: SID=10 device type=DISK

channel ORA\_DISK\_1: starting datafile backup set restore

channel ORA\_DISK\_1: specifying datafile(s) to restore from backup set

channel ORA\_DISK\_1: restoring datafile 00001 to/u02/app/oracle/oradata/LEO1/system01.dbf

channel ORA\_DISK\_1: restoring datafile 00002 to/u02/app/oracle/oradata/LEO1/sysaux01.dbf

channel ORA\_DISK\_1: restoring datafile 00003 to/u02/app/oracle/oradata/LEO1/undotbs01.dbf

channel ORA\_DISK\_1: restoring datafile 00004 to/u02/app/oracle/oradata/LEO1/users01.dbf

channel ORA\_DISK\_1: restoring datafile 00005 to/u02/app/oracle/oradata/LEO1/leo1.dbf

channel ORA\_DISK\_1: restoring datafile 00006 to/u02/app/oracle/oradata/LEO1/test1\_01.dbf

channel ORA\_DISK\_1: restoring datafile 00007 to/u02/app/oracle/oradata/LEO1/test2\_01.dbf

channel ORA\_DISK\_1: reading from backup piece/u02/app/oracle/backup/DB\_0to99v4v\_1\_1

channel ORA\_DISK\_1: piece handle= /u02/app/oracle/backup/DB\_0to99v4v\_1\_1 tag=TAG20130510T162607

channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:02:05

channel ORA\_DISK\_1: starting datafile backup set restore

channel ORA\_DISK\_1: specifying datafile(s) to restore from backup set

channel ORA\_DISK\_1: restoring datafile 00008 to/u02/app/oracle/oradata/LEO1/test3\_01.dbf

channel ORA\_DISK\_1: restoring datafile 00009 to/u02/app/oracle/oradata/LEO1/test4\_01.dbf

channel ORA\_DISK\_1: reading from backup piece/u02/app/oracle/backup/DB\_11o99vpa\_1\_1

channel ORA\_DISK\_1: piece handle= /u02/app/oracle/backup/DB\_11o99vpa\_1\_1 tag=TAG20130510T163657

channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:00:03

Finished restore at 10-MAY-13

RMAN> recover database until sequence 4 thread 1;

Starting recover at 10-MAY-13

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting incremental datafile backup set restore

channel ORA\_DISK\_1: specifying datafile(s) to restore from backup set

destination for restore of datafile 00001:/u02/app/oracle/oradata/LEO1/system01.dbf

destination for restore of datafile 00002:/u02/app/oracle/oradata/LEO1/sysaux01.dbf

destination for restore of datafile 00003: /u02/app/oracle/oradata/LEO1/undotbs01.dbf

destination for restore of datafile 00004:/u02/app/oracle/oradata/LEO1/users01.dbf

destination for restore of datafile 00005:/u02/app/oracle/oradata/LEO1/leo1.dbf

destination for restore of datafile 00006: /u02/app/oracle/oradata/LEO1/test1\_01.dbf

destination for restore of datafile 00007:/u02/app/oracle/oradata/LEO1/test2\_01.dbf

channel ORA\_DISK\_1: reading from backup piece/u02/app/oracle/backup/DB\_11o99vpa\_1\_1

channel ORA\_DISK\_1: piece handle= /u02/app/oracle/backup/DB\_11o99vpa\_1\_1 tag=TAG20130510T163657

channel ORA\_DISK\_1: restored backup piece 1

channel ORA\_DISK\_1: restore complete, elapsed time: 00:00:01

starting media recovery

archived log for thread 1 with sequence 3 is already on disk as file/u02/app/oracle/archdata/1\_3\_815069267.dbf

archived log file name=/u02/app/oracle/archdata/1\_3\_815069267.dbf thread=1sequence=3

media recovery complete, elapsed time: 00:00:01

Finished recover at 10-MAY-13

RMAN> alter database open resetlogs;         打开数据库

database opened

LEO1@LEO1>select count(\*) from test3;        完整恢复回来啦

  COUNT(\*)

----------

    71894

LEO1@LEO1>select count(\*) from test4;

  COUNT(\*)

----------

     71895

大家肯定会发现一个有趣的现象，我们备份集顺序DB\_0to99v4v\_1\_1->DB\_0vo99vgi\_1\_1->DB\_11o99vpa\_1\_1

-rw-r----- 1 oracle asmadmin 1023426560 May 10 16:27 DB\_0to99v4v\_1\_1

-rw-r----- 1 oracle asmadmin  10493952 May 10 16:34 DB\_0vo99vgi\_1\_1

-rw-r----- 1 oracle asmadmin  20193280 May 10 16:38 DB\_11o99vpa\_1\_1

而我们恢复顺序DB\_0to99v4v\_1\_1->DB\_11o99vpa\_1\_1，没有中间的DB\_0vo99vgi\_1\_1，这就是累积增量备份的特色，当进行备份时它要去找比它自己级别小的基准点进行增量备份，因此DB\_11o99vpa\_1\_1是从0级一直备到最新状态（包括DB\_0vo99vgi\_1\_1）又根据Oracle优先使用备份集恢复，用完所有备份集后，在应用归档日志恢复，因为备份集效率比归档快很多，这一原则，我们可以直接使用DB\_11o99vpa\_1\_1备份集进行恢复了。

小结：情深深雨蒙蒙~风吹草低见牛羊，示例说明两种增量备份的差别实验已经完成，大家从这些实验中学习到东西了嘛！应该说这两种增量各有千秋，适合不同的应用场景，如何更好的使用它们，要根据你项目能够接受的备份及恢复程度而定，好了我们明天见goodbye 亲。

**3.演示用catalog数据库作为RMAN的资料库对数据库进行一次全备份**

上面我们说过RMAN元数据可以放在控制文件中，其实还可以放在catalog数据库中，catalog库是个什么东东呢？我们简单的阐述一下它个功能。

1.  catalog库统一管理RMAN备份信息即元数据信息，如果没有catalog库，就把RMAN备份信息写入控制文件

2.  目标数据库必须注册到catalog库中才能使用

3.  控制文件恢复成本越来越低，降低了catalog库使用。

4.  控制文件不能保留超过一年以上的备份信息，catalog可却可以。

5.  catalog库可以同时保存n台数据库的备份信息，降低管理成本，提升管理效率

参考官方文档

【参】Books->Backup and Recovery Reference -> CREATE CATALOG和REGISTER

【参】Books-> Backup and Recovery Advanced User’s Guide -> 10 Managing the RecoveryCatalog -> Creating a Recovery Catalog

1.创建表空间catalog1 用于存储rman备份信息，创建表空间代表【catalog库】

LEO1@LEO1>create tablespace catalog1 datafile'/u02/app/oracle/oradata/LEO1/catalog1\_01.dbf' size 20m autoextend off;

Tablespace created.

2.创建用户cl\_admin并指定默认的表空间catalog1

LEO1@LEO1>create user cl\_admin identified by cl\_admin defaulttablespace catalog1;

User created.

3.将recovery\_catalog\_owner角色授予给cl\_admin用户，才能提供维护和查询恢复目录的权限

LEO1@LEO1>grant connect,resource,recovery\_catalog\_owner to cl\_admin;

Grant succeeded.

LEO1@LEO1>select \* from dba\_roles where role like '%RECOVER%';

ROLE                          PASSWORD AUTHENTICAT

------------------------------ -------- -----------

RECOVERY\_CATALOG\_OWNER        NO       NONE

LEO1@LEO1>conn / as sysdba

Connected.

SYS@LEO1>select \* from role\_sys\_privs whererole='RECOVERY\_CATALOG\_OWNER';    查看这个角色具有哪些系统权限->11个权限

ROLE                          PRIVILEGE                               ADM

------------------------------ -------------------------------------------

RECOVERY\_CATALOG\_OWNER        CREATE SYNONYM                          NO

RECOVERY\_CATALOG\_OWNER        CREATE CLUSTER                          NO

RECOVERY\_CATALOG\_OWNER         ALTERSESSION                            NO

RECOVERY\_CATALOG\_OWNER        CREATE DATABASE LINK                    NO

RECOVERY\_CATALOG\_OWNER        CREATE SESSION                          NO

RECOVERY\_CATALOG\_OWNER        CREATE TABLE                            NO

RECOVERY\_CATALOG\_OWNER        CREATE SEQUENCE                         NO

RECOVERY\_CATALOG\_OWNER         CREATEPROCEDURE                         NO

RECOVERY\_CATALOG\_OWNER        CREATE VIEW                             NO

RECOVERY\_CATALOG\_OWNER        CREATE TYPE                             NO

RECOVERY\_CATALOG\_OWNER        CREATE TRIGGER                           NO

11 rows selected.

4.进入rman创建恢复目录catalog库

[oracle@leonarding1 backup]$ rman catalog cl\_admin/cl\_admin             以恢复目录所有者身份登录rman

Recovery Manager: Release 11.2.0.1.0 - Production on Sat May 11 09:06:292013

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connected to recovery catalog database                                 连接到恢复目录数据库

RMAN> create catalog tablespace catalog1;                    用catalog1表空间代表catalog库

recovery catalog created

5.target库注册到catalog库

[oracle@leonarding1 backup]$ rman target sys/oracle catalogcl\_admin/cl\_admin

Recovery Manager: Release 11.2.0.1.0 - Production on Sat May 11 09:15:102013

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connected to target database: LEO1 (DBID=1692458681)  必须以SYS身份登录，不能以普通用户身份登录，否则不能注册

connected to recovery catalog database                同时也连接到了catalog库

RMAN> register database;                把target库->注册->catalog库，谁注册了谁的备份信息才能存到catalog库

database registered in recovery catalog

starting full resync of recovery catalog

full resync complete

6.在数据库中确认注册成功，看看哪些数据库注册到catalog库了

[oracle@leonarding1 ~]$ sqlplus cl\_admin/cl\_admin

CL\_ADMIN@LEO1>col name for a6

CL\_ADMIN@LEO1>select \* from rc\_database;         从这个视图上我们就可以看到leo1库已经注册到catalog中了

    DB\_KEY  DBINC\_KEY       DBID NAME   RESETLOGS\_CHANGE# RESETLOGS

---------- ---------- ---------- ------ ----------------- ---------

         2          4 1692458681 LEO1             1086803 10-MAY-13

7.取消注册

RMAN> unregister database;                                          从恢复目录库中取消目标数据库的注册

8.全库备份

RMAN> backup as compressed backupset full database include currentcontrolfile plus archivelog delete all input;

Starting backup at 11-MAY-13

current log archived

allocated channel: ORA\_DISK\_1

channel ORA\_DISK\_1: SID=19 device type=DISK

channel ORA\_DISK\_1: starting compressed archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=6 RECID=38 STAMP=814107533

input archived log thread=1 sequence=7 RECID=36 STAMP=814105467

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_15o9bs9s\_1\_1 tag=TAG20130511T094947comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01

channel ORA\_DISK\_1: deleting archived log(s)

archived log file name=/u02/app/oracle/archdata/1\_6\_814098124.dbf RECID=38STAMP=814107533

archived log file name=/u02/app/oracle/archdata/1\_7\_814098124.dbf RECID=36STAMP=814105467

channel ORA\_DISK\_1: starting compressed archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=1 RECID=39 STAMP=815067081

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_16o9bs9t\_1\_1 tag=TAG20130511T094947comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:03

channel ORA\_DISK\_1: deleting archived log(s)

archived log file name=/u02/app/oracle/archdata/1\_1\_814107939.dbf RECID=39STAMP=815067081

channel ORA\_DISK\_1: starting compressed archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=8 RECID=37 STAMP=814105539

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_17o9bsa1\_1\_1 tag=TAG20130511T094947comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01

channel ORA\_DISK\_1: deleting archived log(s)

archived log file name=/u02/app/oracle/archdata/1\_8\_814098124.dbf RECID=37STAMP=814105539

channel ORA\_DISK\_1: starting compressed archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=2 RECID=40 STAMP=815067673

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_18o9bsa2\_1\_1 tag=TAG20130511T094947comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01

channel ORA\_DISK\_1: deleting archived log(s)

archived log file name=/u02/app/oracle/archdata/1\_2\_814107939.dbf RECID=40STAMP=815067673

channel ORA\_DISK\_1: starting compressed archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=1 RECID=43 STAMP=815070347

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_19o9bsa3\_1\_1 tag=TAG20130511T094947comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01

channel ORA\_DISK\_1: deleting archived log(s)

archived log file name=/u02/app/oracle/archdata/1\_1\_815069267.dbf RECID=43STAMP=815070347

channel ORA\_DISK\_1: starting compressed archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=3 RECID=41 STAMP=815067752

input archived log thread=1 sequence=4 RECID=42 STAMP=815069267

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_1ao9bsa4\_1\_1 tag=TAG20130511T094947comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01

channel ORA\_DISK\_1: deleting archived log(s)

archived log file name=/u02/app/oracle/archdata/1\_3\_814107939.dbf RECID=41STAMP=815067752

archived log file name=/u02/app/oracle/archdata/1\_4\_814107939.dbf RECID=42STAMP=815069267

channel ORA\_DISK\_1: starting compressed archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=2 RECID=44 STAMP=815070349

input archived log thread=1 sequence=3 RECID=45 STAMP=815071289

input archived log thread=1 sequence=4 RECID=46 STAMP=815071321

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_1bo9bsa5\_1\_1 tag=TAG20130511T094947comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:03

channel ORA\_DISK\_1: deleting archived log(s)

archived log file name=/u02/app/oracle/archdata/1\_2\_815069267.dbf RECID=44STAMP=815070349

archived log file name=/u02/app/oracle/archdata/1\_3\_815069267.dbf RECID=45STAMP=815071289

archived log file name=/u02/app/oracle/archdata/1\_4\_815069267.dbf RECID=46STAMP=815071321

channel ORA\_DISK\_1: starting compressed archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=1 RECID=48 STAMP=815130519

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_1co9bsa9\_1\_1 tag=TAG20130511T094947comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:07

channel ORA\_DISK\_1: deleting archived log(s)

archived log file name=/u02/app/oracle/archdata/1\_1\_815071959.dbf RECID=48STAMP=815130519

channel ORA\_DISK\_1: starting compressed archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=5 RECID=47 STAMP=815071959

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_1do9bsag\_1\_1 tag=TAG20130511T094947comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01

channel ORA\_DISK\_1: deleting archived log(s)

archived log file name=/u02/app/oracle/archdata/1\_5\_815069267.dbf RECID=47STAMP=815071959

channel ORA\_DISK\_1: starting compressed archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=2 RECID=49 STAMP=815132985

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_1eo9bsai\_1\_1 tag=TAG20130511T094947comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01

channel ORA\_DISK\_1: deleting archived log(s)

archived log file name=/u02/app/oracle/archdata/1\_2\_815071959.dbf RECID=49STAMP=815132985

Finished backup at 11-MAY-13

Starting backup at 11-MAY-13

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting compressed full datafile backup set

channel ORA\_DISK\_1: specifying datafile(s) in backup set

input datafile file number=00001name=/u02/app/oracle/oradata/LEO1/system01.dbf

input datafile file number=00002name=/u02/app/oracle/oradata/LEO1/sysaux01.dbf

input datafile file number=00003name=/u02/app/oracle/oradata/LEO1/undotbs01.dbf

input datafile file number=00005 name=/u02/app/oracle/oradata/LEO1/leo1.dbf

input datafile file number=00006name=/u02/app/oracle/oradata/LEO1/test1\_01.dbf

input datafile file number=00007name=/u02/app/oracle/oradata/LEO1/test2\_01.dbf

input datafile file number=00008 name=/u02/app/oracle/oradata/LEO1/test3\_01.dbf

input datafile file number=00009name=/u02/app/oracle/oradata/LEO1/test4\_01.dbf

input datafile file number=00010name=/u02/app/oracle/oradata/LEO1/catalog1\_01.dbf

input datafile file number=00004 name=/u02/app/oracle/oradata/LEO1/users01.dbf

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_1fo9bsaj\_1\_1 tag=TAG20130511T095011comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:01:35

channel ORA\_DISK\_1: starting compressed full datafile backup set

channel ORA\_DISK\_1: specifying datafile(s) in backup set

including current control file in backup set

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_1go9bsdi\_1\_1 tag=TAG20130511T095011comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01

Finished backup at 11-MAY-13

Starting backup at 11-MAY-13

current log archived

using channel ORA\_DISK\_1

channel ORA\_DISK\_1: starting compressed archived log backup set

channel ORA\_DISK\_1: specifying archived log(s) in backup set

input archived log thread=1 sequence=3 RECID=50 STAMP=815133109

channel ORA\_DISK\_1: starting piece 1 at 11-MAY-13

channel ORA\_DISK\_1: finished piece 1 at 11-MAY-13

piece handle=/u02/app/oracle/backup/DB\_1ho9bsdm\_1\_1 tag=TAG20130511T095150comment=NONE

channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01

channel ORA\_DISK\_1: deleting archived log(s)

archived log file name=/u02/app/oracle/archdata/1\_3\_815071959.dbf RECID=50STAMP=815133109

Finished backup at 11-MAY-13

Starting Control File and SPFILE Autobackup at 11-MAY-13

piece handle=/u02/app/oracle/backup/control/cf\_c-1692458681-20130511-01comment=NONE

Finished Control File and SPFILE Autobackup at 11-MAY-13

这些备份信息就会保存在catalog数据库中，你可以同时保存n台数据库的备份信息，请注意一点，catalog库也会有crash风险，如果这些备份信息丢失那么所有备份集就会失效，因此catalog库也需要备份。

小结：备份与恢复是数据库的一个核心模块，几乎没有见过无需备份的库，RMAN是oracle专用级备份与恢复工具，几乎可以完成所有的备份任务，是我们DBA的利器，因此花些时间学习RMAN是很有意义的。以此文纪念成长ing我们：） 晚安亲