【DATAGUARD】物理 dg 在主库丢失归档文件的情况下的恢复(七)

1.1 BLOG 文档结构图

1.2 前言部分

1.2.1 导读

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

① 物理 dg 的在主库丢失归档文件的情况下的恢复

② 物理 dg 管理和维护的一些 sql

注意：本篇 BLOG 中代码部分需要特别关注的地方我都用黄色背景和红色字体来表示，比如下边的例子中，thread 1 的最大归档日志号为 33，thread 2 的最大归档日志号为 43 是需要特别关注的地方。

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

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

1.2.2 实验环境介绍

项目	主库	dg 库
db 类型	单实例	单实例
db version	11.2.0.3	11.2.0.3
db 存储	FS type	FS type
ORACLE_SID	oradg11g	oradgphy
db_name	**oradg11g**	**oradg11g**
主机 IP 地址：	192.168.59.130	192.168.59.130
OS 版本及 kernel 版本	RHEL6.5 64 位，2.6.32-504.16.2.el6.x86_64	RHEL6.5 64 位，2.6.32-504.16.2.el6.x86_64
OS hostname	rhel6_lhr	rhel6_lhr

1.2.3 相关参考文章链接

dg 的系列文章参考：

【DATAGUARD】 基于同一个主机建立物理备库和逻辑备库（一）： http://blog.itpub.net/26736162/viewspace-1448197/

【DATAGUARD】 基于同一个主机建立物理备库和逻辑备库（二 ）: http://blog.itpub.net/26736162/viewspace-1448207/

【DATAGUARD】 基于同一个主机建立物理备库和逻辑备库（三 ）: http://blog.itpub.net/26736162/viewspace-1481972/

【DATAGUARD】 基于同一个主机建立物理备库和逻辑备库 (四)--添加一个物理 dg 节点 ： http://blog.itpub.net/26736162/viewspace-1484878/

【DATAGUARD】物理 dg 的 switchover 切换（五） ： http://blog.itpub.net/26736162/viewspace-1753111/

【DATAGUARD】物理 dg 的 failover 切换(六)： http://blog.itpub.net/26736162/viewspace-1753130/

1.2.4 本文简介

最近由于合同到期，去面试了几家做 oracle dba 的工作，面试中出现了不少的问题，有的面试官太奇葩了，问的问题也比较难以回答，可怜我的表达能力不太好，俗话就是说不会忽悠人，因此面试连连碰壁，这也是哥的软肋，本来哥的技术已经很好的了，一般的 DBA 的活一点问题都没有，可面试就是不能通过，最近真的是身心俱创，不说了，说多了都是泪，这篇 blog 是基于我去 1 号店面试的时候面试官提的一个问题，当时隐约觉得有什么办法可以恢复，但是想不起来，结果就回答只能重建了，回来后搜了搜资料还是可以恢复的，趁着周末就实验了一番，今天贴出来给大家共享共享。

1.3 相关知识点扫盲

都是 DG 的一些基本维护知识，这里就不贴了，直接进入实验环节吧。

Using RMAN Incremental Backups to Refresh a Standby Database

You can create an incremental backup of the target database containing changes to the database since the creation of the duplicate or the previous syncrhonization. You can apply the incremental backup to the standby database.

Note:

This technique cannot be used to update a duplicate database.

RMAN enables you to synchronize a standby database with a primary database by creating an incremental backup at the source database that contains all changed blocks since the duplicate was created or last refreshed. You then apply the incremental backup to the standby database, which updates it with all changes.

This capability facilitates the temporary conversion of a physical standby database into a reporting database, as described in *Oracle Data Guard Concepts and Administration*. In particular, this capability makes it possible to reverse the effects of converting the standby into a reporting database. After the standby database has been used for reporting or testing, Flashback Database can reverse any changes resulting from that work, returning the database to its contents when it was still a standby. An incremental backup created with BACKUP INCREMENTAL... FROM SCN can be used to refresh the standby with changes at the primary since the conversion and then managed recovery can resume. The effect is to return the reporting database to its role as standby.

For more details on this scenario, see *Oracle Data Guard Concepts and Administration*.

Using BACKUP INCREMENTAL... FROM SCN

The incremental backup is created at the source database by means of the BACKUP INCREMENTAL FROM SCN=*n* form of the BACKUP command. For example:

```
BACKUP DEVICE TYPE SBT INCREMENTAL FROM SCN 750923 DATABASE;
BACKUP INCREMENTAL FROM SCN 750923 DATABASE;
BACKUP DEVICE TYPE DISK INCREMENTAL FROM SCN 750983 DATABASE
FORMAT '/tmp/incr_standby_%U';
```

RMAN uses the selected SCN as the basis for this incremental backup. For all files being backed up, RMAN includes all data blocks that were changed at SCNs greater than or equal to the FROM SCN in the incremental backup.

Note:

- RMAN does not consider the incremental backup as part of a backup strategy at the source database. The backup is not suitable for use in a normal RECOVER DATABASE operation at the source database.
- The backup sets produced by this command are written to ?/dbs by default, even if the flash recovery area or some other backup destination is defined as the default for disk backups.
- You must create this incremental backup on disk for it to be useful. When you move the incremental backup to the standby, you must catalog it at the standby as described in "Step 3: Catalog the Incremental Backup Files at the Standby Database". Backups on tape cannot be cataloged.

See Also:

《Oracle Database Backup and Recovery Reference 》 for more details on BACKUP command syntax

Refreshing a Standby Database With INCREMENTAL FROM SCN Backups: Example

This example shows the steps required to update a standby database using incremental backups. The assumption is that you have already activated the standby, performed your tests or other operations at the standby, and then used Flashback Database to undo the effects of those changes. The task here is to refresh the standby with the latest changes to the primary, so that it can resume its role as a standby database.

Step 1: Create the Incremental Backup

Create the needed incremental backup at the source database, using BACKUP with the INCREMENTAL FROM SCN clause.

Assume that the incremental backup to be used in updating the duplicate database is to be created on disk, with the filenames for backup pieces determined by the format /tmp/incr_for_standby/bkup_%U.

```
RMAN> BACKUP DEVICE TYPE DISK INCREMENTAL FROM SCN 750983 DATABASE
FORMAT '/tmp/incr_for_standby/bkup_%U';
```

Step 2: Make the Incremental Backup Accessible at the Standby Database

Make the backup pieces containing the incremental backup available in some directory accessible on the system containing the standby database. For this example, assume that the destination directory is called /standbydisk1/incrback/ and ensure that it contains nothing besides the incremental backups from Step 1.

Step 3: Catalog the Incremental Backup Files at the Standby Database

Use the RMAN CATALOG command to register the backup sets in the RMAN repository at the duplicate. With an RMAN client connected to the standby database and the recovery catalog (if you use one at the standby), mount the standby and run the following command:

RMAN> CATALOG START WITH '/standbydisk1/incrback/';

The backups are now available for use in recovery of the standby.

Step 4: Apply the Incremental Backup to the Standby Database

Use the RMAN RECOVER command with the NOREDO option to apply the incremental backup to the standby database. All changed blocks captured in the incremental backup are updated at the standby database, bringing it up to date with the primary database. With an RMAN client connected to the standby database, run the following command:

RMAN> RECOVER DATABASE NOREDO;

You can now resume managed recovery at the standby. Any redo logs required at the standby with changes since those contained in the incremental are automatically requested from the primary and applied

1.4 实验部分

1.4.1 实验目标

① 主库丢失归档文件，然后在不重建物理 dg 的情况下来恢复物理 dg

1.4.2 实验过程

1.4.2.1 主备库环境

主库：

```
20:39:41 SQL> select dbid,name,current_scn,protection_mode,protection_level,database_role,force_logging,open_mode,switchover_status from v$database;
```

```
      DBID NAME      CURRENT_SCN PROTECTION_MODE      PROTECTION_LEVEL     DATABASE_ROLE    FOR OPEN_MODE            SWITCHOVER_STATUS
---------- --------- ----------- -------------------- -------------------- ---------------- --- -------------------- --------------------
1403587593 ORADG11G      2240299 MAXIMUM PERFORMANCE  MAXIMUM PERFORMANCE  PRIMARY          YES READ WRITE           TO STANDBY

已用时间:  00: 00: 00.01
20:39:42 SQL>
20:42:29 SQL> archive log list;
数据库日志模式            存档模式
自动存档              启用
存档终点              USE_DB_RECOVERY_FILE_DEST
最早的联机日志序列     47
下一个存档日志序列    49
当前日志序列          49
20:43:02 SQL>
```

备库：

```
20:40:39 SQL>  select dbid,name,current_scn,protection_mode,protection_level,database_role,force_logging,open_mode,switchover_status from v$database;

      DBID NAME      CURRENT_SCN PROTECTION_MODE      PROTECTION_LEVEL     DATABASE_ROLE    FOR OPEN_MODE            SWITCHOVER_STATUS
---------- --------- ----------- -------------------- -------------------- ---------------- --- -------------------- --------------------
1403587593 ORADG11G      2240295 MAXIMUM PERFORMANCE  MAXIMUM PERFORMANCE  PHYSICAL STANDBY YES READ ONLY WITH APPLY NOT ALLOWED

已用时间:  00: 00: 00.06
20:40:44 SQL>
20:42:23 SQL> archive log list;
数据库日志模式            存档模式
自动存档              启用
存档终点              USE_DB_RECOVERY_FILE_DEST
最早的联机日志序列     47
下一个存档日志序列    0
当前日志序列          49
20:43:23 SQL>
```

1.4.2.2 模拟归档丢失

备库操作，备库取消归档应用，让备库处于只读模式：

```
20:43:23 SQL> ALTER DATABASE recover managed standby DATABASE cancel;

数据库已更改。

已用时间:  00: 00: 01.00
20:44:39 SQL>
20:44:39 SQL>  select dbid,name,current_scn,protection_mode,protection_level,database_role,force_logging,open_mode,switchover_status from v$database;

      DBID NAME      CURRENT_SCN PROTECTION_MODE      PROTECTION_LEVEL     DATABASE_ROLE    FOR OPEN_MODE            SWITCHOVER_STATUS
---------- --------- ----------- -------------------- -------------------- ---------------- --- -------------------- --------------------
1403587593 ORADG11G      2240536 MAXIMUM PERFORMANCE  MAXIMUM PERFORMANCE  PHYSICAL STANDBY YES READ ONLY            NOT ALLOWED

已用时间:  00: 00: 00.00
20:45:09 SQL>
```

主库配置归档 2 的状态为 defer，目的是为了不把归档自动传递到备库,实际情况下往往是由于网络故障，备库挂掉等等情况导致，我们多次切换主库日志：

```
20:50:48 SQL>  ALTER system SET log_archive_dest_state_2 = 'defer';

系统已更改。
```

```
已用时间:  00: 00: 00.01
20:52:31 SQL>
20:52:31 SQL> alter system switch logfile;

系统已更改。

已用时间:  00: 00: 00.01
20:54:54 SQL> alter system switch logfile;

系统已更改。

已用时间:  00: 00: 00.03
20:54:56 SQL> alter system switch logfile;

系统已更改。

已用时间:  00: 00: 00.01
20:54:57 SQL> alter system switch logfile;

系统已更改。

已用时间:  00: 00: 00.01
20:55:05 SQL> alter system switch logfile;

系统已更改。

已用时间:  00: 00: 00.00
20:55:45 SQL> create table lhr.testdg as select * from dual;

表已创建。

已用时间:  00: 00: 00.10
20:55:49 SQL> insert into lhr.testdg select * from dual;

已创建 1 行。

已用时间:  00: 00: 00.01
20:56:10 SQL> commit;

提交完成。

已用时间:  00: 00: 00.00
20:56:43 SQL> alter system switch logfile;

系统已更改。

已用时间:  00: 00: 00.01
20:56:52 SQL> alter system switch logfile;

系统已更改。

已用时间:  00: 00: 00.01
20:56:56 SQL>  insert into lhr.testdg select * from dual;

已创建 1 行。

已用时间:  00: 00: 00.00
20:57:07 SQL> commit;

提交完成。

已用时间:  00: 00: 00.00
20:57:11 SQL> alter system switch logfile;

系统已更改。
```

```
已用时间:  00: 00: 01.57
20:57:15 SQL>
20:57:15 SQL> select * from lhr.testdg;

D
-
X
X
X

已用时间:  00: 00: 00.00
20:58:00 SQL>
20:58:00 SQL> archive log list;
数据库日志模式            存档模式
自动存档              启用
存档终点              USE_DB_RECOVERY_FILE_DEST
最早的联机日志序列     55
下一个存档日志序列    57
当前日志序列          57
20:58:30 SQL>
```

查看主库归档情况：

```
20:58:30 SQL> col name for a100
20:58:55 SQL> set linesize 9999  pagesize 9999
20:58:55 SQL> SELECT dest_id,
20:58:55   2         THREAD#,
20:58:55   3         NAME,
       sequence#,
       archived,
       applied,
       a.NEXT_CHANGE#
FROM   v$archived_log a
WHERE  a.sequence# >= 40
AND    resetlogs_change# = (SELECT d.RESETLOGS_CHANGE# FROM v$database d)
and a.dest_id=1
ORDER  BY a.THREAD#,
          a.sequence#,
20:58:55  14    a.dest_id;

   DEST_ID    THREAD# NAME                                                                                                 SEQUENCE# ARC APPLIED   NEXT_CHANGE#
---------- ---------- ---------------------------------------------------------------------------------------------------- ---------- --- --------- ------------
         1          1                                                                                                            40 YES NO             2181533
         1          1                                                                                                            41 YES NO             2181856
         1          1                                                                                                            42 YES NO             2182794
         1          1                                                                                                            43 YES NO             2182842
         1          1                                                                                                            44 YES NO             2223480
         1          1                                                                                                            45 YES NO             2223488
         1          1 /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23/o1_mf_1_46_bxm58pvo_.arc               46 YES NO             2224321
         1          1 /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23/o1_mf_1_47_bxmc8z90_.arc               47 YES NO             2234639
         1          1 /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23/o1_mf_1_48_bxmc917l_.arc               48 YES NO             2234642
         1          1 /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23/o1_mf_1_49_bxmjnyoh_.arc               49 YES NO             2241189
         1          1 /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23/o1_mf_1_50_bxmjo0gk_.arc               50 YES NO             2241194
         1          1 /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23/o1_mf_1_51_bxmjo1vw_.arc               51 YES NO             2241198
         1          1 /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23/o1_mf_1_52_bxmjo9pw_.arc               52 YES NO             2241209
         1          1 /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23/o1_mf_1_53_bxmjocqc_.arc               53 YES NO             2241214
         1          1 /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23/o1_mf_1_54_bxmjrnt2_.arc               54 YES NO             2241390
         1          1 /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23/o1_mf_1_55_bxmjrrbl_.arc               55 YES NO             2241396
         1          1 /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23/o1_mf_1_56_bxmjscy0_.arc               56 YES NO             2241419

已选择 17 行。

已用时间:  00: 00: 00.00
20:58:56 SQL>
```

查看备库归档情况：

```
20:59:04 SQL> col name for a100
21:00:45 SQL> set linesize 9999  pagesize 9999
21:00:45 SQL> SELECT dest_id,
21:00:45   2         THREAD#,
21:00:45   3         NAME,
21:00:45   4         sequence#,
21:00:45   5         archived,
21:00:45   6         applied,
21:00:45   7         a.NEXT_CHANGE#
21:00:45   8  FROM   v$archived_log a
21:00:45   9  WHERE  a.sequence# >= 45
21:00:45  10  AND    resetlogs_change# = (SELECT d.RESETLOGS_CHANGE# FROM v$database d)
21:00:45  11  and a.dest_id=1
21:00:45  12  ORDER  BY a.THREAD#,
21:00:45  13            a.sequence#,
21:00:45  14    a.dest_id;

   DEST_ID    THREAD# NAME                                                                                                 SEQUENCE# ARC APPLIED   NEXT_CHANGE#
---------- ---------- ------------------------------------------------------------------------------------------------------ ---------- --- --------- ------------
         1          1                                                                                                            46 YES YES            2224321
         1          1                                                                                                            47 YES YES            2234639
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_48_bxmc9189_.arc               48 YES YES            2234642
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_49_bxmjnyj3_.arc               49 YES NO             2241189

已用时间:  00: 00: 00.01
21:00:46 SQL>
```

可以看到，备库已经断档了，50 到 56 都没有接收，接下来我们删除主库的归档日志，我们只删除 54、55 这 2 个归档日志：

```
[oracle@rhel6_lhr ~]$ cd /u01/app/oracle/flash_recovery_area/ORADG11G/archivelog/2015_08_23
[oracle@rhel6_lhr 2015_08_23]$ ls
o1_mf_1_46_bxm58pvo_.arc  o1_mf_1_48_bxmc917l_.arc  o1_mf_1_50_bxmjo0gk_.arc  o1_mf_1_52_bxmjo9pw_.arc  o1_mf_1_54_bxmjrnt2_.arc  o1_mf_1_56_bxmjscy0_.arc
o1_mf_1_47_bxmc8z90_.arc  o1_mf_1_49_bxmjnyoh_.arc  o1_mf_1_51_bxmjo1vw_.arc  o1_mf_1_53_bxmjocqc_.arc  o1_mf_1_55_bxmjrrbl_.arc
[oracle@rhel6_lhr 2015_08_23]$ ll
total 23624
-rw-r----- 1 oracle asmadmin   422400 Aug 23 17:40 o1_mf_1_46_bxm58pvo_.arc
-rw-r----- 1 oracle asmadmin 17354240 Aug 23 19:23 o1_mf_1_47_bxmc8z90_.arc
-rw-r----- 1 oracle asmadmin     1536 Aug 23 19:23 o1_mf_1_48_bxmc917l_.arc
-rw-r----- 1 oracle asmadmin  6266368 Aug 23 20:54 o1_mf_1_49_bxmjnyoh_.arc
-rw-r----- 1 oracle asmadmin     2048 Aug 23 20:54 o1_mf_1_50_bxmjo0gk_.arc
-rw-r----- 1 oracle asmadmin     1536 Aug 23 20:54 o1_mf_1_51_bxmjo1vw_.arc
-rw-r----- 1 oracle asmadmin     5120 Aug 23 20:55 o1_mf_1_52_bxmjo9pw_.arc
-rw-r----- 1 oracle asmadmin     2048 Aug 23 20:55 o1_mf_1_53_bxmjocqc_.arc
-rw-r----- 1 oracle asmadmin    96256 Aug 23 20:56 o1_mf_1_54_bxmjrnt2_.arc
-rw-r----- 1 oracle asmadmin     2560 Aug 23 20:56 o1_mf_1_55_bxmjrrbl_.arc
-rw-r----- 1 oracle asmadmin    12800 Aug 23 20:57 o1_mf_1_56_bxmjscy0_.arc
[oracle@rhel6_lhr 2015_08_23]$ rm -rf o1_mf_1_54*
[oracle@rhel6_lhr 2015_08_23]$ rm -rf o1_mf_1_55*
You have new mail in /var/spool/mail/oracle
[oracle@rhel6_lhr 2015_08_23]$ ll
total 23524
-rw-r----- 1 oracle asmadmin   422400 Aug 23 17:40 o1_mf_1_46_bxm58pvo_.arc
-rw-r----- 1 oracle asmadmin 17354240 Aug 23 19:23 o1_mf_1_47_bxmc8z90_.arc
-rw-r----- 1 oracle asmadmin     1536 Aug 23 19:23 o1_mf_1_48_bxmc917l_.arc
-rw-r----- 1 oracle asmadmin  6266368 Aug 23 20:54 o1_mf_1_49_bxmjnyoh_.arc
-rw-r----- 1 oracle asmadmin     2048 Aug 23 20:54 o1_mf_1_50_bxmjo0gk_.arc
-rw-r----- 1 oracle asmadmin     1536 Aug 23 20:54 o1_mf_1_51_bxmjo1vw_.arc
-rw-r----- 1 oracle asmadmin     5120 Aug 23 20:55 o1_mf_1_52_bxmjo9pw_.arc
-rw-r----- 1 oracle asmadmin     2048 Aug 23 20:55 o1_mf_1_53_bxmjocqc_.arc
-rw-r----- 1 oracle asmadmin    12800 Aug 23 20:57 o1_mf_1_56_bxmjscy0_.arc
```

```
[oracle@rhel6_lhr 2015_08_23]$
```

主库开启备库的归档：

```
21:05:44 SQL> ALTER system SET log_archive_dest_state_2 = 'enable';

系统已更改。

已用时间:  00: 00: 00.00
21:19:46 SQL>
```

备库开启实时应用：

```
21:00:46 SQL> alter database recover managed standby database using current logfile disconnect from session;

数据库已更改。

已用时间:  00: 00: 06.02
21:22:17 SQL>
```

此时备库告警日志：

```
Sun Aug 23 21:22:16 2015
Managed Standby Recovery starting Real Time Apply
Parallel Media Recovery started with 2 slaves
Waiting for all non-current ORLs to be archived...
All non-current ORLs have been archived.
Media Recovery Log /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_49_bxmjnyj3_.arc
Media Recovery Log /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_50_bxml3lv7_.arc
Media Recovery Log /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_51_bxml3lrh_.arc
Media Recovery Log /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_52_bxml3lqv_.arc
Media Recovery Log /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_53_bxml3lz7_.arc
Media Recovery Waiting for thread 1 sequence 54
Fetching gap sequence in thread 1, gap sequence 54-55
Completed: alter database recover managed standby database using current logfile disconnect from session
Sun Aug 23 21:25:17 2015
Error 12154 received logging on to the standby
FAL[client, USER]: Error 12154 connecting to oradg11g for fetching gap sequence
Sun Aug 23 21:57:57 2015
FAL[client]: Failed to request gap sequence
 GAP - thread 1 sequence 54-55
 DBID 1403587593 branch 886695024
FAL[client]: All defined FAL servers have been attempted.
------------------------------------------------------------
Check that the CONTROL_FILE_RECORD_KEEP_TIME initialization
parameter is defined to a value that's sufficiently large
enough to maintain adequate log switch information to resolve
archivelog gaps.
------------------------------------------------------------
```

再次查看备库归档情况：

```
21:34:58 SQL>
21:36:10 SQL> col name for a100
21:37:40 SQL> set linesize 9999  pagesize 9999
21:37:40 SQL> SELECT dest_id,
21:37:40   2         THREAD#,
21:37:40   3         NAME,
21:37:40   4         sequence#,
21:37:40   5         archived,
```

```
21:37:41   6         applied,
21:37:41   7         a.NEXT_CHANGE#
21:37:41   8  FROM   v$archived_log a
21:37:41   9  WHERE  a.sequence# >= 45
21:37:41  10  AND    resetlogs_change# = (SELECT d.RESETLOGS_CHANGE# FROM v$database d)
21:37:41  11  ORDER  BY a.THREAD#,
21:37:41  12            a.sequence#,
21:37:41  13    a.dest_id;

   DEST_ID    THREAD# NAME                                                                                                SEQUENCE# ARC APPLIED   NEXT_CHANGE#
---------- ---------- ---------------------------------------------------------------------------------------------------- ---------- --- --------- ------------
         2          1                                                                                                          45 YES YES            2223488
         1          1                                                                                                          46 YES YES            2224321
         1          1                                                                                                          47 YES YES            2234639
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_48_bxmc9189_.arc              48 YES YES            2234642
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_49_bxmjnyj3_.arc              49 YES YES            2241189
         2          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_50_bxml3lv7_.arc              50 YES YES            2241194
         2          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_51_bxml3lrh_.arc              51 YES YES            2241198
         2          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_52_bxml3lqv_.arc              52 YES YES            2241209
         2          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_53_bxml3lz7_.arc              53 YES YES            2241214
         2          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_56_bxml3lz0_.arc              56 YES NO             2241419
         2          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_57_bxml3m03_.arc              57 YES NO             2243353

已选择 11 行。

已用时间:  00: 00: 00.01
21:37:41 SQL>
21:40:35 SQL> select thread#,low_sequence#,high_sequence# from v$archive_gap;

   THREAD# LOW_SEQUENCE# HIGH_SEQUENCE#
---------- ------------- --------------
         1            54             55

已用时间:  00: 00: 00.01
21:50:38 SQL>
```

可以看到备库已经产生 gap 了。

1.4.2.3 主库基于 SCN 备份

54、55 号日志不见了，这个时候我们以 53 号的归档日志的 next_change#即 54 号的 first_change#为 scn 号来对主库基于 scn 的 rman 增量备份。

```
SELECT (SELECT MIN(d.CHECKPOINT_CHANGE#) FROM v$datafile d) datafile_scn,
       (SELECT MIN(d.CHECKPOINT_CHANGE#)
        FROM   v$datafile_header d
        WHERE  rownum = 1) datafile_header_scn,
       (SELECT current_scn FROM v$database) current_scn,
       (SELECT b.NEXT_CHANGE#
        FROM   v$archived_log b
        WHERE  b.SEQUENCE# = 53
        AND    resetlogs_change# =
               (SELECT d.RESETLOGS_CHANGE# FROM v$database d)
        AND    rownum = 1) NEXT_CHANGE#
FROM   dual;
```

DATAFILE_SCN	DATAFILE_HEADER_SCN	CURRENT_SCN	NEXT_CHANGE#
2241214	2241214	2241213	2241214

这几个值基本上差不多，我们可以以 2241214 或者 2241213 为基准来备份，若是数据文件和文件头的 scn 不一致我们应该取这几个值中**最小**的一个。

```
run
{
allocate channel d1 type disk;
allocate channel d2 type disk;
backup as compressed backupset incremental from SCN 2241214 database format '/u05/oracle/oracle_bk/ORADG11G/standby_%d_%T_%U.bak' include current controlfile for standby filesperset=5  tag 'FOR STANDBY';
release channel d1;
release channel d2;
}
```

```
[oracle@rhel6_lhr ~]$ rman target /

恢复管理器: Release 11.2.0.3.0 - Production on 星期日 8月 23 21:55:49 2015

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已连接到目标数据库: ORADG11G (DBID=1403587593)

RMAN> run
2> {
3> allocate channel d1 type disk;
4> allocate channel d2 type disk;
5> backup as compressed backupset incremental from SCN 2241214 database format '/u05/oracle/oracle_bk/ORADG11G/standby_%d_%T_%U.bak' include current controlfile for standby filesperset=5  tag 'FOR STANDBY';
6> release channel d1;
7> release channel d2;
8> }

使用目标数据库控制文件替代恢复目录
分配的通道: d1
通道 d1: SID=145 设备类型=DISK

分配的通道: d2
通道 d2: SID=19 设备类型=DISK

启动 backup 于 2015-08-23 21:55:54

备份将于 2015-08-30 21:55:54 废弃
将不保留或备份归档日志
通道 d1: 正在启动压缩的全部数据文件备份集
通道 d1: 正在指定备份集内的数据文件
输入数据文件: 文件号=00001 名称=/u01/app/oracle/oradata/oradg11g/system01.dbf
输入数据文件: 文件号=00003 名称=/u01/app/oracle/oradata/oradg11g/undotbs01.dbf
输入数据文件: 文件号=00005 名称=/u01/app/oracle/oradata/oradg11g/example01.dbf
通道 d1: 正在启动段 1 于 2015-08-23 21:55:54
通道 d2: 正在启动压缩的全部数据文件备份集
通道 d2: 正在指定备份集内的数据文件
输入数据文件: 文件号=00002 名称=/u01/app/oracle/oradata/oradg11g/sysaux01.dbf
输入数据文件: 文件号=00006 名称=/u01/app/oracle/oradata/oradg11g/logmnrtbs1.dbf
输入数据文件: 文件号=00004 名称=/u01/app/oracle/oradata/oradg11g/users01.dbf
通道 d2: 正在启动段 1 于 2015-08-23 21:55:54

通道 d2: 已完成段 1 于 2015-08-23 22:00:00
段句柄=/u05/oracle/oracle_bk/ORADG11G/standby_ORADG11G_20150823_2sqfbp7a_1_1.bak 标记=FOR STANDBY 注释=NONE
通道 d2: 备份集已完成, 经过时间:00:04:06
通道 d2: 正在启动压缩的全部数据文件备份集
通道 d2: 正在指定备份集内的数据文件
```

```
备份集内包括备用控制文件
通道 d2: 正在启动段 1 于 2015-08-23 22:00:03
通道 d2: 已完成段 1 于 2015-08-23 22:00:04
段句柄=/u05/oracle/oracle_bk/ORADG11G/standby_ORADG11G_20150823_2tqfbpf0_1_1.bak 标记=FOR STANDBY 注释=NONE
通道 d2: 备份集已完成, 经过时间:00:00:01
通道 d1: 已完成段 1 于 2015-08-23 22:00:54
段句柄=/u05/oracle/oracle_bk/ORADG11G/standby_ORADG11G_20150823_2rqfbp7a_1_1.bak 标记=FOR STANDBY 注释=NONE
通道 d1: 备份集已完成, 经过时间:00:05:00

备份将于 2015-08-30 22:00:54 废弃
将不保留或备份归档日志
通道 d1: 正在启动压缩的全部数据文件备份集
通道 d1: 正在指定备份集内的数据文件
备份集内包括当前控制文件
通道 d1: 正在启动段 1 于 2015-08-23 22:00:55
通道 d1: 已完成段 1 于 2015-08-23 22:00:56
段句柄=/u05/oracle/oracle_bk/ORADG11G/standby_ORADG11G_20150823_2uqfbpgm_1_1.bak 标记=FOR STANDBY 注释=NONE
通道 d1: 备份集已完成, 经过时间:00:00:01
完成 backup 于 2015-08-23 22:00:56

释放的通道: d1

释放的通道: d2

RMAN>
RMAN>
RMAN> list backupset summary;


备份列表
==========
关键字     TY LV S 设备类型 完成时间            段数 副本数 压缩标记
------- -- -- - ---------- ------------------- ------- ------- ---------- ---
9       B     A DISK        2015-08-23 21:59:53 1       1       YES        FOR STANDBY
10      B     A DISK        2015-08-23 22:00:04 1       1       YES        FOR STANDBY
11      B     A DISK        2015-08-23 22:00:49 1       1       YES        FOR STANDBY
12      B     A DISK        2015-08-23 22:00:55 1       1       YES        FOR STANDBY
RMAN> exit


恢复管理器完成。
[oracle@rhel6_lhr ~]$ ll -h /u05/oracle/oracle_bk/ORADG11G/*
-rw-r----- 1 oracle asmadmin 1.2M Aug 23 22:00 /u05/oracle/oracle_bk/ORADG11G/standby_ORADG11G_20150823_2rqfbp7a_1_1.bak
-rw-r----- 1 oracle asmadmin 1.4M Aug 23 21:59 /u05/oracle/oracle_bk/ORADG11G/standby_ORADG11G_20150823_2sqfbp7a_1_1.bak
-rw-r----- 1 oracle asmadmin 1.1M Aug 23 22:00 /u05/oracle/oracle_bk/ORADG11G/standby_ORADG11G_20150823_2tqfbpf0_1_1.bak
-rw-r----- 1 oracle asmadmin 1.1M Aug 23 22:00 /u05/oracle/oracle_bk/ORADG11G/standby_ORADG11G_20150823_2uqfbpgm_1_1.bak
[oracle@rhel6_lhr ~]$
```

可以看到增量备份成功，接下来将备份传递到备库，可以用 scp 或者 ftp 工具， scp * oracle@192.168.213.101:/u05/oracle/oracle_bk/ORADG11G/。

```
[oracle@rhel6_lhr ~]$ scp /u05/oracle/oracle_bk/ORADG11G/* oracle@192.168.59.130:/u05/oracle/
The authenticity of host '192.168.59.130 (192.168.59.130)' can't be established.
RSA key fingerprint is 77:e6:11:1a:7c:c7:81:7c:88:c9:21:18:51:2a:84:d1.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.59.130' (RSA) to the list of known hosts.
oracle@192.168.59.130's password:
standby_ORADG11G_20150823_2rqfbp7a_1_1.bak                                                  100% 1144KB   1.1MB/s   00:00
standby_ORADG11G_20150823_2sqfbp7a_1_1.bak                                                  100% 1376KB   1.3MB/s   00:00
standby_ORADG11G_20150823_2tqfbpf0_1_1.bak                                                  100% 1104KB   1.1MB/s   00:00
standby_ORADG11G_20150823_2uqfbpgm_1_1.bak                                                  100% 1120KB   1.1MB/s   00:00
You have new mail in /var/spool/mail/oracle
[oracle@rhel6_lhr ~]$
```

1.4.2.4 备库执行恢复操作

一、 重启备库到 nomount 状态来恢复控制文件

```
22:09:23 SQL> set line 9999
22:10:26 SQL> col name format a10
22:10:26 SQL> select dbid,name,current_scn,protection_mode,protection_level,database_role,force_logging,open_mode,switchover_status from v$database;

      DBID NAME       CURRENT_SCN PROTECTION_MODE      PROTECTION_LEVEL     DATABASE_ROLE    FOR OPEN_MODE            SWITCHOVER_STATUS
---------- ---------- ----------- -------------------- -------------------- ---------------- --- -------------------- --------------------
1403587593 ORADG11G       2241213 MAXIMUM PERFORMANCE  MAXIMUM PERFORMANCE  PHYSICAL STANDBY YES READ ONLY WITH APPLY NOT ALLOWED

已用时间:  00: 00: 00.01
22:11:41 SQL> create pfile='?/dbs/standby_pfile_before_recover_dg.ora' from spfile;

文件已创建。

已用时间:  00: 00: 00.01
22:12:29 SQL>
22:12:29 SQL> shutdown immediate;
数据库已经关闭。
已经卸载数据库。
ORACLE 例程已经关闭。
22:13:46 SQL> startup nomount;
ORACLE 例程已经启动。

Total System Global Area  242171904 bytes
Fixed Size                  2227256 bytes
Variable Size             197133256 bytes
Database Buffers           37748736 bytes
Redo Buffers                5062656 bytes
22:13:56 SQL> show parameter control

NAME                                 TYPE                 VALUE
------------------------------------ -------------------- ------------------------------
control_file_record_keep_time        integer              7
control_files                        string               /u01/app/oracle/oradata/oradgp
                                                          hy/crontal01.ctl, /u01/app/ora
                                                          cle/oradata/oradgphy/control02
                                                          .ctl
control_management_pack_access       string               DIAGNOSTIC+TUNING

[oracle@rhel6_lhr ~]$ rman target /

恢复管理器: Release 11.2.0.3.0 - Production on 星期日 8月 23 22:30:24 2015

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已连接到目标数据库: ORADG11G (未装载)

RMAN>  restore standby  controlfile  to '/u01/app/oracle/oradata/oradgphy/crontal01.ctl' from '/u05/oracle/standby_ORADG11G_20150823_2tqfbpf0_1_1.bak';

启动 restore 于 2015-08-23 22:30:26
使用目标数据库控制文件替代恢复目录
分配的通道: ORA_DISK_1
通道 ORA_DISK_1: SID=134 设备类型=DISK

通道 ORA_DISK_1: 正在还原控制文件
通道 ORA_DISK_1: 还原完成, 用时: 00:00:01
完成 restore 于 2015-08-23 22:30:27

RMAN>  restore standby  controlfile  to '/u01/app/oracle/oradata/oradgphy/control02.ctl' from '/u05/oracle/standby_ORADG11G_20150823_2tqfbpf0_1_1.bak';
```

```
启动 restore 于 2015-08-23 22:30:52
使用通道 ORA_DISK_1

通道 ORA_DISK_1: 正在还原控制文件
通道 ORA_DISK_1: 还原完成, 用时: 00:00:01
完成 restore 于 2015-08-23 22:30:53

RMAN>
RMAN> catalog start with '/u05/oracle/';

RMAN-00571: ===========================================================
RMAN-00569: =============== ERROR MESSAGE STACK FOLLOWS ===============
RMAN-00571: ===========================================================
RMAN-03002: catalog 命令 (在 08/23/2015 22:33:07 上) 失败
ORA-01507: 未装载数据库

RMAN> alter database mount;

数据库已装载
释放的通道: ORA_DISK_1

RMAN> catalog start with '/u05/oracle/';


搜索与样式 /u05/oracle 匹配的所有文件

数据库未知文件的列表
===================================
文件名: /u05/oracle/standby_ORADG11G_20150823_2rqfbp7a_1_1.bak
文件名: /u05/oracle/standby_ORADG11G_20150823_2sqfbp7a_1_1.bak
文件名: /u05/oracle/standby_ORADG11G_20150823_2uqfbpgm_1_1.bak
文件名: /u05/oracle/standby_ORADG11G_20150823_2tqfbpf0_1_1.bak

是否确实要将上述文件列入目录 (输入 YES 或 NO)? yes
正在编制文件目录...
目录编制完毕

已列入目录的文件的列表
=======================
文件名: /u05/oracle/standby_ORADG11G_20150823_2rqfbp7a_1_1.bak
文件名: /u05/oracle/standby_ORADG11G_20150823_2sqfbp7a_1_1.bak
文件名: /u05/oracle/standby_ORADG11G_20150823_2uqfbpgm_1_1.bak
文件名: /u05/oracle/standby_ORADG11G_20150823_2tqfbpf0_1_1.bak
```

二、 恢复备库

```
RMAN> recover DATABASE noredo;

启动 recover 于 2015-08-23 22:37:12
使用通道 ORA_DISK_1
通道 ORA_DISK_1: 正在开始还原增量数据文件备份集
通道 ORA_DISK_1: 正在指定从备份集还原的数据文件
数据文件 00002 的还原目标: /u01/app/oracle/oradata/oradgphy/sysaux01.dbf
数据文件 00004 的还原目标: /u01/app/oracle/oradata/oradgphy/users01.dbf
数据文件 00006 的还原目标: /u01/app/oracle/oradata/oradgphy/logmnrtbs1.dbf
通道 ORA_DISK_1: 正在读取备份片段 /u05/oracle/oracle_bk/ORADG11G/standby_ORADG11G_20150823_2sqfbp7a_1_1.bak
通道 ORA_DISK_1: 段句柄 = /u05/oracle/oracle_bk/ORADG11G/standby_ORADG11G_20150823_2sqfbp7a_1_1.bak 标记 = FOR STANDBY
通道 ORA_DISK_1: 已还原备份片段 1
通道 ORA_DISK_1: 还原完成, 用时: 00:00:01
通道 ORA_DISK_1: 正在开始还原增量数据文件备份集
通道 ORA_DISK_1: 正在指定从备份集还原的数据文件
数据文件 00001 的还原目标: /u01/app/oracle/oradata/oradgphy/system01.dbf
数据文件 00003 的还原目标: /u01/app/oracle/oradata/oradgphy/undotbs01.dbf
```

```
数据文件 00005 的还原目标: /u01/app/oracle/oradata/oradgphy/example01.dbf
通道 ORA_DISK_1: 正在读取备份片段 /u05/oracle/standby_ORADG11G_20150823_2rqfbp7a_1_1.bak
通道 ORA_DISK_1: 段句柄 = /u05/oracle/standby_ORADG11G_20150823_2rqfbp7a_1_1.bak 标记 = FOR STANDBY
通道 ORA_DISK_1: 已还原备份片段 1
通道 ORA_DISK_1: 还原完成, 用时: 00:00:03

完成 recover 于 2015-08-23 22:37:16

RMAN>
```

告警日志：

```
Sun Aug 23 22:37:12 2015
Incremental restore complete of datafile 4 /u01/app/oracle/oradata/oradgphy/users01.dbf
  checkpoint is 2245592
  last deallocation scn is 3
Incremental restore complete of datafile 6 /u01/app/oracle/oradata/oradgphy/logmnrtbs1.dbf
  checkpoint is 2245592
Incremental restore complete of datafile 2 /u01/app/oracle/oradata/oradgphy/sysaux01.dbf
  checkpoint is 2245592
  last deallocation scn is 995211
Incremental restore complete of datafile 3 /u01/app/oracle/oradata/oradgphy/undotbs01.dbf
  checkpoint is 2245591
  last deallocation scn is 3
Incremental restore complete of datafile 5 /u01/app/oracle/oradata/oradgphy/example01.dbf
  checkpoint is 2245591
  last deallocation scn is 1015098
Incremental restore complete of datafile 1 /u01/app/oracle/oradata/oradgphy/system01.dbf
  checkpoint is 2245591
  last deallocation scn is 993074
```

三、 备库开始应用 redo

```
[oracle@rhel6_lhr ~]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.3.0 Production on 星期日 8月 23 22:39:48 2015

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连接到:
Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

22:39:48 SQL> col name for a100
22:40:29 SQL> set linesize 9999  pagesize 9999
22:40:29 SQL> SELECT dest_id,
22:40:29   2         THREAD#,
22:40:29   3         NAME,
22:40:29   4         sequence#,
22:40:29   5         archived,
22:40:29   6         applied,
22:40:29   7         a.NEXT_CHANGE#
22:40:29   8  FROM   v$archived_log a
22:40:29   9  WHERE  a.sequence# >= 40
22:40:29  10  AND    resetlogs_change# = (SELECT d.RESETLOGS_CHANGE# FROM v$database d)
22:40:29  11  ORDER  BY a.THREAD#,
22:40:29  12            a.sequence#,
22:40:30  13    a.dest_id;

   DEST_ID    THREAD# NAME                                                                                                 SEQUENCE# ARC APPLIED   NEXT_CHANGE#
---------- ---------- ---------------------------------------------------------------------------------------------------- ---------- --- --------- ------------
```

```
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_48_bxmc9189_.arc                48 YES NO              2234642
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_49_bxmjnyj3_.arc               49 YES NO              2241189
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_50_bxml3lv7_.arc               50 YES NO              2241194
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_51_bxml3lrh_.arc               51 YES NO              2241198
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_52_bxml3lqv_.arc               52 YES NO              2241209
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_53_bxml3lz7_.arc               53 YES NO              2241214
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_56_bxml3lz0_.arc               56 YES NO              2241419
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_57_bxml3m03_.arc               57 YES NO              2243353
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_58_bxmp464x_.arc               58 YES NO              2248351
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_59_bxmpksob_.arc               59 YES NO              2248782

已选择 10 行。

已用时间:  00: 00: 00.01
22:40:30 SQL> alter database recover managed standby database using current logfile disconnect from session;

数据库已更改。

已用时间:  00: 00: 06.02
22:41:19 SQL> col name for a100
22:41:40 SQL> set linesize 9999  pagesize 9999
22:41:40 SQL> SELECT dest_id,
22:41:41   2         THREAD#,
22:41:41   3         NAME,
22:41:41   4         sequence#,
22:41:41   5         archived,
22:41:41   6         applied,
22:41:41   7         a.NEXT_CHANGE#
22:41:41   8  FROM   v$archived_log a
22:41:41   9  WHERE  a.sequence# >= 40
22:41:41  10  AND    resetlogs_change# = (SELECT d.RESETLOGS_CHANGE# FROM v$database d)
22:41:41  11  ORDER  BY a.THREAD#,
22:41:41  12            a.sequence#,
22:41:41  13    a.dest_id;

   DEST_ID    THREAD# NAME                                                                                                 SEQUENCE# ARC APPLIED   NEXT_CHANGE#
---------- ---------- ---------------------------------------------------------------------------------------------------- ---------- --- --------- ------------
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_48_bxmc9189_.arc                48 YES NO              2234642
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_49_bxmjnyj3_.arc               49 YES NO              2241189
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_50_bxml3lv7_.arc               50 YES NO              2241194
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_51_bxml3lrh_.arc               51 YES NO              2241198
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_52_bxml3lqv_.arc               52 YES NO              2241209
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_53_bxml3lz7_.arc               53 YES NO              2241214
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_56_bxml3lz0_.arc               56 YES NO              2241419
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_57_bxml3m03_.arc               57 YES NO              2243353
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_58_bxmp464x_.arc               58 YES YES             2248351
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_59_bxmpksob_.arc               59 YES IN-MEMORY       2248782

已选择 10 行。

已用时间:  00: 00: 00.00
22:41:41 SQL>
22:41:41 SQL> SELECT * FROM V$ARCHIVE_GAP;

未选定行

已用时间:  00: 00: 00.01
22:41:41 SQL>
```

四、　　备库 read only 模式打开

```
22:41:41 SQL> alter database recover managed standby database cancel;

数据库已更改。
```

```
已用时间:  00: 00: 01.00
22:43:40 SQL> alter database open;

数据库已更改。

已用时间:  00: 00: 00.22
22:43:45 SQL> alter database recover managed standby database using current logfile disconnect from session;


数据库已更改。

已用时间:  00: 00: 06.04
22:44:00 SQL> 22:44:00 SQL>
22:44:02 SQL> select * from lhr.testdg;

D
-
X
X
X

已用时间:  00: 00: 00.00
22:44:10 SQL>
```

1.4.2.5 校验操作

主库：

```
22:41:00 SQL> alter system switch logfile;
系统已更改。

已用时间:  00: 00: 00.01
22:45:14 SQL> insert into lhr.testdg select * from lhr.testdg;

已创建 3 行。

已用时间:  00: 00: 00.00
22:45:29 SQL> commit;

提交完成。

已用时间:  00: 00: 00.01
22:45:32 SQL> select count(1) from lhr.testdg;

  COUNT(1)
----------
         6

已用时间:  00: 00: 00.00
22:45:42 SQL> archive log list;
数据库日志模式            存档模式
自动存档              启用
存档终点              USE_DB_RECOVERY_FILE_DEST
最早的联机日志序列     59
下一个存档日志序列   61
当前日志序列           61
22:46:03 SQL>
```

备库：

```
22:46:54 SQL> col name for a100
22:47:13 SQL> set linesize 9999  pagesize 9999
22:47:13 SQL> SELECT dest_id,
22:47:13   2         THREAD#,
22:47:13   3         NAME,
22:47:13   4         sequence#,
22:47:13   5         archived,
22:47:13   6         applied,
22:47:13   7         a.NEXT_CHANGE#
22:47:13   8  FROM   v$archived_log a
22:47:13   9  WHERE  a.sequence# >= 50
22:47:13  10  AND    resetlogs_change# = (SELECT d.RESETLOGS_CHANGE# FROM v$database d)
22:47:13  11  ORDER  BY a.THREAD#,
22:47:13  12            a.sequence#,
22:47:13  13    a.dest_id;

   DEST_ID    THREAD# NAME                                                                                                 SEQUENCE# ARC APPLIED   NEXT_CHANGE#
---------- ---------- ---------------------------------------------------------------------------------------------------- ---------- --- --------- ------------
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_50_bxml3lv7_.arc                50 YES NO              2241194
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_51_bxml3lrh_.arc                51 YES NO              2241198
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_52_bxml3lqv_.arc                52 YES NO              2241209
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_53_bxml3lz7_.arc                53 YES NO              2241214
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_56_bxml3lz0_.arc                56 YES NO              2241419
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_57_bxml3m03_.arc                57 YES NO              2243353
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_58_bxmp464x_.arc                58 YES YES             2248351
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_59_bxmpksob_.arc                59 YES YES             2248782
         1          1 /u01/app/oracle/flash_recovery_area/ORADGPHY/archivelog/2015_08_23/o1_mf_1_60_bxmq3tn7_.arc                60 YES IN-MEMORY       2249391

已选择 9 行。

已用时间:  00: 00: 00.00
22:47:13 SQL>
```

可以看到主备库正常。

1.4.2.6 删除备库

如果备份用不到了，则现在可以删除

RMAN> DELETE BACKUP TAG 'FOR STANDBY';

1.4.3 实验总结

最后，我们可以看到，在主库 archivelog 丢失无法同步到备库时，可以利用增量 scn 的方式，来避免重建 standby，千万不要以为结束了，既然丢失了归档，数据库还是进行一次全备吧。

1.5 总结

进行 Dataguard 的维护非常常见的运维需求，在实际场景下，我们尽可能选择稳妥完全的策略进行操作，保证数据不丢失。

1.6 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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