【DG】主 rac + 备 rac dg 部署

1.1 BLOG 文档结构图

1.2 前言部分

1.2.1 导读和注意事项

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

① 主库为 rac，备库为 rac 的物理 dg 的搭建（重点）

② dbca 静默方式创建 rac 数据库

③ 如何将数据库加入 crsctl 管理

④ rac 库修改归档路径和归档模式

⑤ 如何添加 standby 日志

⑥ 简单物理 dg 的维护

Tips：

① 若文章代码格式有错乱，推荐使用搜狗、360 或 QQ 浏览器，也可以下载 pdf 格式的文档来查看，pdf 文档下载地址：http://yunpan.cn/cdEQedhCs2kFz （提取码：ed9b）

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

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

```
[ZFXXDB1:root]:/>lsvg -o
T_XDESK_APP1_vg
rootvg
[ZFXXDB1:root]:/>
00:27:22 SQL> alter tablespace idxtbs read write;


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

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

1.2.2 相关参考文章链接

【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】 将 11g 物理备库转换为 Snapshot Standby ： http://blog.itpub.net/26736162/viewspace-1525548/

【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/

【DATAGUARD】物理 dg 在主库丢失归档文件的情况下的恢复(七)： http://blog.itpub.net/26736162/viewspace-1780863/

【DATAGUARD】物理 dg 配置客户端无缝切换 (八.1)--Data Guard Broker 的配置: http://blog.itpub.net/26736162/viewspace-1811839/

【DATAGUARD】物理 dg 配置客户端无缝切换 (八.2)--Fast-Start Failover 的配置: http://blog.itpub.net/26736162/viewspace-1811936/

【DATAGUARD】物理 dg 配置客户端无缝切换 (八.3)--客户端 TAF 配置: http://blog.itpub.net/26736162/viewspace-1811944/

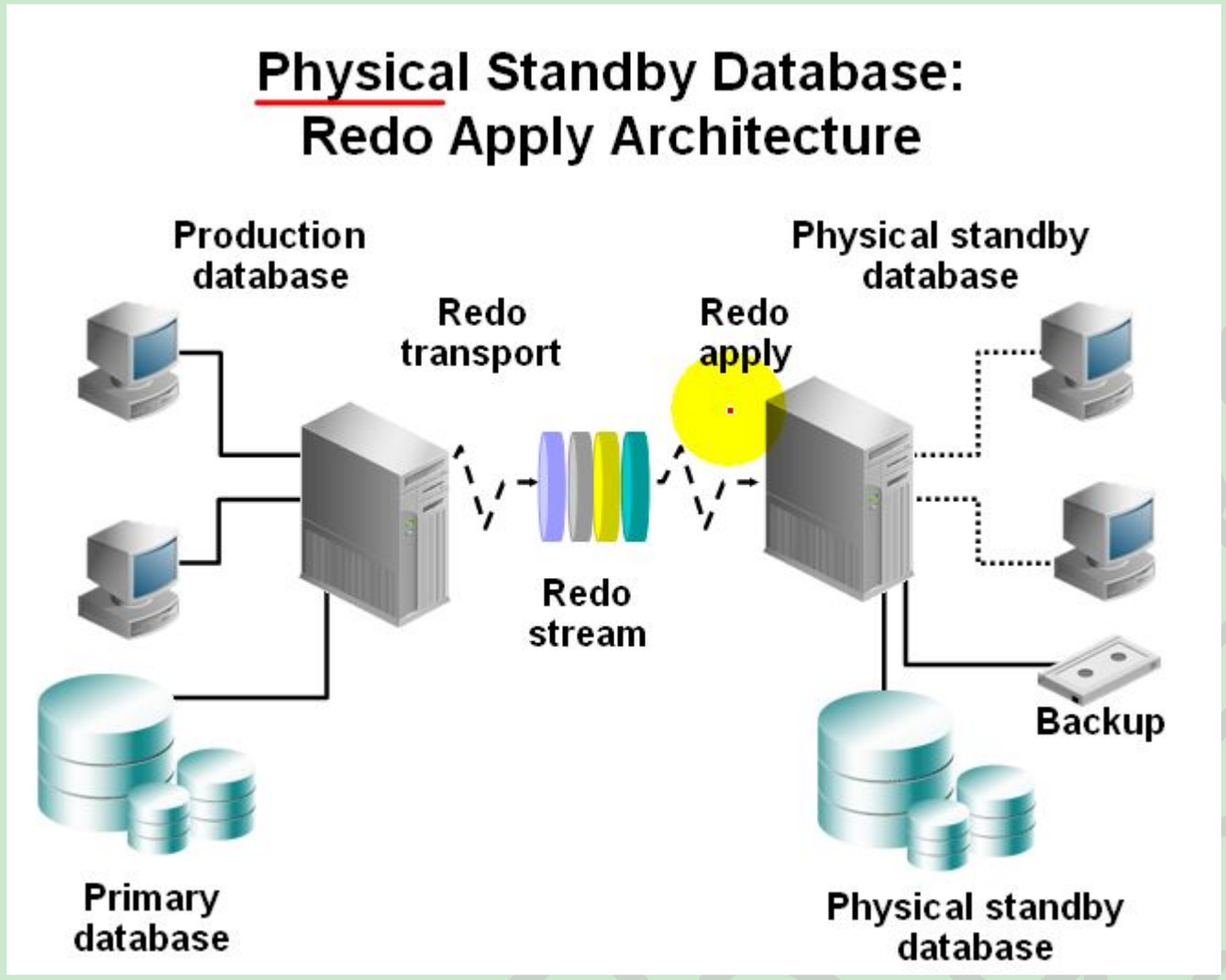
【推荐】 【DATAGUARD】物理 dg 配置客户端无缝切换 (八.4)--ora-16652 和 ora-16603 错误: http://blog.itpub.net/26736162/viewspace-1811947/

【DG】 主 rac + 备 rac dg 部署 ： http://blog.itpub.net/26736162/viewspace-1991614/

1.2.3 本文简介

虽然之前已经多次安装过 dg 了 ,但都是基于单实例的 ,无论是物理还是逻辑的 ,感觉都非常轻松 ,没有碰到大的问题 ,但是最近同事安装 dg 老是碰到问题 ,尤其是在执行 duplicate 命令的时候报错，所以我想还是自己也搭建的试试吧，顺便也写写文档。

1.3 相关知识点扫盲(摘自网络)



Physical Standby 使用的是 Media Recovery 技术，在数据块级别进行恢复，这种方式没有数据类型的限制，可以保证两个数据库完全一致。 Physical Standby 数据库只能在 Mount 状态下进行恢复，也可以是打开，但只能已只读方式打开，并且打开时不能执行恢复操作。Logical Standby 使用的是 Logminer 技术，通过把日志内容还原成 SQL 语句，然后 SQL 引擎执行这些语句，Logminer Standby 不支持所有数据类型，可以在视图 DBA_LOGSTDBY_UNSUPPORTED 中查看不支持的数据类型，如果使用了这种数据类型，则不能保证数据库完全一致。LogicalStandby 数据库可以在恢复的同时进行读写操作。

不少未实际接触过 dg 的初学者可能会下意识以为 data guard 是一个备份恢复的工具。我要说的是，这种形容不完全错，dg 拥有备份的功能，某些情况下它甚至可以与 primary 数据库完全一模一样，但是它存在的目的并不仅仅是为了恢复数据，应该说它的存在是为了 确保企业数据的高可用性，数据保护以及灾难恢复（ 注意这个字眼，灾难恢复）。dg 提供全面的服务包括：创建，维护，管理以及监控 standby 数据库，确保数据安全，管理员可以通过将一些操作转移到 standby 数据库执行的方式改善数据库性能 ，构建高可用的企业数据库应用环境。

在 Data Gurad 环境中，至少有两个数据库，一个处于 Open 状态对外提供服务，这个数据库叫作 Primary Database。 第二个处于恢复状态，叫作 Standby Database。 运行时 primary Database 对外提供服务，用户在 Primary Database 上进行操作，操作被记录在联机日志和归档日志中，这些日志通过网络传递给 Standby Database。 这个日志会在 Standby Database 上重演，从而实现 Primary Database 和 Standby Database 的数据同步。

Oracle Data Gurad 对这一过程进一步的优化设计，使得日志的传递，恢复工作更加自动化，智能化，并且提供一系列参数和命令简化了 DBA 工作。

如果是可预见因素需要关闭 Primary Database，比如软硬件升级，可以把 Standby Database 切换为 Primary Database 继续对外服务，这样即减少了服务停止时间，并且数据不会丢失。

如果异常原因导致 Primary Database 不可用，也可以把 Standby Database 强制切换为 Primary Database 继续对外服务，这时数据损失都和配置的数据保护级别有关系。因此 Primary 和 Standby 只是一个角色概念，并不固定在某个数据库中。

问题：RAC 和 DG 有什么区别

RAC， Data Gurad， 高可用性体系中的二种工具，每个工具即可以独立应用，也可以相互配合。 他们各自的侧重点不同，适用场景也不同。

RAC 它的强项在于解决单点故障和负载均衡，因此 RAC 方案常用于 7*24 的核心系统，但 RAC 方案中的数据只有一份，尽管可以通过 RAID 等机制可以避免存储故障，但是数据本身是没有冗余的，容易形成单点故障。

Data Gurad 通过冗余数据来提供数据保护，Data Gurad 通过日志同步机制保证冗余数据和主数据之前的同步，这种同步可以是实时，延时，同步，异步多种形式。Data Gurad 常用于异地容灾和小企业的高可用性方案，虽然可以在 Standby 机器上执行只读查询，从而分散 Primary 数据库的性能压力，但是 Data Gurad 决不是性能解决方案。

第 2 章　实验部分(正式开始搭建)

创建物理备库的方法很多，对于 Oracle 11g 而言，可以直接从 active database 来创建，也可以基于 10g 的 RMAN 备份方式来创建。

2.1 实验环境介绍

项目	primary db	physical standby db
db 类型	rac	rac
db version	11.2.0.4.0	11.2.0.4.0
db 存储	ASM	ASM
主机 IP 地址/hosts 配置	22.123.124.31 ZFXXX3 22.123.124.33 ZFXXX3-vip 222.123.124.31 ZFXXX3-priv 22.123.124.32 ZFXXX4 22.123.124.34 ZFXXX4-vip 222.123.124.32 ZFXXX4-priv 22.123.124.35 ZFXXX-scan	22.123.124.64 ZFXXX1 22.123.124.65 ZFXXX1-vip 222.123.124.64 ZFXXX1-priv 22.123.124.66 ZFXXX2 22.123.124.67 ZFXXX2-vip 222.123.124.66 ZFXXX2-priv 22.123.124.68 ZFXXX-scan
OS 版本及 kernel 版本	AIX 64 位 7.1.0.0	AIX 64 位 7.1.0.0
OS hostname	ZFXXX3 ZFXXX4	ZFXXX1 ZFXXX2
platform_name	AIX-Based Systems (64-bit)	AIX-Based Systems (64-bit)
db time zone	14	14
字符集	ZHS16GBK	ZHS16GBK
compatible	11.2.0.4.0	11.2.0.4.0
归档模式	Archive Mode	Archive Mode
ORACLE_SID	DGPRI	DGPHY
db_name/GLOBAL_DBNAME	TESTDG	TESTDG

db_unique_name	TESTDG	TESTDGPHY
TNS_NAME	TNS_DGPRI	TNS_DGPHY
磁盘组	+DATA	+DATA
归档路径	GPFS 方式共享路径： /arch	GPFS 方式共享路径： /arch
ORACLE_HOME	/oracle/app/oracle/product/11.2.0/db	/oracle/app/oracle/product/11.2.0/db
dbid	2836886746	2836886746
注：标红的选项是必填，且需要特别关注的项目		

该环境中我主要是为了区分 dg 中各种参数配置的是 tnsnames、oracle_sid、dbname 还是 db_unique_name ，所以设置的值不同，一般情况这 4 者可以设置成一样的，dg 中 db_unique_name、oracle_sid 和 tns 可以设置成一样的。

2.2 主库操作

2.2.1 先创建主库

dbca -silent -createDatabase -templateName General_Purpose.dbc -gdbname TESTDG -sid DGPRI -sysPassword lhr -systemPassword lhr -datafileDestination 'DATA/' -redoLogFileSize 50 -recoveryAreaDestination '/arch' -storageType ASM -asmsnmpPassword lhr -diskGroupName 'DATA' -responseFile NO_VALUE -characterset ZHS16GBK -nationalCharacterSet AL16UTF16 -sampleSchema true -automaticMemoryManagement true -totalMemory 1024 -nodeinfo ZFXXX3,ZFXXX4

注意：sid 不能含有下横线，如 DG_PRI 会报错：

The SID name can only contain alphanumeric characters.

静默方式创建一个 rac 主库：

```
[ZFXXX3:root]:/>crsctl stat res -t
--------------------------------------------------------------------------------
NAME           TARGET  STATE        SERVER                   STATE_DETAILS
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.DATA.dg
               ONLINE  ONLINE       zfXXX3
               ONLINE  ONLINE       zfXXX4
ora.LISTENER.lsnr
```

```
               ONLINE  ONLINE       zfXXX3
               ONLINE  ONLINE       zfXXX4
ora.asm
               ONLINE  ONLINE       zfXXX3               Started
               ONLINE  ONLINE       zfXXX4               Started
ora.gsd
               OFFLINE OFFLINE      zfXXX3
               OFFLINE OFFLINE      zfXXX4
ora.net1.network
               ONLINE  ONLINE       zfXXX3
               ONLINE  ONLINE       zfXXX4
ora.ons
               ONLINE  ONLINE       zfXXX3
               ONLINE  ONLINE       zfXXX4
ora.registry.acfs
               ONLINE  ONLINE       zfXXX3
               ONLINE  ONLINE       zfXXX4
--------------------------------------------------------------------------------
Cluster Resources
--------------------------------------------------------------------------------
ora.LISTENER_SCAN1.lsnr
      1        ONLINE  ONLINE       zfXXX4
ora.cvu
      1        ONLINE  ONLINE       zfXXX4
ora.oc4j
      1        ONLINE  ONLINE       zfXXX4
ora.oradesdb.db
      1        ONLINE  ONLINE       zfXXX3               Open,Readonly
      2        ONLINE  ONLINE       zfXXX4               Open,Readonly
ora.scan1.vip
      1        ONLINE  ONLINE       zfXXX4
ora.testdg.db
      1        OFFLINE OFFLINE
      2        OFFLINE OFFLINE
ora.zfXXX3.vip
      1        ONLINE  ONLINE       zfXXX3
ora.zfXXX4.vip
      1        ONLINE  ONLINE       zfXXX4
[ZFXXX3:root]:/>cat /etc/hosts
# IBM_PROLOG_BEGIN_TAG
# This is an automatically generated prolog.
#
# bos61D src/bos/usr/sbin/netstart/hosts 1.2
#
# Licensed Materials - Property of IBM
#
# COPYRIGHT International Business Machines Corp. 1985,1989
# All Rights Reserved
#
# US Government Users Restricted Rights - Use, duplication or
# disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
#
# @(#)47        1.2  src/bos/usr/sbin/netstart/hosts, cmdnet, bos61D, d2007_49A2 10/1/07 13:57:52
# IBM_PROLOG_END_TAG
#
# COMPONENT_NAME: TCPIP hosts
#
# FUNCTIONS: loopback
#
# ORIGINS: 26  27
#
# (C) COPYRIGHT International Business Machines Corp. 1985, 1989
# All Rights Reserved
# Licensed Materials - Property of IBM
#
# US Government Users Restricted Rights - Use, duplication or
# disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
#
```

```
#  /etc/hosts
#
# This file contains the hostnames and their address for hosts in the
# network.  This file is used to resolve a hostname into an Internet
# address.
#
# At minimum, this file must contain the name and address for each
# device defined for TCP in your /etc/net file.  It may also contain
# entries for well-known (reserved) names such as timeserver
# and printserver as well as any other host name and address.
#
# The format of this file is:
# Internet Address      Hostname        # Comments
# Internet Address can be either IPv4 or IPv6 address.
# Items are separated by any number of blanks and/or tabs.  A '#'
# indicates the beginning of a comment; characters up to the end of the
# line are not interpreted by routines which search this file.  Blank
# lines are allowed.

# Internet Address      Hostname        # Comments
# 192.9.200.1           net0sample      # ethernet name/address
# 128.100.0.1           token0sample    # token ring name/address
# 10.2.0.2              x25sample       # x.25 name/address
# 2000:1:1:1:209:6bff:feee:2b7f         ipv6sample      # ipv6 name/address
127.0.0.1               loopback localhost      # loopback (lo0) name/address
::1                     loopback localhost      # IPv6 loopback (lo0) name/address



22.123.124.31    ZFXXX3
22.123.124.33    ZFXXX3-vip
222.123.124.31   ZFXXX3-priv

22.123.124.32    ZFXXX4
22.123.124.34    ZFXXX4-vip
222.123.124.32   ZFXXX4-priv
22.123.124.35    ZFXXX-scan



[ZFXXX3:root]:/>
[ZFXXX3:root]:/>oslevel
7.1.0.0
[ZFXXX3:root]:/>su - oracle

[ZFXXX3:oracle]:/oracle>dbca -silent -createDatabase -templateName General_Purpose.dbc -gdbname TESTDG  -sid DGPRI -sysPassword lhr -systemPassword lhr -datafileDestination 'DATA/'
-redoLogFileSize 50 -recoveryAreaDestination '/arch' -storageType ASM -asmsnmpPassword lhr  -diskGroupName 'DATA' -responseFile NO_VALUE -characterset ZHS16GBK
-nationalCharacterSet AL16UTF16 -sampleSchema true -automaticMemoryManagement true -totalMemory 1024  -nodeinfo ZFXXX3,ZFXXX4
Copying database files
1% complete
3% complete
30% complete
Creating and starting Oracle instance
32% complete
36% complete
40% complete
44% complete
45% complete
48% complete
50% complete
Creating cluster database views
52% complete
70% complete
Completing Database Creation
73% complete
76% complete
85% complete
94% complete
```

```
100% complete
Look at the log file "/oracle/app/oracle/cfgtoollogs/dbca/TESTDG/TESTDG.log" for further details.
[ZFXXX3:oracle]:/oracle>more /oracle/app/oracle/cfgtoollogs/dbca/TESTDG/TESTDG.log
Copying database files
DBCA_PROGRESS : 1%
DBCA_PROGRESS : 3%
DBCA_PROGRESS : 30%
Creating and starting Oracle instance
DBCA_PROGRESS : 32%
DBCA_PROGRESS : 36%
DBCA_PROGRESS : 40%
DBCA_PROGRESS : 44%
DBCA_PROGRESS : 45%
DBCA_PROGRESS : 48%
DBCA_PROGRESS : 50%
Creating cluster database views
DBCA_PROGRESS : 52%
DBCA_PROGRESS : 70%
Completing Database Creation
DBCA_PROGRESS : 73%
DBCA_PROGRESS : 76%
DBCA_PROGRESS : 85%
DBCA_PROGRESS : 94%
DBCA_PROGRESS : 100%
Database creation complete. For details check the logfiles at:
 /oracle/app/oracle/cfgtoollogs/dbca/TESTDG.
Database Information:
Global Database Name:TESTDG
System Identifier(SID) Prefix:DGPRI
[ZFXXX3:oracle]:/oracle>
[ZFXXX3:oracle]:/oracle>crsctl stat res -t
--------------------------------------------------------------------------------
NAME           TARGET  STATE        SERVER                   STATE_DETAILS
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.DATA.dg
               ONLINE  ONLINE       zfXXX3
               ONLINE  ONLINE       zfXXX4
ora.LISTENER.lsnr
               ONLINE  ONLINE       zfXXX3
               ONLINE  ONLINE       zfXXX4
ora.asm
               ONLINE  ONLINE       zfXXX3               Started
               ONLINE  ONLINE       zfXXX4               Started
ora.gsd
               OFFLINE OFFLINE      zfXXX3
               OFFLINE OFFLINE      zfXXX4
ora.net1.network
               ONLINE  ONLINE       zfXXX3
               ONLINE  ONLINE       zfXXX4
ora.ons
               ONLINE  ONLINE       zfXXX3
               ONLINE  ONLINE       zfXXX4
ora.registry.acfs
               ONLINE  ONLINE       zfXXX3
               ONLINE  ONLINE       zfXXX4
--------------------------------------------------------------------------------
Cluster Resources
--------------------------------------------------------------------------------
ora.LISTENER_SCAN1.lsnr
      1        ONLINE  ONLINE       zfXXX4
ora.cvu
      1        ONLINE  ONLINE       zfXXX4
ora.oc4j
      1        ONLINE  ONLINE       zfXXX4
ora.oradesdb.db
      1        ONLINE  ONLINE       zfXXX3               Open,Readonly
```

```
      2        ONLINE  ONLINE       zfXXX4                   Open,Readonly
ora.scan1.vip
      1        ONLINE  ONLINE       zfXXX4
ora.testdg.db
      1        ONLINE  ONLINE       zfXXX3                   Open
      2        ONLINE  ONLINE       zfXXX4                   Open
ora.zfXXX3.vip
      1        ONLINE  ONLINE       zfXXX3
ora.zfXXX4.vip
      1        ONLINE  ONLINE       zfXXX4
[ZFXXX3:root]:/>
```

2.2.2 主库前期准备

2.2.2.1 force logging + archivelog

1. 创建一个用户 lhr 用于测试
2. 修改主库为 force logging 模式
3. 修改主库为归档模式

select INST_ID, dbid,name,DB_UNIQUE_NAME,current_scn,protection_mode,database_role,force_logging,open_mode,switchover_status from gv$database;

```
[ZFXXX3:oracle]:/oracle>export ORACLE_SID=DGPRI1
[ZFXXX3:oracle]:/oracle>sqlplus / as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Wed Feb 17 11:19:24 2016

Copyright (c) 1982, 2013, Oracle.  All rights reserved.


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

SYS@DGPRI1> create user lhr identified by lhr;

User created.

SYS@DGPRI1> grant dba to lhr;

Grant succeeded.

SYS@DGPRI1> set line 9999
SYS@DGPRI1> select name , open_mode, log_mode,force_logging,DATABASE_ROLE,switchover_status from gv$database;

NAME      OPEN_MODE            LOG_MODE     FOR DATABASE_ROLE    SWITCHOVER_STATUS
--------- -------------------- ------------ --- ---------------- --------------------
TESTDG    READ WRITE           NOARCHIVELOG NO  PRIMARY          NOT ALLOWED
TESTDG    READ WRITE           NOARCHIVELOG NO  PRIMARY          NOT ALLOWED

SYS@DGPRI1> alter database force logging;
```

```
Database altered.

SYS@DGPRI1> select name , open_mode, log_mode,force_logging,DATABASE_ROLE,switchover_status from gv$database;

NAME      OPEN_MODE            LOG_MODE     FOR DATABASE_ROLE    SWITCHOVER_STATUS
--------- -------------------- ------------ --- ---------------- --------------------
TESTDG    READ WRITE           NOARCHIVELOG YES PRIMARY          NOT ALLOWED
TESTDG    READ WRITE           NOARCHIVELOG YES PRIMARY          NOT ALLOWED

SYS@DGPRI1>
```

```
alter system set log_archive_dest_1='LOCATION=/arch' scope=spfile sid='DGPRI1';
alter system set log_archive_dest_1='LOCATION=/arch' scope=spfile sid='DGPRI2';
alter system set log_archive_dest_1='LOCATION=/arch' scope=spfile sid='*';

host srvctl stop database -d TESTDG -o immediate
host srvctl status database -d TESTDG
host srvctl start database -d TESTDG -o mount

alter database archivelog;
```

修改 rac 主库为归档模式：

```
SYS@DGPRI1> alter system set log_archive_dest_1='LOCATION=/arch' scope=spfile sid='DGPRI1';

System altered.

SYS@DGPRI1> alter system set log_archive_dest_1='LOCATION=/arch' scope=spfile sid='DGPRI2';

System altered.

SYS@DGPRI1> host srvctl stop database -d TESTDG -o immediate

SYS@DGPRI1> host srvctl status database -d TESTDG
Instance DGPRI1 is not running on node zfXXX3
Instance DGPRI2 is not running on node zfXXX4

SYS@DGPRI1> host srvctl start database -d TESTDG -o mount

SYS@DGPRI1> archive log list;
ORA-03135: connection lost contact
SYS@DGPRI1> conn / as sysdba
Connected.
SYS@DGPRI1> alter database archivelog;

Database altered.

SYS@DGPRI1> set line 9999
SYS@DGPRI1> select name , open_mode, log_mode,force_logging,DATABASE_ROLE,switchover_status from gv$database;

NAME      OPEN_MODE            LOG_MODE     FOR DATABASE_ROLE    SWITCHOVER_STATUS
--------- -------------------- ------------ --- ---------------- --------------------
TESTDG    MOUNTED              ARCHIVELOG   YES PRIMARY          NOT ALLOWED
TESTDG    MOUNTED              ARCHIVELOG   YES PRIMARY          NOT ALLOWED

SYS@DGPRI1> archive log list;
Database log mode              Archive Mode
```

```
Automatic archival            Enabled
Archive destination           /arch
Oldest online log sequence    5
Next log sequence to archive  6
Current log sequence          6
SYS@DGPRI1> alter database open;

Database altered.

SYS@DGPRI1> select name , open_mode, log_mode,force_logging,DATABASE_ROLE,switchover_status from gv$database;

NAME      OPEN_MODE            LOG_MODE     FOR DATABASE_ROLE    SWITCHOVER_STATUS
--------- -------------------- ------------ --- ---------------- --------------------
TESTDG    READ WRITE           ARCHIVELOG   YES PRIMARY          NOT ALLOWED
TESTDG    MOUNTED              ARCHIVELOG   YES PRIMARY          NOT ALLOWED

SYS@DGPRI1>
```

启动第二个节点：

```
[ZFXXX4:root]:/>ORACLE_SID=DGPRI2
[ZFXXX4:root]:/>su - oracle
[ZFXXX4:oracle]:/oracle>ORACLE_SID=DGPRI2
[ZFXXX4:oracle]:/oracle>sqlplus / as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Wed Feb 17 12:26:42 2016

Copyright (c) 1982, 2013, Oracle.  All rights reserved.


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

SYS@DGPRI2> alter database open;

Database altered.

SYS@DGPRI2> set line 9999
SYS@DGPRI2> select name , open_mode, log_mode,force_logging,DATABASE_ROLE,switchover_status from gv$database;

NAME      OPEN_MODE            LOG_MODE     FOR DATABASE_ROLE    SWITCHOVER_STATUS
--------- -------------------- ------------ --- ---------------- --------------------
TESTDG    READ WRITE           ARCHIVELOG   YES PRIMARY          NOT ALLOWED
TESTDG    READ WRITE           ARCHIVELOG   YES PRIMARY          NOT ALLOWED

SYS@DGPRI2> archive log list;
Database log mode              Archive Mode
Automatic archival             Enabled
Archive destination            /arch
Oldest online log sequence     1
Next log sequence to archive   1
Current log sequence           1
SYS@DGPRI2>
```

2.2.2.2 为主库添加 standby redo log

--为主库添加 standby redo log，简要描述一下 standby redo log 的作用

--实际上就是与主库接收到的重做日志相对应，也就是说备库调用 RFS 进程将从主库接收到的重做日志按顺序写入到 standby logfile

--在主库创建 standby logfile 是便于发生角色转换后备用

--sandby redo log 创建原则：

--a)、确保 standby redo log 的大小与主库 online redo log 的大小一致

--b)、如主库为单实例数据库：standby redo log 组数=主库日志组总数+1

--c)、如果主库是 RAC 数据库：standby redo log 组数=(每线程的日志组数+1)*最大线程数

--d)、不建议复用 standby redo log，避免增加额外的 I/O 以及延缓重做传输

单实例:

```
alter database add standby logfile group 4 ('/u01/app/oracle/oradata/oralg/standby_redo04.log') size 50m;
alter database add standby logfile group 5 ('/u01/app/oracle/oradata/oralg/standby_redo05.log') size 50m;
alter database add standby logfile group 6 ('/u01/app/oracle/oradata/oralg/standby_redo06.log') size 50m;
alter database add standby logfile group 7 ('/u01/app/oracle/oradata/oralg/standby_redo07.log') size 50m;
```

rac 下：

```
alter database add standby logfile thread 1 group 5 size 50M ,group 6 size 50M ,group 7 size 50M ;
alter database add standby logfile thread 2 group 8 size 50M ,group 9 size 50M ,group 10 size 50M ;
```

```
SYS@DGPRI1> select * from v$standby_log;

no rows selected

SYS@DGPRI1> select group#,THREAD#,MEMBERS  from v$log ;

    GROUP#    THREAD#    MEMBERS
---------- ---------- ----------
         1          1          2
         2          1          2
         3          2          2
         4          2          2

SYS@DGPRI1>
SYS@DGPRI1> col member format a100
SYS@DGPRI1> select GROUP# ,STATUS , TYPE , MEMBER from v$logfile;

    GROUP# STATUS  TYPE    MEMBER
---------- ------- ------- ----------------------------------------------------------------------------------------------------
         2         ONLINE  +DATA/testdg/onlinelog/group_2.260.904043421
         2         ONLINE  +DATA/testdg/onlinelog/group_2.263.904043421
         1         ONLINE  +DATA/testdg/onlinelog/group_1.262.904043421
         1         ONLINE  +DATA/testdg/onlinelog/group_1.261.904043421
         3         ONLINE  +DATA/testdg/onlinelog/group_3.303.904043623
         3         ONLINE  +DATA/testdg/onlinelog/group_3.304.904043623
         4         ONLINE  +DATA/testdg/onlinelog/group_4.305.904043623
```

```
         4         ONLINE  +DATA/testdg/onlinelog/group_4.306.904043623

8 rows selected.

SYS@DGPRI1> alter database add standby logfile thread 1 group 5 size 50M ,group 6 size 50M ,group 7 size 50M ;

Database altered.

SYS@DGPRI1> alter database add standby logfile thread 2 group 8 size 50M ,group 9 size 50M ,group 10 size 50M ;

Database altered.

SYS@DGPRI1> select GROUP#,DBID,THREAD#,SEQUENCE#,BYTES,BLOCKSIZE,USED,ARCHIVED,STATUS from v$standby_log;

    GROUP# DBID                                  THREAD#  SEQUENCE#      BYTES  BLOCKSIZE       USED ARC STATUS
---------- ------------------------------------ ---------- ---------- ---------- ---------- ---------- --- ----------
         5 UNASSIGNED                                    1          0   52428800        512          0 YES UNASSIGNED
         6 UNASSIGNED                                    1          0   52428800        512          0 YES UNASSIGNED
         7 UNASSIGNED                                    1          0   52428800        512          0 YES UNASSIGNED
         8 UNASSIGNED                                    2          0   52428800        512          0 YES UNASSIGNED
         9 UNASSIGNED                                    2          0   52428800        512          0 YES UNASSIGNED
        10 UNASSIGNED                                    2          0   52428800        512          0 YES UNASSIGNED

6 rows selected.

SYS@DGPRI1>
SYS@DGPRI1> select   GROUP# ,STATUS , TYPE  ,  MEMBER from v$logfile;

    GROUP# STATUS  TYPE    MEMBER
---------- ------- ------- ------------------------------------------------------------------------------------------
         2         ONLINE  +DATA/testdg/onlinelog/group_2.260.904043421
         2         ONLINE  +DATA/testdg/onlinelog/group_2.263.904043421
         1         ONLINE  +DATA/testdg/onlinelog/group_1.262.904043421
         1         ONLINE  +DATA/testdg/onlinelog/group_1.261.904043421
         3         ONLINE  +DATA/testdg/onlinelog/group_3.303.904043623
         3         ONLINE  +DATA/testdg/onlinelog/group_3.304.904043623
         4         ONLINE  +DATA/testdg/onlinelog/group_4.305.904043623
         4         ONLINE  +DATA/testdg/onlinelog/group_4.306.904043623
         5         STANDBY +DATA/testdg/onlinelog/group_5.267.904048731
         5         STANDBY +DATA/testdg/onlinelog/group_5.294.904048731
         6         STANDBY +DATA/testdg/onlinelog/group_6.308.904048733
         6         STANDBY +DATA/testdg/onlinelog/group_6.309.904048733
         7         STANDBY +DATA/testdg/onlinelog/group_7.310.904048733
         7         STANDBY +DATA/testdg/onlinelog/group_7.311.904048733
         8         STANDBY +DATA/testdg/onlinelog/group_8.312.904048737
         8         STANDBY +DATA/testdg/onlinelog/group_8.313.904048737
         9         STANDBY +DATA/testdg/onlinelog/group_9.314.904048737
         9         STANDBY +DATA/testdg/onlinelog/group_9.315.904048739
        10         STANDBY +DATA/testdg/onlinelog/group_10.316.904048739
        10         STANDBY +DATA/testdg/onlinelog/group_10.317.904048739

20 rows selected.

SYS@DGPRI1> show parameter name

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
cell_offloadgroup_name               string
db_file_name_convert                 string
db_name                              string      TESTDG
db_unique_name                       string      TESTDG
global_names                         boolean     FALSE
instance_name                        string      DGPRI1
lock_name_space                      string
log_file_name_convert                string
processor_group_name                 string
service_names                        string      TESTDG
SYS@DGPRI1>
```

2.2.2.3 修改主库参数文件

--使用下面的命令修改主库参数(此时主库应当使用 spfile 启动参数)

LOG_ARCHIVE_CONFIG = 'DG_CONFIG (db_unique_name, db_unique_name, ...)' 主库与备库端采用相同设置。

LOG_ARCHIVE_DEST_n ='SERVICE=。。。。。 SERIVCE：用于指定备用数据库的 TNSNAMES 描述符

db_file_name_convert、 log_file_name_convert 参数值为路径，可以直接写 db_unique_name， 如果使用 ASM，可以设置为*.db_file_name_convert =('+DATA','+RECOVERY')

fal_server、 fal_client 参数值为 TNSNAMES 描述符

```
alter system set db_unique_name='TESTDG' scope=spfile;
alter system set log_archive_config='DG_CONFIG=(TESTDG,TESTDGPHY)' sid='*';
alter system set log_archive_dest_1='LOCATION=/arch db_unique_name=TESTDG valid_for=(ALL_LOGFILES,ALL_ROLES)' sid='*';
alter system set log_archive_dest_2='SERVICE=TNS_DGPHY LGWR ASYNC db_unique_name=TESTDGPHY valid_for=(ONLINE_LOGFILES,PRIMARY_ROLE)' sid='*';
alter system set log_archive_dest_state_1=enable sid='*';
alter system set log_archive_dest_state_2=enable sid='*';
alter system set log_archive_max_processes=4 sid='*';
alter system set remote_login_passwordfile='EXCLUSIVE' scope=spfile;

--Add below item when DB turn to standby role
alter system set db_file_name_convert='TESTDGPHY','TESTDG' scope=spfile;
alter system set log_file_name_convert='TESTDGPHY','TESTDG' scope=spfile;
alter system set standby_file_management='AUTO' sid='*';
alter system set fal_server='TNS_DGPHY' sid='*';
alter system set fal_client='TNS_DGPRI' sid='*';
```

```
SYS@DGPRI1> show parameter spfile

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
spfile                               string      +DATA/testdg/spfiledgpri.ora
SYS@DGPRI1>
SYS@DGPRI1>alter system set db_unique_name='TESTDG' scope=spfile;
alter system set log_archive_config='DG_CONFIG=(TESTDG,TESTDGPHY)' sid='*';
alter system set log_archive_dest_1='LOCATION=/arch db_unique_name=TESTDG valid_for=(ALL_LOGFILES,ALL_ROLES)' sid='*';
alter system set log_archive_dest_2='SERVICE=TNS_DGPHY LGWR ASYNC db_unique_name=TESTDGPHY valid_for=(ONLINE_LOGFILES,PRIMARY_ROLE)' sid='*';
alter system set log_archive_dest_state_1=enable sid='*';
alter system set log_archive_dest_state_2=enable sid='*';
alter system set log_archive_max_processes=4 sid='*';
alter system set remote_login_passwordfile='EXCLUSIVE' scope=spfile;

--Add below item when DB turn to standby role
alter system set db_file_name_convert='TESTDGPHY','TESTDG' scope=spfile;
alter system set log_file_name_convert='TESTDGPHY','TESTDG' scope=spfile;
alter system set standby_file_management='AUTO' sid='*';
alter system set fal_server='TNS_DGPHY' sid='*';
alter system set fal_client='TNS_DGPRI' sid='*';

SYS@DGPRI1>
```

```
System altered.

SYS@DGPRI1>

System altered.

SYS@DGPRI1>

System altered.

SYS@DGPRI1>


System altered.

SYS@DGPRI1>
System altered.

SYS@DGPRI1>
System altered.

SYS@DGPRI1>
System altered.

SYS@DGPRI1>
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SYS@DGPRI1>
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SYS@DGPRI1>
SYS@DGPRI1>
SYS@DGPRI1>
SYS@DGPRI1>
SYS@DGPRI1>
```

2.3 配置主库和备库的监听

--为主库和备库配置监听，整个 DG 的 redo 传输服务，都依赖于 Oracle Net，因此需要为主备库配置监听，且需要配置静态监听

--配置方法多种多样，可用 netmgr，netca，以及直接编辑 listener.ora 与 tnsnames.ora 文件

--下面是配置之后的 listener.ora 与 tnsnames.ora 文件内容

```
more $ORACLE_HOME/network/admin/listener.ora
```

2.3.1 主库

在主库的第一个节点的监听文件中加入如下内容：

```
LISTENER =
(DESCRIPTION_LIST =
   (DESCRIPTION =
     (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.31)(PORT = 1521))
   )
)

SID_LIST_LISTENER =
 (SID_LIST =
  (SID_DESC =
    (SID_NAME = PLSExtProc)
    (ORACLE_HOME = /oracle/app/oracle/product/11.2.0/db)
    (PROGRAM = extproc)
  )
 (SID_DESC =
   (GLOBAL_DBNAME = TESTDG)
   (ORACLE_HOME = /oracle/app/oracle/product/11.2.0/db)
   (SID_NAME= DGPRI1)
 )
)
```

第二个节点加入：

```
LISTENER =
(DESCRIPTION_LIST =
   (DESCRIPTION =
     (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.32)(PORT = 1521))
   )
)

SID_LIST_LISTENER =
 (SID_LIST =
  (SID_DESC =
    (SID_NAME = PLSExtProc)
    (ORACLE_HOME = /oracle/app/oracle/product/11.2.0/db)
    (PROGRAM = extproc)
  )
 (SID_DESC =
   (GLOBAL_DBNAME = TESTDG)
   (ORACLE_HOME = /oracle/app/oracle/product/11.2.0/db)
   (SID_NAME= DGPRI2)
 )
)
```

以第一个节点为例，其它类似：

```
[ZFXXX3:oracle]:/oracle>lsnrctl status

LSNRCTL for IBM/AIX RISC System/6000: Version 11.2.0.4.0 - Production on 17-FEB-2016 16:50:02

Copyright (c) 1991, 2013, Oracle.  All rights reserved.

Connecting to (ADDRESS=(PROTOCOL=tcp)(HOST=)(PORT=1521))
STATUS of the LISTENER
------------------------
Alias                     LISTENER
Version                   TNSLSNR for IBM/AIX RISC System/6000: Version 11.2.0.4.0 - Production
Start Date                31-DEC-2015 15:02:50
Uptime                    48 days 1 hr. 47 min. 12 sec
```

```
Trace Level               off
Security                  ON: Local OS Authentication
SNMP                      OFF
Listener Parameter File   /oracle/app/11.2.0/grid/network/admin/listener.ora
Listener Log File         /oracle/app/grid/diag/tnslsnr/ZFXXX3/listener/alert/log.xml
```

将上边所说的内容加入文件：/oracle/app/11.2.0/grid/network/admin/listener.ora ，然后重启监听器，lsnrctl stop , lsnrctl start，需要注意的是 rac 下是在 grid 用户下修改监听文件的。

2.3.2 备库

监听配置参考主库的操作：

备库第一个节点：

```
LISTENER =
(DESCRIPTION_LIST =
   (DESCRIPTION =
     (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.64)(PORT = 1521))
   )
)

SID_LIST_LISTENER =
 (SID_LIST =
  (SID_DESC =
     (SID_NAME = PLSExtProc)
     (ORACLE_HOME = /oracle/app/oracle/product/11.2.0/db)
     (PROGRAM = extproc)
   )
  (SID_DESC =
    (GLOBAL_DBNAME = TESTDG)
    (ORACLE_HOME = /oracle/app/oracle/product/11.2.0/db)
    (SID_NAME= DGPHY1)
  )
)
```

备库第二个节点：

```
LISTENER =
(DESCRIPTION_LIST =
   (DESCRIPTION =
     (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.66)(PORT = 1521))
   )
)

SID_LIST_LISTENER =
 (SID_LIST =
  (SID_DESC =
     (SID_NAME = PLSExtProc)
     (ORACLE_HOME = /oracle/app/oracle/product/11.2.0/db)
     (PROGRAM = extproc)
   )
  (SID_DESC =
```

```
    (GLOBAL_DBNAME = TESTDG)
    (ORACLE_HOME = /oracle/app/oracle/product/11.2.0/db)
    (SID_NAME= DGPHY2)
  )
)
```

2.4 配置主库和备库的 tnsname

```
[ZFXXX3:grid]:/oracle/app/11.2.0/grid/network/admin>exit
[ZFXXX3:root]:/>su - oracle
[ZFXXX3:oracle]:/oracle>cd $ORACLE_HOME/network/admin
[ZFXXX3:oracle]:/oracle/app/oracle/product/11.2.0/db/network/admin>ls
samples       shrept.lst    sqlnet.ora    tnsnames.b    tnsnames.ora
[ZFXXX3:oracle]:/oracle/app/oracle/product/11.2.0/db/network/admin>vi $ORACLE_HOME/network/admin/tnsnames.ora
```

注意：tns 文件是在 oracle 用户下配置，将主库和备库的一共 4 个节点的 tnsnames.ora 文件加入如下内容：

```
TNS_DGPRI =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.31)(PORT = 1521))
    (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.32)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = TESTDG)
    )
  )

TNS_DGPHY =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.64)(PORT = 1521))
    (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.66)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = TESTDG)
    )
  )
```

在 4 个节点上分别测试：

```
[ZFXXX1:oracle]:/oracle>tnsping TNS_DGPHY

TNS Ping Utility for IBM/AIX RISC System/6000: Version 11.2.0.4.0 - Production on 17-FEB-2016 17:50:00

Copyright (c) 1997, 2013, Oracle.  All rights reserved.

Used parameter files:
/oracle/app/oracle/product/11.2.0/db/network/admin/sqlnet.ora


Used TNSNAMES adapter to resolve the alias
Attempting to contact (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.64)(PORT = 1521)) (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.66)(PORT = 1521)) (CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME
= TESTDG)))
OK (80 msec)
[ZFXXX1:oracle]:/oracle>tnsping TNS_DGPRI

TNS Ping Utility for IBM/AIX RISC System/6000: Version 11.2.0.4.0 - Production on 17-FEB-2016 17:50:09
```

```
Copyright (c) 1997, 2013, Oracle.  All rights reserved.

Used parameter files:
/oracle/app/oracle/product/11.2.0/db/network/admin/sqlnet.ora


Used TNSNAMES adapter to resolve the alias
Attempting to contact (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.31)(PORT = 1521)) (ADDRESS = (PROTOCOL = TCP)(HOST = 22.123.124.32)(PORT = 1521)) (CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME
= TESTDG)))
OK (0 msec)
[ZFXXX1:oracle]:/oracle>
```

2.5 配置主备库密码文件

--由于要求主库与备库 sys 使用相同的密码，在此处，我们直接复制了主库的密码文件到备库，将主库第一个节点的密码文件 copy 到其它 3 个节点并修改名称，名称为 orapw+ORACLE_SID

```
[ZFXXX3:oracle]:/oracle>l $ORACLE_HOME/dbs/orapwDGPRI*
-rw-r-----    1 oracle   dba            1536 Feb 17 11:12 /oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPRI1
[ZFXXX3:oracle]:/oracle>cp /oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPRI1 /oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPRI2
[ZFXXX3:oracle]:/oracle>cp /oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPRI1 /oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPHY1
[ZFXXX3:oracle]:/oracle>cp /oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPRI1 /oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPHY2
[ZFXXX3:oracle]:/oracle>scp /oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPRI2 oracle@22.123.124.32:/oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPRI2
[ZFXXX3:oracle]:/oracle>scp /oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPHY1 oracle@22.123.124.64:/oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPHY1
[ZFXXX3:oracle]:/oracle>scp /oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPHY2 oracle@22.123.124.66:/oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPHY2
```

2.6 备库操作

2.6.1 配置备库路径

11g 一般创建如下路径，若是 asm 的话只需要创建 /u01/app/oracle/admin/TESTDGPHY/adump

mkdir -p $ORACLE_BASE/admin/TESTDGPHY/adump
mkdir -p $ORACLE_BASE/oradata/TESTDGPHY/
mkdir -p $ORACLE_BASE/oradata/TESTDGPHY/standby_redo/

```
[ZFXXX1:oracle]:/oracle>mkdir -p  $ORACLE_BASE/admin/TESTDGPHY/adump
[ZFXXX1:oracle]:/oracle>
```

第二个节点创建：

```
[ZFXXX2:oracle]:/oracle>mkdir -p  $ORACLE_BASE/admin/TESTDGPHY/adump
[ZFXXX2:oracle]:/oracle>
```

11g 如果不创建 audit_file_dest 的路径会报如下的错误，而 10g 的话创建的路径比较多，可以查看 spfile 内容进行创建：

```
RMAN-04014: startup failed: ORA-09925: Unable to create audit trail file
```

```
IBM AIX RISC System/6000 Error: 2: No such file or directory
Additional information: 9925
```

2.6.2 配置备库 pfile 文件并启动到 nomount 状态

我们选择备库的第一个节点作为实施节点:

```
[ZFXXX1:root]:/>su - oracle
[ZFXXX1:oracle]:/oracle>cd $ORACLE_HOME/dbs
[ZFXXX1:oracle]:/oracle/app/oracle/product/11.2.0/db/dbs>l
total 42416
-rw-rw----    1 oracle   dba            1544 Dec 25 09:31 hc_oraESK1.dat
-rw-rw----    1 oracle   dba            1544 Feb 18 09:32 hc_oraESKDB1.dat
-rw-rw----    1 oracle   dba            1544 Jul 16 2015  hc_oraMCIS1.dat
-rw-rw----    1 oracle   dba            1544 Nov 18 2014  hc_oraNUW1.dat
-rw-rw----    1 oracle   dba            1544 Dec 23 2014  hc_oraTEST2.dat
-rw-rw----    1 oracle   dba            1544 Jan 29 16:17 hc_oralhr.dat
-rw-rw----    1 oracle   dba            1544 Jan 29 15:47 hc_oralhr1.dat
-rw-r--r--    1 oracle   dba            2851 May 15 2009  init.ora
-rw-r-----    1 oracle   dba             162 Jul 15 2015  initDBUA4155109.ora
-rw-r-----    1 oracle   dba              39 Dec 24 17:21 initoraESK1.ora
-rw-r--r--    1 oracle   dba              66 Feb 01 17:08 initoraESKDB1.ora
-rw-r-----    1 oracle   dba              42 Jul 15 2015  initoraMCIS1.ora
-rw-r-----    1 oracle   dba              40 Nov 06 2014  initoraNUW1.ora
-rw-r-----    1 oracle   dba              42 Nov 19 2014  initoraTEST2.ora
-rw-r--r--    1 oracle   dba             923 Jan 29 15:51 initoralhr.ora
-rw-r-----    1 oracle   dba             843 Jan 08 09:20 initoralhr.ora.bak.zfXXX1
-rw-r--r--    1 oracle   dba              80 Jan 29 15:47 initoralhr1.ora
-rw-r-----    1 oracle   dba            1536 Jul 15 2015  orapwDBUA4155109
-rw-r-----    1 oracle   dba            1536 Feb 17 17:59 orapwDGPHY1
-rw-r-----    1 oracle   dba            1536 Jan 08 16:16 orapworaESKDB1
-rw-r-----    1 oracle   dba            1536 Jul 15 2015  orapworaMCIS1
-rw-r-----    1 oracle   dba            1536 Nov 06 2014  orapworaNUW1
-rw-r-----    1 oracle   dba            1536 Nov 19 2014  orapworaTEST2
-rw-r-----    1 oracle   dba            1536 Jan 07 15:43 orapworalhr
-rw-r-----    1 oracle   dba        21610496 Jan 04 14:52 snapcf_oraESKDB1.f

[ZFXXX1:oracle]:/oracle>export ORACLE_SID=DGPHY1
[ZFXXX1:oracle]:/oracle>sqlplus / as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Thu Feb 18 10:20:55 2016

Copyright (c) 1982, 2013, Oracle.  All rights reserved.

Connected to an idle instance.

SYS@DGPHY1> startup nomount pfile=?/dbs/initDGPHY1.ora
ORACLE instance started.

Total System Global Area  271437824 bytes
Fixed Size                  2245464 bytes
Variable Size             213912744 bytes
Database Buffers           50331648 bytes
Redo Buffers                4947968 bytes
SYS@DGPHY1>
```

2.6.3 利用 rman 的 duplicate 复制主库文件到备库

--对于从主库克隆 standby 有多种方法，而且 Oracle 11g 支持从 ative database 直接克隆数据库

--为主库生成控制文件,注，对于配置 standby，不能直接使用 copy 方式复制控制文件到备库

我们选择备库的第一个节点作为实施节点，脚本需要修改的地方参考前边的说明，懒人可以把 TNS 和 db_unique_name 设置成一样的:

```
duplicate target database
for standby nofilenamecheck
from active database
DORECOVER
spfile
set db_unique_name='TESTDGPHY'
set log_archive_dest_1='LOCATION=/arch valid_for=(ALL_LOGFILES,ALL_ROLES) db_unique_name=TESTDGPHY'
set log_archive_dest_2='service=TNS_DGPRI async lgwr register valid_for=(online_logfile,primary_role) db_unique_name=TESTDG'
set standby_file_management='AUTO'
set fal_server='TNS_DGPRI'
set fal_client='TESTDGPHY'
set control_files='+DATA/TESTDGPHY/controlfile/crontal01.ctl','+DATA/TESTDGPHY/controlfile/control02.ctl'
set db_file_name_convert='TESTDG','TESTDGPHY'
set log_file_name_convert='TESTDG','TESTDGPHY'
set memory_target='1024M'
set audit_file_dest='/oracle/app/oracle/admin/TESTDGPHY/adump'
set db_create_file_dest = '+DATA'
set instance_number = '1'
;
```

若主库比较大，也可以多开几个 channel 来传递，如下脚本：

```
run {
allocate channel ch001 type disk;
allocate channel ch002 type disk;
allocate channel ch003 type disk;
allocate channel ch004 type disk;
allocate auxiliary channel ch005 type disk;
duplicate target database
for standby nofilenamecheck
from active database
DORECOVER
spfile
set db_unique_name='TESTDGPHY'
set log_archive_dest_1='LOCATION=/arch valid_for=(ALL_LOGFILES,ALL_ROLES) db_unique_name=TESTDGPHY'
set log_archive_dest_2='service=TNS_DGPRI async lgwr register valid_for=(online_logfile,primary_role) db_unique_name=TESTDG'
set standby_file_management='AUTO'
set fal_server='TNS_DGPRI'
set fal_client='TESTDGPHY'
set control_files='+DATA/TESTDGPHY/controlfile/crontal01.ctl','+DATA/TESTDGPHY/controlfile/control02.ctl'
set db_file_name_convert='TESTDG','TESTDGPHY'
set log_file_name_convert='TESTDG','TESTDGPHY'
set memory_target='1024M'
set audit_file_dest='/oracle/app/oracle/admin/TESTDGPHY/adump'
set db_create_file_dest = '+DATA'
set instance_number = '1'
;
release channel ch001;
release channel ch002;
release channel ch003;
release channel ch004;
```

```
release channel ch005;
}
```

```
[ZFXXX1:oracle]:/oracle>rman target sys/lhr@TNS_DGPRI auxiliary sys/lhr@TNS_DGPHY

Recovery Manager: Release 11.2.0.4.0 - Production on Thu Feb 18 14:29:29 2016

Copyright (c) 1982, 2011, Oracle and/or its affiliates.  All rights reserved.

connected to target database: TESTDG (DBID=2836886746)
connected to auxiliary database: TESTDG (not mounted)

RMAN> duplicate target database
2> for standby nofilenamecheck
3> from active database
4> DORECOVER
5> spfile
6> set db_unique_name='TESTDGPHY'
7> set log_archive_dest_1='LOCATION=/arch valid_for=(ALL_LOGFILES,ALL_ROLES) db_unique_name=TESTDGPHY'
8> set log_archive_dest_2='service=TNS_DGPRI async lgwr register valid_for=(online_logfile,primary_role) db_unique_name=TESTDG'
9> set standby_file_management='AUTO'
10> set fal_server='TNS_DGPRI'
11> set fal_client='TESTDGPHY'
12> set control_files='+DATA/TESTDGPHY/controlfile/crontal01.ctl','+DATA/TESTDGPHY/controlfile/control02.ctl'
13> set db_file_name_convert='TESTDG','TESTDGPHY'
14> set log_file_name_convert='TESTDG','TESTDGPHY'
15> set memory_target='1024M'
16> set audit_file_dest='/oracle/app/oracle/admin/TESTDGPHY/adump'
17> set db_create_file_dest = '+DATA'
18> set instance_number = '1'
19> ;

Starting Duplicate Db at 2016-02-18 14:29:41
using target database control file instead of recovery catalog
allocated channel: ORA_AUX_DISK_1
channel ORA_AUX_DISK_1: SID=44 device type=DISK

contents of Memory Script:
{
   backup as copy reuse
   targetfile  '/oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPRI1' auxiliary format
 '/oracle/app/oracle/product/11.2.0/db/dbs/orapwDGPHY1'   targetfile
 '+DATA/testdg/spfiledgpri.ora' auxiliary format
 '/oracle/app/oracle/product/11.2.0/db/dbs/spfileDGPHY1.ora'   ;
   sql clone "alter system set spfile= ''/oracle/app/oracle/product/11.2.0/db/dbs/spfileDGPHY1.ora''";
}
executing Memory Script

Starting backup at 2016-02-18 14:29:41
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=71 instance=DGPRI1 device type=DISK
Finished backup at 2016-02-18 14:29:44

sql statement: alter system set spfile= ''/oracle/app/oracle/product/11.2.0/db/dbs/spfileDGPHY1.ora''

contents of Memory Script:
{
   sql clone "alter system set  db_unique_name =
 ''TESTDGPHY'' comment=
 '''' scope=spfile";
   sql clone "alter system set  log_archive_dest_1 =
 ''LOCATION=/arch valid_for=(ALL_LOGFILES,ALL_ROLES) db_unique_name=TESTDGPHY'' comment=
 '''' scope=spfile";
   sql clone "alter system set  log_archive_dest_2 =
 ''service=TNS_DGPRI async lgwr register valid_for=(online_logfile,primary_role) db_unique_name=TESTDG'' comment=
 '''' scope=spfile";
```

```
  sql clone "alter system set  standby_file_management =
''AUTO'' comment=
'''' scope=spfile";
  sql clone "alter system set  fal_server =
''TNS_DGPRI'' comment=
'''' scope=spfile";
  sql clone "alter system set  fal_client =
''TESTDGPHY'' comment=
'''' scope=spfile";
  sql clone "alter system set  control_files =
''+DATA/TESTDGPHY/controlfile/crontal01.ctl'', ''+DATA/TESTDGPHY/controlfile/control02.ctl'' comment=
'''' scope=spfile";
  sql clone "alter system set  db_file_name_convert =
''TESTDG'', ''TESTDGPHY'' comment=
'''' scope=spfile";
  sql clone "alter system set  log_file_name_convert =
''TESTDG'', ''TESTDGPHY'' comment=
'''' scope=spfile";
  sql clone "alter system set  memory_target =
1024M comment=
'''' scope=spfile";
  sql clone "alter system set  audit_file_dest =
''/oracle/app/oracle/admin/TESTDGPHY/adump'' comment=
'''' scope=spfile";
  sql clone "alter system set  db_create_file_dest =
''+DATA'' comment=
'''' scope=spfile";
  sql clone "alter system set  instance_number =
1 comment=
'''' scope=spfile";
  shutdown clone immediate;
  startup clone nomount;
}
executing Memory Script

sql statement: alter system set  db_unique_name =  ''TESTDGPHY'' comment= '''' scope=spfile

sql statement: alter system set  log_archive_dest_1 =  ''LOCATION=/arch valid_for=(ALL_LOGFILES,ALL_ROLES) db_unique_name=TESTDGPHY'' comment= '''' scope=spfile

sql statement: alter system set  log_archive_dest_2 =  ''service=TNS_DGPRI async lgwr register valid_for=(online_logfile,primary_role) db_unique_name=TESTDG'' comment= '''' scope=spfile

sql statement: alter system set  standby_file_management =  ''AUTO'' comment= '''' scope=spfile

sql statement: alter system set  fal_server =  ''TNS_DGPRI'' comment= '''' scope=spfile

sql statement: alter system set  fal_client =  ''TESTDGPHY'' comment= '''' scope=spfile

sql statement: alter system set  control_files =  ''+DATA/TESTDGPHY/controlfile/crontal01.ctl'', ''+DATA/TESTDGPHY/controlfile/control02.ctl'' comment= '''' scope=spfile

sql statement: alter system set  db_file_name_convert =  ''TESTDG'', ''TESTDGPHY'' comment= '''' scope=spfile

sql statement: alter system set  log_file_name_convert =  ''TESTDG'', ''TESTDGPHY'' comment= '''' scope=spfile

sql statement: alter system set  memory_target =  1024M comment= '''' scope=spfile

sql statement: alter system set  audit_file_dest =  ''/oracle/app/oracle/admin/TESTDGPHY/adump'' comment= '''' scope=spfile

sql statement: alter system set  db_create_file_dest =  ''+DATA'' comment= '''' scope=spfile

sql statement: alter system set  instance_number =  1 comment= '''' scope=spfile

Oracle instance shut down

connected to auxiliary database (not started)
Oracle instance started

Total System Global Area    1068937216 bytes
```

```
Fixed Size                     2253216 bytes
Variable Size                608177760 bytes
Database Buffers             452984832 bytes
Redo Buffers                   5521408 bytes

contents of Memory Script:
{
   backup as copy current controlfile for standby auxiliary format  '+DATA/testdgphy/controlfile/crontal01.ctl';
   restore clone controlfile to  '+DATA/testdgphy/controlfile/control02.ctl' from
 '+DATA/testdgphy/controlfile/crontal01.ctl';
}
executing Memory Script

Starting backup at 2016-02-18 14:29:59
using channel ORA_DISK_1
channel ORA_DISK_1: starting datafile copy
copying standby control file
output file name=/oracle/app/oracle/product/11.2.0/db/dbs/snapcf_DGPRI1.f tag=TAG20160218T143003 RECID=2 STAMP=904141804
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:01
Finished backup at 2016-02-18 14:30:01

Starting restore at 2016-02-18 14:30:01
allocated channel: ORA_AUX_DISK_1
channel ORA_AUX_DISK_1: SID=97 instance=DGPHY1 device type=DISK

channel ORA_AUX_DISK_1: copied control file copy
Finished restore at 2016-02-18 14:30:03

contents of Memory Script:
{
   sql clone 'alter database mount standby database';
}
executing Memory Script

sql statement: alter database mount standby database
RMAN-05529: WARNING: DB_FILE_NAME_CONVERT resulted in invalid ASM names; names changed to disk group only.

contents of Memory Script:
{
   set newname for tempfile  1 to
 "+data";
   switch clone tempfile all;
   set newname for datafile  1 to
 "+data";
   set newname for datafile  2 to
 "+data";
   set newname for datafile  3 to
 "+data";
   set newname for datafile  4 to
 "+data";
   set newname for datafile  5 to
 "+data";
   set newname for datafile  6 to
 "+data";
   backup as copy reuse
   datafile  1 auxiliary format
 "+data"   datafile
 2 auxiliary format
 "+data"   datafile
 3 auxiliary format
 "+data"   datafile
 4 auxiliary format
 "+data"   datafile
 5 auxiliary format
 "+data"   datafile
 6 auxiliary format
 "+data"   ;
   sql 'alter system archive log current';
```

```
}
executing Memory Script

executing command: SET NEWNAME

renamed tempfile 1 to +data in control file

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

Starting backup at 2016-02-18 14:30:08
using channel ORA_DISK_1
channel ORA_DISK_1: starting datafile copy
input datafile file number=00001 name=+DATA/testdg/datafile/system.293.904043353
output file name=+DATA/testdgphy/datafile/system.456.904141809 tag=TAG20160218T143012
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:15
channel ORA_DISK_1: starting datafile copy
input datafile file number=00002 name=+DATA/testdg/datafile/sysaux.292.904043353
output file name=+DATA/testdgphy/datafile/sysaux.457.904141825 tag=TAG20160218T143012
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:15
channel ORA_DISK_1: starting datafile copy
input datafile file number=00005 name=+DATA/testdg/datafile/example.301.904043427
output file name=+DATA/testdgphy/datafile/example.458.904141839 tag=TAG20160218T143012
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:07
channel ORA_DISK_1: starting datafile copy
input datafile file number=00003 name=+DATA/testdg/datafile/undotbs1.291.904043355
output file name=+DATA/testdgphy/datafile/undotbs1.459.904141847 tag=TAG20160218T143012
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:03
channel ORA_DISK_1: starting datafile copy
input datafile file number=00006 name=+DATA/testdg/datafile/undotbs2.302.904043579
output file name=+DATA/testdgphy/datafile/undotbs2.460.904141849 tag=TAG20160218T143012
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting datafile copy
input datafile file number=00004 name=+DATA/testdg/datafile/users.290.904043355
output file name=+DATA/testdgphy/datafile/users.461.904141851 tag=TAG20160218T143012
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:01
Finished backup at 2016-02-18 14:30:51

sql statement: alter system archive log current

contents of Memory Script:
{
   backup as copy reuse
   archivelog like  "/arch/1_11_904043420.dbf" auxiliary format
 "/arch/1_11_904043420.dbf"   archivelog like
 "/arch/1_12_904043420.dbf" auxiliary format
 "/arch/1_12_904043420.dbf"   archivelog like
 "/arch/1_10_904043420.dbf" auxiliary format
 "/arch/1_10_904043420.dbf"   archivelog like
 "/arch/2_5_904043420.dbf" auxiliary format
 "/arch/2_5_904043420.dbf"   archivelog like
 "/arch/2_4_904043420.dbf" auxiliary format
 "/arch/2_4_904043420.dbf"   ;
   catalog clone archivelog  "/arch/1_11_904043420.dbf";
   catalog clone archivelog  "/arch/1_12_904043420.dbf";
   catalog clone archivelog  "/arch/1_10_904043420.dbf";
   catalog clone archivelog  "/arch/2_5_904043420.dbf";
   catalog clone archivelog  "/arch/2_4_904043420.dbf";
   switch clone datafile all;
```

```
}
executing Memory Script

Starting backup at 2016-02-18 14:30:54
using channel ORA_DISK_1
channel ORA_DISK_1: starting archived log copy
input archived log thread=1 sequence=11 RECID=9 STAMP=904141813
output file name=/arch/1_11_904043420.dbf RECID=0 STAMP=0
channel ORA_DISK_1: archived log copy complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting archived log copy
input archived log thread=1 sequence=12 RECID=12 STAMP=904141858
output file name=/arch/1_12_904043420.dbf RECID=0 STAMP=0
channel ORA_DISK_1: archived log copy complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting archived log copy
input archived log thread=1 sequence=10 RECID=8 STAMP=904122715
output file name=/arch/1_10_904043420.dbf RECID=0 STAMP=0
channel ORA_DISK_1: archived log copy complete, elapsed time: 00:00:03
channel ORA_DISK_1: starting archived log copy
input archived log thread=2 sequence=5 RECID=11 STAMP=904141841
output file name=/arch/2_5_904043420.dbf RECID=0 STAMP=0
channel ORA_DISK_1: archived log copy complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting archived log copy
input archived log thread=2 sequence=4 RECID=10 STAMP=904141800
output file name=/arch/2_4_904043420.dbf RECID=0 STAMP=0
channel ORA_DISK_1: archived log copy complete, elapsed time: 00:00:01
Finished backup at 2016-02-18 14:31:02

cataloged archived log
archived log file name=/arch/1_11_904043420.dbf RECID=1 STAMP=904141862

cataloged archived log
archived log file name=/arch/1_12_904043420.dbf RECID=2 STAMP=904141862

cataloged archived log
archived log file name=/arch/1_10_904043420.dbf RECID=3 STAMP=904141862

cataloged archived log
archived log file name=/arch/2_5_904043420.dbf RECID=4 STAMP=904141863

cataloged archived log
archived log file name=/arch/2_4_904043420.dbf RECID=5 STAMP=904141863

datafile 1 switched to datafile copy
input datafile copy RECID=2 STAMP=904141863 file name=+DATA/testdgphy/datafile/system.456.904141809
datafile 2 switched to datafile copy
input datafile copy RECID=3 STAMP=904141863 file name=+DATA/testdgphy/datafile/sysaux.457.904141825
datafile 3 switched to datafile copy
input datafile copy RECID=4 STAMP=904141863 file name=+DATA/testdgphy/datafile/undotbs1.459.904141847
datafile 4 switched to datafile copy
input datafile copy RECID=5 STAMP=904141863 file name=+DATA/testdgphy/datafile/users.461.904141851
datafile 5 switched to datafile copy
input datafile copy RECID=6 STAMP=904141863 file name=+DATA/testdgphy/datafile/example.458.904141839
datafile 6 switched to datafile copy
input datafile copy RECID=7 STAMP=904141863 file name=+DATA/testdgphy/datafile/undotbs2.460.904141849

contents of Memory Script:
{
   set until scn  1182684;
   recover
   standby
   clone database
    delete archivelog
   ;
}
executing Memory Script

executing command: SET until clause
```

```
Starting recover at 2016-02-18 14:31:03
using channel ORA_AUX_DISK_1

starting media recovery

archived log for thread 1 with sequence 11 is already on disk as file /arch/1_11_904043420.dbf
archived log for thread 1 with sequence 12 is already on disk as file /arch/1_12_904043420.dbf
archived log for thread 2 with sequence 4 is already on disk as file /arch/2_4_904043420.dbf
archived log for thread 2 with sequence 5 is already on disk as file /arch/2_5_904043420.dbf
archived log file name=/arch/1_11_904043420.dbf thread=1 sequence=11
archived log file name=/arch/2_4_904043420.dbf thread=2 sequence=4
archived log file name=/arch/1_12_904043420.dbf thread=1 sequence=12
archived log file name=/arch/2_5_904043420.dbf thread=2 sequence=5
media recovery complete, elapsed time: 00:00:00
Finished recover at 2016-02-18 14:31:06
Finished Duplicate Db at 2016-02-18 14:31:13

RMAN>
```

2.6.4 创建备库 spfile 并启动备库

由于备库是 rac，我们应该修改 spfile 到磁盘组，然后才能启动 rac 的 2 个节点：

```
[ZFXXX1:oracle]:/oracle>sqlplus / as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Thu Feb 18 14:36:27 2016

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

SYS@DGPHY1> select open_mode from v$database;

OPEN_MODE
--------------------
MOUNTED

SYS@DGPHY1> show parameter cluster

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
cluster_database                     boolean     TRUE
cluster_database_instances           integer     2
cluster_interconnects                string
SYS@DGPHY1> show  parameter spfile

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
spfile                               string      /oracle/app/oracle/product/11.
                                                 2.0/db/dbs/spfileDGPHY1.ora
SYS@DGPHY1>



SYS@DGPHY1> create pfile='/tmp/aa.txt' from spfile;

File created.
```

这里修改 pfile 文件内容修改后的内容如下：

```
*.audit_file_dest='/oracle/app/oracle/admin/TESTDGPHY/adump'
*.audit_trail='db'
*.cluster_database=true
*.compatible='11.2.0.4.0'
*.control_files='+DATA/TESTDGPHY/controlfile/crontal01.ctl','+DATA/TESTDGPHY/controlfile/control02.ctl'
*.db_block_size=8192
*.db_create_file_dest='+DATA'
*.db_domain=''
*.db_file_name_convert='TESTDG','TESTDGPHY'
*.db_name='TESTDG'
*.db_recovery_file_dest='+DATA'
*.db_recovery_file_dest_size=4621074432
*.db_unique_name='TESTDGPHY'
*.diagnostic_dest='/oracle/app/oracle'
*.dispatchers='(PROTOCOL=TCP) (SERVICE=DGPRIXDB)'
*.fal_client='TESTDGPHY'
*.fal_server='TNS_DGPRI'
*.log_archive_config='DG_CONFIG=(TESTDG,TESTDGPHY)'
*.log_archive_dest_1='LOCATION=/arch valid_for=(ALL_LOGFILES,ALL_ROLES) db_unique_name=TESTDGPHY'
*.log_archive_dest_2='service=TNS_DGPRI async lgwr register valid_for=(online_logfile,primary_role) db_unique_name=TESTDG'
*.log_archive_dest_state_1='ENABLE'
*.log_archive_dest_state_2='ENABLE'
*.log_archive_max_processes=4
*.log_file_name_convert='TESTDG','TESTDGPHY'
*.memory_target=1073741824
*.open_cursors=300
*.pga_aggregate_target=268435456
*.processes=150
*.remote_listener='ZFXXX-scan:1521'
*.remote_login_passwordfile='EXCLUSIVE'
*.sga_target=805306368
*.standby_file_management='AUTO'
DGPHY2.instance_number=2
DGPHY1.instance_number=1
DGPHY2.thread=2
DGPHY1.thread=1
DGPHY2.undo_tablespace='UNDOTBS2'
DGPHY1.undo_tablespace='UNDOTBS1'
```

需要关注上边蓝色的部分。

创建 spfile 文件到磁盘组，并在 pfile 文件中添加 spfile 的路径：

```
SYS@DGPHY1> create spfile='+DATA/TESTDGPHY/PARAMETERFILE/spfiledgphy.ora'  from pfile='/tmp/aa.txt';

File created.

SYS@DGPHY1> exit
Disconnected from Oracle Database 11g Enterprise Edition Release 11.2.0.4.0 - 64bit Production
With the Partitioning, Real Application Clusters, Automatic Storage Management, OLAP,
Data Mining and Real Application Testing options
[ZFXXX1:oracle]:/oracle>echo  "SPFILE='+DATA/TESTDGPHY/PARAMETERFILE/spfiledgphy.ora'" >  $ORACLE_HOME/dbs/initDGPHY1.ora
[ZFXXX1:oracle]:/oracle>more $ORACLE_HOME/dbs/initDGPHY1.ora
SPFILE='+DATA/TESTDGPHY/PARAMETERFILE/spfiledgphy.ora'
[ZFXXX1:oracle]:/oracle>
```

在第二个节点中，在 pfile 文件中添加 spfile 的路径：

```
[ZFXXX2:oracle]:/oracle>echo  "SPFILE='+DATA/TESTDGPHY/PARAMETERFILE/spfiledgphy.ora'" >  $ORACLE_HOME/dbs/initDGPHY2.ora
```

```
[ZFXXX2:oracle]:/oracle>more $ORACLE_HOME/dbs/initDGPHY2.ora
SPFILE='+DATA/TESTDGPHY/PARAMETERFILE/spfiledgphy.ora'
```

删除原 spfile 文件：/oracle/app/oracle/product/11.2.0/db/dbs/spfileDGPHY1.ora

启动 2 个节点后查看：

```
SYS@DGPHY1> startup force;
ORACLE instance started.

Total System Global Area 1068937216 bytes
Fixed Size                  2253216 bytes
Variable Size             608177760 bytes
Database Buffers          452984832 bytes
Redo Buffers                5521408 bytes
Database mounted.
Database opened.
SYS@DGPHY1> show parameter spfile

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
spfile                               string      +DATA/testdgphy/parameterfile/
                                                 spfiledgphy.ora
SYS@DGPHY1>
SYS@DGPHY1> set line 9999
SYS@DGPHY1> select name , open_mode, log_mode,force_logging,DATABASE_ROLE,switchover_status from gv$database;

NAME      OPEN_MODE            LOG_MODE     FOR DATABASE_ROLE    SWITCHOVER_STATUS
--------- -------------------- ------------ --- ---------------- --------------------
TESTDG    READ ONLY            ARCHIVELOG   YES PHYSICAL STANDBY NOT ALLOWED
TESTDG    READ ONLY            ARCHIVELOG   YES PHYSICAL STANDBY NOT ALLOWED

SYS@DGPHY1>
```

2.6.5 将备库加入 crsctl 中

```
srvctl stop database -d TESTDG -o immediate
srvctl status database -d DGPHY
srvctl start database -d TESTDG -o mount


srvctl add database -d TESTDGPHY -c RAC -o /oracle/app/oracle/product/11.2.0/db -p '+DATA/TESTDGPHY/PARAMETERFILE/spfiledgphy.ora' -r physical_standby -n TESTDG

srvctl add instance -d TESTDGPHY -i DGPHY1 -n ZFXXX1
srvctl add instance -d TESTDGPHY -i DGPHY2 -n ZFXXX2

srvctl status database -d TESTDGPHY
srvctl start database -d TESTDGPHY

srvctl remove  database -d  TESTDGPHY

srvctl config database -d TESTDGPHY -a
```

dbca 创建的数据库会自动加入 crsctl 中，但通过 rman 创建的库不会加入 crsctl 中，需要手动添加，将备库加入 crsctl 中后可以通过 srvctl 来管理数据库了。

```
[ZFXXX2:oracle]:/oracle>crsctl stat res -t
--------------------------------------------------------------------------------
NAME           TARGET  STATE        SERVER                   STATE_DETAILS
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.DATA.dg
               ONLINE  ONLINE       zfXXX1
               ONLINE  ONLINE       zfXXX2
ora.LISTENER.lsnr
               ONLINE  ONLINE       zfXXX1
               ONLINE  ONLINE       zfXXX2
ora.asm
               ONLINE  ONLINE       zfXXX1               Started
               ONLINE  ONLINE       zfXXX2               Started
ora.gsd
               OFFLINE OFFLINE      zfXXX1
               OFFLINE OFFLINE      zfXXX2
ora.net1.network
               ONLINE  ONLINE       zfXXX1
               ONLINE  ONLINE       zfXXX2
ora.ons
               ONLINE  ONLINE       zfXXX1
               ONLINE  ONLINE       zfXXX2
ora.registry.acfs
               ONLINE  ONLINE       zfXXX1
               ONLINE  ONLINE       zfXXX2
--------------------------------------------------------------------------------
Cluster Resources
--------------------------------------------------------------------------------
ora.LISTENER_SCAN1.lsnr
      1        ONLINE  ONLINE       zfXXX1
ora.cvu
      1        ONLINE  ONLINE       zfXXX1
ora.oc4j
      1        ONLINE  ONLINE       zfXXX1
ora.ora2lhr.db
      1        ONLINE  ONLINE       zfXXX2               Open
ora.oraeskdb.db
      1        ONLINE  ONLINE       zfXXX1               Open
      2        ONLINE  ONLINE       zfXXX2               Open
ora.oralhr.db
      1        ONLINE  ONLINE       zfXXX2               Open
ora.scan1.vip
      1        ONLINE  ONLINE       zfXXX1
ora.zfXXX1.vip
      1        ONLINE  ONLINE       zfXXX1
ora.zfXXX2.vip
      1        ONLINE  ONLINE       zfXXX2
[ZFXXX2:oracle]:/oracle>
[ZFXXX2:oracle]:/oracle>

[ZFXXX2:oracle]:/oracle>srvctl add database -h

Adds a database configuration to the Oracle Clusterware.

Usage: srvctl add database -d <db_unique_name> -o <oracle_home> [-c {RACONENODE | RAC | SINGLE} [-e <server_list>] [-i <inst_name>] [-w <timeout>]] [-m <domain_name>] [-p <spfile>] [-r {PRIMARY | PHYSICAL_STANDBY
| LOGICAL_STANDBY | SNAPSHOT_STANDBY}] [-s <start_options>] [-t <stop_options>] [-n <db_name>] [-y {AUTOMATIC | MANUAL | NORESTART}] [-g "<serverpool_list>"] [-x <node_name>] [-a "<diskgroup_list>"] [-j
"<acfs_path_list>"]
    -d <db_unique_name>      Unique name for the database
    -o <oracle_home>         ORACLE_HOME path
    -c <type>                Type of database: RAC One Node, RAC, or Single Instance
    -e <server_list>         Candidate server list for RAC One Node database
    -i <inst_name>           Instance name prefix for administrator-managed RAC One Node database (default first 12 characters of <db_unique_name>)
    -w <timeout>             Online relocation timeout in minutes
    -x <node_name>           Node name. -x option is specified for single-instance databases
    -m <domain>              Domain for database. Must be set if database has DB_DOMAIN set.
    -p <spfile>              Server parameter file path
```

```
    -r <role>               Role of the database (primary, physical_standby, logical_standby, snapshot_standby)
    -s <start_options>      Startup options for the database. Examples of startup options are OPEN, MOUNT, or 'READ ONLY'.
    -t <stop_options>       Stop options for the database. Examples of shutdown options are NORMAL, TRANSACTIONAL, IMMEDIATE, or ABORT.
    -n <db_name>            Database name (DB_NAME), if different from the unique name given by the -d option
    -y <dbpolicy>           Management policy for the database (AUTOMATIC, MANUAL, or NORESTART)
    -g "<serverpool_list>"  Comma separated list of database server pool names
    -a "<diskgroup_list>"   Comma separated list of disk groups
    -j "<acfs_path_list>"   Comma separated list of ACFS paths where database's dependency will be set
    -h                      Print usage
[ZFXXX2:oracle]:/oracle>echo $ORACLE_HOME
/oracle/app/oracle/product/11.2.0/db
[ZFXXX2:oracle]:/oracle>srvctl add database -d TESTDGPHY -c RAC -o /oracle/app/oracle/product/11.2.0/db -p '+DATA/TESTDGPHY/PARAMETERFILE/spfiledgphy.ora' -r physical_standby -n
TESTDG -i DGPHY
[ZFXXX2:oracle]:/oracle>
[ZFXXX2:oracle]:/oracle>srvctl add instance -d TESTDGPHY -i DGPHY1 -n ZFXXX1
[ZFXXX2:oracle]:/oracle>srvctl add instance -d TESTDGPHY -i DGPHY2 -n ZFXXX2
[ZFXXX2:oracle]:/oracle>srvctl status database -d TESTDGPHY
Instance DGPHY1 is not running on node zfXXX1
Instance DGPHY2 is not running on node zfXXX2
[ZFXXX2:oracle]:/oracle>srvctl start database -d TESTDGPHY
[ZFXXX2:oracle]:/oracle>srvctl status database -d TESTDGPHY
Instance DGPHY1 is running on node zfXXX1
Instance DGPHY2 is running on node zfXXX2
[ZFXXX2:oracle]:/oracle>srvctl config database -d TESTDGPHY -a
Database unique name: TESTDGPHY
Database name: TESTDG
Oracle home: /oracle/app/oracle/product/11.2.0/db
Oracle user: oracle
Spfile: +DATA/TESTDGPHY/PARAMETERFILE/spfiledgphy.ora
Domain:
Start options: open
Stop options: immediate
Database role: PHYSICAL_STANDBY
Management policy: AUTOMATIC
Server pools: DGPHY
Database instances: DGPHY1,DGPHY2
Disk Groups:
Mount point paths:
Services:
Type: RAC
Database is enabled
Database is administrator managed
[ZFXXX2:oracle]:/oracle>
[ZFXXX2:root]:/>crsctl stat res -t
--------------------------------------------------------------------------------
NAME           TARGET  STATE        SERVER                   STATE_DETAILS
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.DATA.dg
               ONLINE  ONLINE       zfXXX1
               ONLINE  ONLINE       zfXXX2
ora.LISTENER.lsnr
               ONLINE  ONLINE       zfXXX1
               ONLINE  ONLINE       zfXXX2
ora.asm
               ONLINE  ONLINE       zfXXX1               Started
               ONLINE  ONLINE       zfXXX2               Started
ora.gsd
               OFFLINE OFFLINE      zfXXX1
               OFFLINE OFFLINE      zfXXX2
ora.net1.network
               ONLINE  ONLINE       zfXXX1
               ONLINE  ONLINE       zfXXX2
ora.ons
               ONLINE  ONLINE       zfXXX1
               ONLINE  ONLINE       zfXXX2
ora.registry.acfs
```

```
               ONLINE  ONLINE       zfXXX1
               ONLINE  ONLINE       zfXXX2
--------------------------------------------------------------------------------
Cluster Resources
--------------------------------------------------------------------------------
ora.LISTENER_SCAN1.lsnr
      1        ONLINE  ONLINE       zfXXX1
ora.cvu
      1        ONLINE  ONLINE       zfXXX1
ora.oc4j
      1        ONLINE  ONLINE       zfXXX1
ora.ora2lhr.db
      1        ONLINE  ONLINE       zfXXX2               Open
ora.oraeskdb.db
      1        ONLINE  ONLINE       zfXXX1               Open
      2        ONLINE  ONLINE       zfXXX2               Open
ora.oralhr.db
      1        ONLINE  ONLINE       zfXXX2               Open
ora.scan1.vip
      1        ONLINE  ONLINE       zfXXX1
ora.testdgphy.db
      1        ONLINE  ONLINE       zfXXX1               Open,Readonly
      2        ONLINE  ONLINE       zfXXX2               Open,Readonly
ora.zfXXX1.vip
      1        ONLINE  ONLINE       zfXXX1
ora.zfXXX2.vip
      1        ONLINE  ONLINE       zfXXX2
[ZFXXX2:root]:/>
```

2.6.6 启动备库到 open read only 状态

```
 [ZFXXX1:oracle]:/oracle>sqlplus / as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Thu Feb 18 16:16:32 2016

Copyright (c) 1982, 2013, Oracle.  All rights reserved.


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

SYS@DGPHY1> set line 9999
SYS@DGPHY1> select GROUP#,THREAD#,SEQUENCE#,BYTES,BLOCKSIZE,MEMBERS,STATUS from v$log;

    GROUP#    THREAD#  SEQUENCE#      BYTES  BLOCKSIZE    MEMBERS STATUS
---------- ---------- ---------- ---------- ---------- ---------- ----------------
         1          1         17   52428800        512          2 CLEARING
         2          1         18   52428800        512          2 CURRENT
         3          2         13   52428800        512          2 CURRENT
         4          2         12   52428800        512          2 CLEARING

SYS@DGPHY1>

SYS@DGPHY1> set line 9999
SYS@DGPHY1> select dbid,name,current_scn,protection_mode,database_role,force_logging,open_mode,switchover_status from gv$database;

      DBID NAME      CURRENT_SCN PROTECTION_MODE      DATABASE_ROLE    FOR OPEN_MODE            SWITCHOVER_STATUS
---------- --------- ----------- -------------------- ---------------- --- -------------------- --------------------
2836886746 TESTDG        1182683 MAXIMUM PERFORMANCE  PHYSICAL STANDBY YES READ ONLY            NOT ALLOWED
2836886746 TESTDG        1182683 MAXIMUM PERFORMANCE  PHYSICAL STANDBY YES READ ONLY            NOT ALLOWED
```

```
SYS@DGPHY1>
SYS@DGPHY1> select GROUP#,DBID,THREAD#,SEQUENCE#,BYTES,BLOCKSIZE,USED,ARCHIVED,STATUS from v$standby_log;

    GROUP# DBID                                 THREAD#  SEQUENCE#      BYTES  BLOCKSIZE       USED ARC STATUS
---------- ---------------------------------- ---------- ---------- ---------- ---------- ---------- --- ----------
         5 2836886746                                  1         18   52428800        512    1556992 YES ACTIVE
         6 UNASSIGNED                                  1          0   52428800        512          0 YES UNASSIGNED
         7 UNASSIGNED                                  1          0   52428800        512          0 YES UNASSIGNED
         8 UNASSIGNED                                  2          0   52428800        512          0 NO  UNASSIGNED
         9 2836886746                                  2         13   52428800        512    1239040 YES ACTIVE
        10 UNASSIGNED                                  2          0   52428800        512          0 YES UNASSIGNED

6 rows selected.

SYS@DGPHY1>
SYS@DGPHY1>
```

2.6.7 校验实时同步功能

为了实时查询，启用管理恢复

```
SYS@DGPHY1>  alter database recover managed standby database using current logfile disconnect;

Database altered.

SYS@DGPHY1> select INST_ID, dbid,name,DB_UNIQUE_NAME,current_scn,protection_mode,database_role,force_logging,open_mode,switchover_status from gv$database;

   INST_ID       DBID NAME      DB_UNIQUE_NAME  CURRENT_SCN PROTECTION_MODE      DATABASE_ROLE    FOR OPEN_MODE            SWITCHOVER_STATUS
---------- ---------- --------- --------------- ----------- -------------------- ---------------- --- -------------------- --------------------
         1 2836886746 TESTDG    TESTDGPHY           1219930 MAXIMUM PERFORMANCE  PHYSICAL STANDBY YES READ ONLY WITH APPLY NOT ALLOWED
         2 2836886746 TESTDG    TESTDGPHY           1219930 MAXIMUM PERFORMANCE  PHYSICAL STANDBY YES READ ONLY WITH APPLY NOT ALLOWED

SYS@DGPHY1>
SYS@DGPHY1>

SYS@DGPHY1> col name for a100
SYS@DGPHY1> set linesize 9999  pagesize 9999
SYS@DGPHY1> SELECT dest_id,
  2         THREAD#,
  3         NAME,
  4         sequence#,
  5         archived,
  6         applied,
  7         a.NEXT_CHANGE#
  8  FROM   v$archived_log a
  9  WHERE  a.sequence# >= 12
 10  AND    resetlogs_change# = (SELECT d.RESETLOGS_CHANGE# FROM v$database d)
 11  ORDER  BY a.THREAD#,
 12            a.sequence#,
 13       a.dest_id;

   DEST_ID    THREAD# NAME                                SEQUENCE# ARC APPLIED   NEXT_CHANGE#
---------- ---------- ---------------------------------- --------- --- --------- ------------
         2          1 /arch/1_13_904043420.dbf                  13   YES YES            1206723
         2          1 /arch/1_14_904043420.dbf                  14   YES YES            1206725
         2          1 /arch/1_15_904043420.dbf                  15   YES YES            1213882
         2          1 /arch/1_16_904043420.dbf                  16   YES YES            1214395
         2          1 /arch/1_17_904043420.dbf                  17   YES YES            1218112
         1          2 /arch/2_12_904043420.dbf                  12   YES IN-MEMORY      1218115

7 rows selected.
```

```
SYS@DGPHY1>
```

主库切换日志，建表测试：

```
 SYS@DGPRI1> ALTER SYSTEM SWITCH LOGFILE;

System altered.

SYS@DGPRI1> ALTER SYSTEM SWITCH LOGFILE;

System altered.

SYS@DGPRI1> ALTER SYSTEM SWITCH LOGFILE;

System altered.

SYS@DGPRI1>


SYS@DGPRI1> create table lhr.test as select * from user_tables;

Table created.

SYS@DGPRI1> select count(1) from lhr.test;

  COUNT(1)
----------
      1014

SYS@DGPRI1>
```

--在备库端查询日志应用情况

```
SYS@DGPHY1> col name for a100
SYS@DGPHY1> set linesize 9999  pagesize 9999
SYS@DGPHY1> SELECT dest_id,
  2         THREAD#,
  3         NAME,
  4         sequence#,
  5         archived,
  6         applied,
  7         a.NEXT_CHANGE#
  8  FROM   v$archived_log a
  9  WHERE  a.sequence# >= 12
 10  AND    resetlogs_change# = (SELECT d.RESETLOGS_CHANGE# FROM v$database d)
 11  ORDER  BY a.THREAD#,
 12            a.sequence#,
 13       a.dest_id;

   DEST_ID    THREAD# NAME                                                SEQUENCE# ARC APPLIED   NEXT_CHANGE#
---------- ---------- ---------------------------------------------------------- --- --------- ------------
         1          1 /arch/1_12_904043420.dbf                                12 YES YES            1182687
         2          1 /arch/1_13_904043420.dbf                                13 YES YES            1206723
         2          1 /arch/1_14_904043420.dbf                                14 YES YES            1206725
         2          1 /arch/1_15_904043420.dbf                                15 YES YES            1213882
         2          1 /arch/1_16_904043420.dbf                                16 YES YES            1214395
         2          1 /arch/1_17_904043420.dbf                                17 YES YES            1218112
         1          1 /arch/1_18_904043420.dbf                                18 YES YES            1221758
         1          1 /arch/1_19_904043420.dbf                                19 YES YES            1221764
```

```
         1          1 /arch/1_20_904043420.dbf                                20 YES YES             1221770
         1          2 /arch/2_12_904043420.dbf                                12 YES YES             1218115
         1          2 /arch/2_13_904043420.dbf                                13 YES IN-MEMORY       1221775

11 rows selected.

SYS@DGPHY1> select count(1) from lhr.test;

  COUNT(1)
----------
      1014

SYS@DGPHY1>
```

可以看到数据已经实时同步了，至此，物理备库搭建完成，至于备库的维护操作还有很多内容，参考我的其它 blog。

2.7 实验总结

实验过程中需要注意的几项内容：

① 主库修改参数一定要加 sid='*'

② 监听必须配置好

③ 执行 duplicate 命令的时候，如果是 rac 库需要添加参数：set instance_number = '1'，否则报错：

```
RMAN-03015: error occurred in stored script Memory Script
RMAN-04014: startup failed: ORA-29760: instance_number parameter not specified
```

About Me

.....

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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于 2016-02-16 10:00~ 2016-02-19 19:00 在中行完成

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