

oracle 在 open 阶段时, 需要进行一致性检验, 然后才可以打开数据库, 到底做了哪些检验呢?

首先会检查数据文件头的 Checkpoint CNT 是否与对应的控制文件中的 Checkpoint CNT 一致, 如果相等, 则会接下来的检验

然后检查数据文件头的开始 SCN 和对应控制文件中的结束 SCN 是否一致, 如果结束 SCN 等于开始 SCN, 则不需要对那个数据文件恢复

下面会通过转储分析控制文件和 1 号数据文件:

```
SQL> select * from v$version where rownum=1;
```

BANNER

```
-----  
-----  
Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - Production
```

```
SQL> startup force mount;
```

ORACLE 例程已经启动。

```
Total System Global Area  422670336 bytes  
Fixed Size                  1336960 bytes  
Variable Size               360712576 bytes  
Database Buffers            54525952 bytes  
Redo Buffers                 6094848 bytes
```

数据库装载完毕。

```
SQL> alter session set events 'immediate trace name control level 8';
```

会话已更改。

```
SQL> select value from v$diag_info where name='Default Trace File';
```

VALUE

```
-----  
-----  
/u01/app/oracle/diag/rdbms/orcl3939/orcl3939/trace/orcl3939_ora_8858.  
trc
```

```
*****  
*****
```

DATABASE ENTRY

```
*****  
*****
```

```
(size = 316, compat size = 316, section max = 1, section in-use = 1,  
last-recid= 0, old-recno = 0, last-recno = 0)
```

```
(extent = 1, blkno = 1, numrecs = 1)
```

```
09/28/2014 17:41:29
```

```
DB Name "ORCL3939"
```

```

Database flags = 0x00404001 0x00001200
Controlfile Creation Timestamp    09/28/2014 17:41:31
Incplmt recovery scn: 0x0000.00000000
Resetlogs scn: 0x0000.000b8338 Resetlogs Timestamp    09/28/2014
17:41:34
Prior resetlogs scn: 0x0000.00000001 Prior resetlogs
Timestamp    08/13/2009 23:00:48
Redo Version: compatible=0xb200000
#Data files = 10, #Online files = 10
Database checkpoint: Thread=1 scn: 0x0000.0076948a
Threads: #Enabled=1, #Open=0, Head=0, Tail=0
enabled   threads:    01000000 00000000 00000000 00000000 00000000
00000000
....
....
Max log members = 3, Max data members = 1
Arch list: Head=3, Tail=3, Force scn: 0x0000.00746fa2scn:
0x0000.00768ce3
Activation ID: 3848061321
Controlfile Checkpointed at scn:    0x0000.00768dc1 05/05/2015
12:24:31
thread:0 rba:(0x0.0.0)
enabled   threads:    00000000 00000000 00000000 00000000 00000000
00000000
....
....

*****
*****
DATA FILE RECORDS
*****
*****
(size = 520, compat size = 520, section max = 100, section in-use = 13,
last-recid= 2877, old-recno = 0, last-recno = 0)
(extent = 1, blkno = 11, numrecs = 100)
DATA FILE #1:
name #7: /u01/app/oracle/oradata/orcl3939/system01.dbf
creation size=0 block size=8192 status=0xe head=7 tail=7 dup=1
tablespace 0, index=1 krfil=1 prev_file=0
unrecoverable scn: 0x0000.00000000 01/01/1988 00:00:00
Checkpoint cnt:1110 scn: 0x0000.0076948a 05/05/2015 12:41:20
Stop scn: 0x0000.0076948a 0
5/05/2015 12:41:20
Creation Checkpointed at scn:    0x0000.00000007 08/13/2009 23:00:53

```

```

thread:0 rba:(0x0.0.0)
enabled threads: 00000000 00000000 00000000 00000000 00000000
00000000
....
....
Offline scn: 0x0000.000b8337 prev_range: 0
Online Checkpointed at scn: 0x0000.000b8338 09/28/2014 17:41:34
thread:1 rba:(0x1.2.0)
enabled threads: 01000000 00000000 00000000 00000000 00000000
00000000
....
....
Hot Backup end marker scn: 0x0000.00000000
aux_file is NOT DEFINED
Plugged readony: NO
Plugin scnscn: 0x0000.00000000
Plugin resetlogs scn/timescn: 0x0000.00000000 01/01/1988 00:00:00
Foreign creation scn/timescn: 0x0000.00000000 01/01/1988 00:00:00
Foreign checkpoint scn/timescn: 0x0000.00000000 01/01/1988 00:00:00
Online move state: 0

```

SQL> alter session set events 'immediate trace name file_hdrs level 10';
会话已更改。

SQL> select value from v\$diag_info where name='Default Trace File';

VALUE

```

-----
-----
/u01/app/oracle/diag/rdbms/orcl3939/orcl3939/trace/orcl3939_ora_8858.
trc

```

DATA FILE #1:

```

name #7: /u01/app/oracle/oradata/orcl3939/system01.dbf
creation size=0 block size=8192 status=0xe head=7 tail=7 dup=1
tablespace 0, index=1 krfil=1 prev_file=0
unrecoverable scn: 0x0000.00000000 01/01/1988 00:00:00
Checkpoint cnt:1110 scn: 0x0000.0076948a 05/05/2015 12:41:20
Stop scn: 0x0000.0076948a 05/05/2015 12:41:20
Creation Checkpointed at scn: 0x0000.00000007 08/13/2009 23:00:53
thread:0 rba:(0x0.0.0)

```

```

    enabled   threads:   00000000 00000000 00000000 00000000 00000000
00000000
    ....
    ....
    Offline scn: 0x0000.000b8337 prev_range: 0
    Online Checkpointed at scn:   0x0000.000b8338 09/28/2014 17:41:34
    thread:1 rba:(0x1.2.0)
    enabled   threads:   01000000 00000000 00000000 00000000 00000000
00000000
    ....
    ....
    Hot Backup end marker scn: 0x0000.00000000
    aux_file is NOT DEFINED
    Plugged readony: NO
    Plugin scnscn: 0x0000.00000000
    Plugin resetlogs scn/timescn: 0x0000.00000000 01/01/1988 00:00:00
    Foreign creation scn/timescn: 0x0000.00000000 01/01/1988 00:00:00
    Foreign checkpoint scn/timescn: 0x0000.00000000 01/01/1988 00:00:00
    Online move state: 0
    上面的信息来自控制文件
    下面的信息来自数据文件头（如果数据文件丢失，则数据文件头不能读取）
    V10 STYLE FILE HEADER:
    Compatibility Vsn = 186646528=0xb200000
    Db ID=3848072073=0xe55ceb89, Db Name='ORCL3939'
    Activation ID=0=0x0
    Control Seq=14952=0x3a68, File size=96000=0x17700
    File Number=1, Blksiz=8192, File Type=3 DATA
    Tablespace #0 - SYSTEM   rel_fn:1
    Creation   at   scn: 0x0000.00000007 08/13/2009 23:00:53
    Backup taken at scn: 0x0000.00713a30 04/29/2015 13:41:44 thread:1
    reset logs count:0x333ab14e scn: 0x0000.000b8338
    prev reset logs count:0x296a3120 scn: 0x0000.00000001
    recovered at 05/05/2015 12:24:15
    status:0x2000 root dba:0x00400208  chkpt cnt: 1110 ctl cnt:1109
    begin-hot-backup file size: 96000
    Checkpointed at scn:   0x0000.0076948a 05/05/2015 12:41:20
    thread:1 rba:(0x1ce.1314.10)
    enabled   threads:   01000000 00000000 00000000 00000000 00000000
00000000
    ....
    ....
    Backup Checkpointed at scn:   0x0000.00713a30 04/29/2015 13:41:44
    thread:1 rba:(0x1bd.b6c8.10)
    enabled   threads:   01000000 00000000 00000000 00000000 00000000

```

00000000

....

....

首先会检查数据文件头的 Checkpoint CNT 是否与对应的控制文件中的 Checkpoint CNT 一致:

由上知控制文件中记录了 chkpt cnt 1110 数据文件头记录了 chkpt cnt 1110 ctl cnt 1109

为什么数据文件头的 chkpt cnt 比 ctl cnt 大 1 呢, 这是因为检查点在更新控制文件和数据文件头上的 chkpt cnt 时, 可以获得当前的 ctl cnt, 把当前的 ctl cnt 写入到了数据文件头, 即 1109

这一步验证已经通过

然后检查数据文件头的开始 SCN 和对应控制文件中的结束 SCN 是否一致:

Checkpointed at scn: 0x0000.0076948a 05/05/2015 12:41:20

两者一致, 可以正常启动

控制文件记录的 scn 是数据库最后一次成功完成检查点的 scn, 数据文件头记录的 scn 是最后一次完成检查点的 scn, 两者相等, 则不需要对你数据文件进行恢复, 如果不一致, 则需要对数据文件

进行恢复。假如数据库异常关闭, 可能数据文件头记录的 scn 比较旧, 与控制文件记录的不一致, 则需要进行恢复, 并且数据文件头记录的 scn 是恢复的起点

SQL> shutdown immediate;

数据库已经关闭。

已经卸载数据库。

ORACLE 例程已经关闭。

SQL> startup mount;

ORACLE 例程已经启动。

Total System Global Area 422670336 bytes

Fixed Size 1336960 bytes

Variable Size 360712576 bytes

Database Buffers 54525952 bytes

Redo Buffers 6094848 bytes

数据库装载完毕。

SQL> select file#,checkpoint_change# from v\$datafile;

FILE# CHECKPOINT_CHANGE#

FILE#	CHECKPOINT_CHANGE#
1	7771815
2	7771815
3	7771815
4	7771815
5	7771815
7	7771815
8	7771815

9	7771815
11	7771815
12	7771815

已选择 10 行。

```
SQL> select file#,checkpoint_change# from v$datafile_header;
```

FILE#	CHECKPOINT_CHANGE#
1	7771815
2	7771815
3	7771815
4	7771815
5	7771815
7	7771815
8	7771815
9	7771815
11	7771815
12	7771815

已选择 10 行。

上面两者是相等的，没有问题，读者可以模拟需要恢复案例。