Oracle 基于 RMAN 的不完全恢复

Oracle 数据库可以实现数据库不完全恢复与完全恢复。完全恢复是将数据库恢复到最新时刻，也就是无损恢复，保证数据库无丢失的恢复。而不完全恢复则是根据需要特意将数据库恢复到某个过去的特定时间点或特定的 SCN 以及特定的 Sequence。可以通过基于用户管理的不完全恢复实现，也可以通过基于 RMAN 方式来实现。

一、不完全恢复的步骤

a、关闭数据库并备份数据库(以防止恢复失败)

b、启动数据库到 mount 状态

c、还原数据库

d、将数据库恢复至某个时间点、序列、或系统改变号

e、使用 RESETLOGS 关键字打开数据库

二、RMAN 不完全恢复的主要操作命令

1）基于 TIME 参数不完全恢复

```
run {
shutdown immediate;
startup mount;
set until time "to_date('20130705 10:09:53','yyyymmdd hh24:mi:ss')";
restore database;
recover database;
alter database open resetlogs;
}
```

2）基于 SCN 参数不完全恢复

```
run {
shutdown immediate;
startup mount;
set until scn 3400;
restore database;
recover database;
alter database open resetlogs;
}
```

3）基于 SEQUENCE 参数不完全恢复:

```
run {
shutdown immediate;
startup mount;
set until sequence 12903;
restore database;
recover database;
lter database open resetlogs;
}
```

三、实例

先备份数据库

```
[oracle@w ~]$ mkdir /u01/app/oracle/rman
[oracle@w ~]$ more rman_full.rcv
```

```
run{
allocate channel ch1 device type disk;
allocate channel ch2 device type disk;
crosscheck archivelog all;
delete noprompt expired archivelog all;
backup database format '/u01/app/oracle/rman/full_%d_%U' tag=full_bak
plus archivelog format '/u01/app/oracle/rman/arch_%d_%U' tag=arch;
release channel ch1;
release channel ch2;
}
[oracle@w ~]$ rman target / cmdfile=/home/oracle/rman_full.rcv log=/home/oracle/rman_full.log
```

查看生成的备份文件

```
[oracle@w ~]$ ls -hltr /u01/app/oracle/rman
```

演示环境

```
SQL> select * from v$version where rownum<2;
```

查询得到当前已产生的归档日志

```
cSELECT name,sequence# seq#,status,completion_time FROM v$archived_log;
SQL> set time on
SQL> conn scott/scott;
```

创建测试用表并插入记录

```
10:07:01 SQL> create table t2(id varchar2(10), dt varchar2(20));
10:07:57 SQL> insert into t2 select 'wlhello',to_char(sysdate,'yyyymmdd hh24:mi:ss') from dual;
10:08:15 SQL> commit;
```

对当前日志进行归档

```
conn / as sysdba
10:08:18 SQL> alter system archive log current;
```

下面的查询可知产生新的归档日志 5

```
10:08:28 SQL> SELECT name,sequence# seq#,status,completion_time FROM v$archived_log
where sequence#>=4;
```

归档日志中包含记录 wlhello

```
10:09:53 SYS@orcl> ho strings
/u01/app/oracle/flash_recovery_area/ORCL/archivelog/2013_07_05/o1_mf_1_5_9b1yyr7c_.arc
|grep "wlhello"
```

第二次插入记录

```
10:10:48 SQL> insert into scott.t2 select 'Jackson',to_char(sysdate,'yyyymmdd hh24:mi:ss') from
dual;
10:11:27 SQL> commit;
10:11:30 SQL> alter system archive log current;
10:11:47 SQL> SELECT name,sequence# seq#,status,completion_time FROM v$archived_log
where sequence#>=4;
10:12:17 SYS@orcl> ho strings
/u01/app/oracle/flash_recovery_area/ORCL/archivelog/2013_07_05/o1_mf_1_6_9b1z6z5t_.arc
|grep "Jackson"
```

查看当前数据库的 SCN
10:12:34 SQL> select name,current_scn from v$database;
第三次插入记录
10:15:07 SQL> insert into scott.t2 select 'Winson',to_char(sysdate,'yyyymmdd hh24:mi:ss') from dual;
10:15:47 SQL> commit;
10:21:18 SQL> alter system switch logfile;
第四次插入记录
0:22:53 SQL> insert into scott.t2 select 'LastRecord',to_char(sysdate,'yyyymmdd hh24:mi:ss') from dual;
10:23:44 SQL> commit;
10:23:47 SQL> select * from scott.t2;
10:23:52 SQL> alter system switch logfile;
下面是最终的归档日志情况
10:24:00 SQL> SELECT name,sequence# seq#,status,completion_time FROM v$archived_log where sequence#>=4;
10:24:12 SQL> ho strings /u01/app/oracle/flash_recovery_area/ORCL/archivelog/2013_07_05/o1_mf_1_7_9b1zdgms_.arc | grep "Winson"
SQL>ho strings /u01/app/oracle/flash_recovery_area/ORCL/archivelog/2013_07_05/o1_mf_1_8_9b1zfh61_.arc | grep "LastRecord"
最后一次插入记录
10:25:16 SQL> insert into scott.t2 select 'Completed',to_char(sysdate,'yyyymmdd hh24:mi:ss') from dual;
10:26:20 SQL> commit;
此时数据库当前的 redo log 并没有归档，因此插入的数据位于联机日志
当前日志
SYS@orcl> Select * from v$log;
10:27:40 SQL> ho strings /u01/app/oracle/oradata/orcl/redo02.log | grep "Completed"
下面列出完成的记录与日志对照关系
SQL> select * from scott.t2;

ID	DT	对应的归档日志	对应的 sequence
wlhello	20130705 10:08:15	o1_mf_1_5_8xdbnqx9_.arc	5
Jackson	20130705 10:11:27	o1_mf_1_6_8xdbv338_.arc	6
Winson	20130705 10:15:47	o1_mf_1_7_8xdcg1wc_.arc	7
LastRecord	20130705 10:23:44	o1_mf_1_8_8xdcl0rx_.arc	8
Completed	20130705 10:26:20	redo02.log	

2、实施不完全恢复
a、基于时间点的不完全恢复
[oracle@wl ~]$ rman target /
RMAN> run{
shutdown immediate;

```
startup mount;
set until time "to_date('20130705 10:09:20','yyyymmdd hh24:mi:ss')";
restore database;
recover database;
}
```

部分提示：

启动数据文件还原

channel ORA_DISK_1: starting datafile backup set restore

完成数据文件还原

channel ORA_DISK_1: restore complete, elapsed time: 00:00:45

启动数据恢复

Starting recover at 20130705 10:35:29

下面提示归档日志已经存在，是由于我们备份归档日志后并没有对其清除

archived log for thread 1 with sequence 27 is already on disk as file /u02/DB/oradb/arch/2013_07_05/o1_mf_1_27_8xd9c0f0_.arc

列出日志对应的 sequence

archived log file name=/u02/DB/oradb/arch/2013_07_05/o1_mf_1_27_8xd9c0f0_.arc thread=1 sequence=27

介质恢复完成,可以看到介质恢复

media recovery complete, elapsed time: 00:00:09

完成恢复

Finished recover at 20130705 10:35:42

手动 open resetlogs

```
RMAN> alter database open resetlogs;
RMAN> host;
[oracle@wl ~]$ more query_t2.sh
#!/bin/bash
if [ -f ~/.bashrc ]; then
   . ~/.bashrc
fi
export ORACLE_SID=orcl
sqlplus -S /nolog <<EOF
connect scott/scott
select * from scott.t2;
exit;
EOF
exit
```

验证结果，记录 wlhello 已经被恢复

```
[oracle@wl ~]$ chmod 777 query_t2.sh
[oracle@wl ~]$ ./query_t2.sh
[oracle@wl ~]$ exit
```

新的 incarnation 已经被产生，为 3

```
RMAN> list incarnation;
```

b、基于 SCN 的不完全恢复

RMAN> shutdown immediate;
RMAN> startup mount;
在此需要 reset incarnation
RMAN> reset database to incarnation 2;
RMAN> run{
set until scn 499726;
restore database;
recover database;
alter database open resetlogs;}
RMAN> host;
验证结果，记录 Jackson 已经被恢复
[oracle@node1 ~]$ ./query_t2.sh
c、基于 sequence 的不完全恢复
RMAN> shutdown immediate;
RMAN> startup mount;
RMAN> reset database to incarnation 2;
sequence 为 8(但不包含 sequence 8)
RMAN> run{
set until sequence 8;
restore database;
recover database;
alter database open resetlogs;}
RMAN> host;
验证结果，记录 Winson 已经被恢复
[oracle@node1 ~]$ ./query_t2.sh
d、恢复到最近时刻
此处的恢复到最近(新)时刻，也就是我们希望恢复最后的记录"Completed"，通常情况下，我们恢复到故障点为完全恢复，此时也可以说是做完全恢复，但是由于我们对数据库作了不完全恢复，因此此时即使是做完全恢复，仍然为不完全恢复。
RMAN> shutdown immediate;
RMAN> startup mount;
RMAN> reset database to incarnation 2;
RMAN> run{
restore database;
recover database;
alter database open;}
RMAN-03002: failure of recover command at 07/05/2013 11:27:48
RMAN-06054: media recovery requesting unknown archived log for thread 1 with sequence 34 and starting SCN of 1367222
可以看到，数据库被 apply 到了 sequence 为 33 的归档日志，现在数据库寻找 sequence 为 34 为 SCN 为 1367222 的归档日志，我们之前仅仅归档到 32，那 sequence 为 33 的归档日志从而而来呢，应该是系统自动产生了一次归档，但这里我的归档日志大小为 50MB，因此也不可能是由于 redo log 满而产生归档。
查看 alert 日志

[oracle@wl trace]$ tail -1280 alert_oradb.log | more
Archived Log entry 8 added for thread 1 sequence 33 ID 0x98733640 dest 1:
下面的归档日志的产生时间与 alert 日志中的时间相吻合
[oracle@node1 2013_07_05]$ ls -al --full-time o1_mf_1_33_8xddbvsc_.arc
445.-rw-r----- 1 oracle asmadmin 259584 2013-07-05 10:37:15.000000000 +0800 o1_mf_1_33_8xddbvsc_.arc
查询视图也可以得到在 RESETLOGS 时产生了归档日志
SQL> col name format a60 wrap
SQL> SELECT name,sequence# seq#,status,completion_time,end_of_redo_type eof_type from v$archived_log where sequence#=33;
验证结果
SQL> alter database open resetlogs;
SQL> select * from scott.t2;