

1、Oracle Data Guard 介绍

1.1 Data Guard 特点

数据库服务器采用 **Data Guard** 灾备模式，可以满足对可用性有特殊需求的应用，具备以下特点：

- (1) 需要冗余的服务器设备：该模式需要有冗余的服务器硬件；硬件成本较高。
- (2) 需要冗余的存储设备：主机和备机都需要同样的存储空间，成本较高。
- (3) 安装配置比较复杂：该模式比单节点、单实例的模式配置复杂一些，需要更多的配置步骤。
- (4) 管理维护成本高：该模式对维护人员的要求较高，维护成本高。
- (5) 具备一定的容灾特性：当主机整个数据库系统不可用并短期内无法恢复时，可以把数据库系统切换到备机上，具备容灾的功能。
- (6) 备机可以用作只读查询；备机可以切换到只读状态供报表之类的查询操作，减轻主机的压力。

2、Oracle Data Guard 单实例部署

2.1 实验环境

在主库上安装数据库软件，并建监听和实例；在备库上只安装数据库软件。

	主库	备库
操作系统	RedHat7.0 64 位	RedHat7.0 64 位
主机名	redhat70	redhat71
IP	192.168.133.70	192.168.133.71
数据库软件版本	Oracle 11.2.0.4	Oracle 11.2.0.4
ORACLE_BASE	/u01/app/oracle	/u01/app/oracle
ORACLE_HOME	/u01/app/oracle/product/11.2.0.4/dbhome_1	/u01/app/oracle/product/11.2.0.4/dbhome_1
ORACLE_SID	orcl70	
闪回区	开启	
归档	开启	

2.2 主库配置

2.2.1 检查 DG

检查 DG 是否安装：

```
SQL> select * from v$option where parameter = 'Oracle Data Guard';
```

PARAMETER	VALUE
Oracle Data Guard	TRUE

备注：如果是 **true** 表示已经安装可以配置，否则需要安装相应组件。

2.2.2 设置数据库归档

查看数据库是否运行在归档模式：

```
SQL> archive log list;
```

Database log mode	No Archive Mode
Automatic archival	Disabled
Archive destination	/u01/app/oracle/product/11.2.0.4/dbhome_1/dbs/arch

```
Oldest online log sequence      4
Current log sequence            6
```

备注：如果数据库已经开启归档，下面的操作可以忽略。

```
SQL> shutdown immediate;#关闭数据库
```

Database closed.

Database dismounted.

ORACLE instance shut down.

```
SQL> startup mount;#启动到 mount 状态
```

ORACLE instance started.

```
Total System Global Area 3340451840 bytes
Fixed Size                  2257840 bytes
Variable Size               1862274128 bytes
Database Buffers            1459617792 bytes
Redo Buffers                 16302080 bytes
```

Database mounted.

```
SQL> alter database archivelog;#开启归档
```

Database altered.

```
SQL> alter database open;#open 数据库
```

Database altered.

```
SQL> alter system set
```

```
log_archive_dest_1='location=/u01/app/oracle/oradata/orcl70/archivelog
```

```
valid_for=(all_logfiles,all_roles) db_unique_name=orcl70' scope=spfile;
```

```
#设置归档路径
```

System altered.

```
SQL> archive log list;
```

```
Database log mode              Archive Mode
Automatic archival             Enabled
Archive destination            /u01/app/oracle/oradata/orcl70/archivelog
Oldest online log sequence     4
Next log sequence to archive   6
Current log sequence           6
```

2.2.3 设置数据库闪回

检查数据库是否开闪回：

```
SQL> select flashback_on from v$database;
```

FLASHBACK_ON

NO

备注：如果数据库已经开启闪回，下面的操作可以忽略。

SQL> alter system set db_recovery_file_dest_size='5G';#设置闪回区大小

System altered.

SQL> alter system set

db_recovery_file_dest='/u01/app/oracle/oradata/orcl70/flashback';

#设置闪回路径

System altered.

SQL> shutdown immediate;#关闭数据库

Database closed.

Database dismounted.

ORACLE instance shut down.

SQL> startup mount;#启动到 mount 状态

ORACLE instance started.

Total System Global Area 3340451840 bytes

Fixed Size 2257840 bytes

Variable Size 1862274128 bytes

Database Buffers 1459617792 bytes

Redo Buffers 16302080 bytes

Database mounted.

SQL> alter database flashback on;#开启闪回

Database altered.

SQL> alter database open;#open 数据库

Database altered.

SQL> select flashback_on from v\$database;

FLASHBACK_ON

YES

2.2.4 设置数据库强制归档

检查数据库是否开启强制归档:

SQL> select force_logging from v\$database;

FOR

NO

备注: 如果数据库已经开启强制归档, 下面的操作可以忽略。

SQL> alter database force logging; #开启强制归档

Database altered.

```
SQL> select force_logging from v$database;
```

FOR

YES

2.2.5 创建 STANDBY 日志文件

查询主库当前 redo logfile 的大小和组数:

```
SQL> select thread#,group#,members,bytes/1024/1024 as M from v$log;
```

THREAD#	GROUP#	MEMBERS	M
-----	-----	-----	-----
1	1	1	50
1	2	1	50
1	3	1	50

查询备库 standby 日志的大小和组数:

```
SQL> select group#,bytes/1024/1024 as M from v$standby_log;
```

no rows selected

```
SQL> alter database add standby logfile group 11
```

```
('/u01/app/oracle/oradata/orcl70/redo11_standby.log') size 50M;
```

Database altered.

```
SQL> alter database add standby logfile group 12
```

```
('/u01/app/oracle/oradata/orcl70/redo12_standby.log') size 50M;
```

Database altered.

```
SQL> alter database add standby logfile group 13
```

```
('/u01/app/oracle/oradata/orcl70/redo13_standby.log') size 50M;
```

Database altered.

```
SQL> alter database add standby logfile group 14
```

```
('/u01/app/oracle/oradata/orcl70/redo14_standby.log') size 50M;
```

Database altered.

```
SQL> select group#,bytes/1024/1024 as M from v$standby_log;
```

GROUP#	M
--------	---

-----	-----
11	50
12	50
13	50
14	50

2.2.6 修改参数文件

SQL> alter system set db_unique_name=orcl70 scope=spfile;

#设置主库唯一名字

System altered.

SQL> alter system set log_archive_config='dg_config=(orcl70,orcl71)' scope=spfile;

#设置 log_archive_config

System altered.

SQL> alter system set log_archive_dest_2='service=ORCL71 lgwr async valid_for=(online_logfiles,primary_role) db_unique_name=orcl71';

#设置备库归档目的地

System altered.

SQL> alter system set fal_server=orcl71;

#设置 standby 库从哪个数据库获取归档日志

System altered.

SQL> alter system set fal_client=orcl70;

System altered.

SQL> alter system set log_archive_dest_state_1='enable';

#启用设置的日志路径

System altered.

SQL> alter system set log_archive_dest_state_2='enable';

System altered.

SQL> alter system set

db_file_name_convert='/u01/app/oracle/oradata/orcl71','/u01/app/oracle/oradata/orcl70' scope=spfile;

#如果主备库文件的存放路径不同，还需要设置以下两个参数（需要重启数据库生效）

System altered.

```
SQL> alter system set  
log_file_name_convert='/u01/app/oracle/oradata/orcl71','/u01/app/oracle/orada  
ta/orcl70' scope=spfile;
```

System altered.

```
SQL> alter system set standby_file_management=auto;  
#设置文件管理模式，此项设置为自动，不然在主库创建数据文件后，备库不  
会自动创建
```

System altered.

备注：上面修改的参数有的需要重启数据库生效，下面为重启数据库步骤。

```
SQL> shutdown immediate;#关闭数据库
```

Database closed.

Database dismounted.

ORACLE instance shut down.

```
SQL> startup;
```

ORACLE instance started.

Total System Global Area 3340451840 bytes

Fixed Size 2257840 bytes

Variable Size 1862274128 bytes

Database Buffers 1459617792 bytes

Redo Buffers 16302080 bytes

Database mounted.

Database opened.

2.2.7 拷贝参数文件

用 spfile 文件创建 pfile 文件：

```
SQL> create pfile from spfile;
```

File created.

使用 scp 命令：

```
[oracle@redhat70 ~]$ cd /u01/app/oracle/product/11.2.0.4/dbhome_1/dbs/
```

```
[oracle@redhat70 dbs]$ ll
```

total 28

```
-rw-rw---- 1 oracle oinstall 1544 Dec 13 05:38 hc_orcl70.dat
```

```
-rw-r--r-- 1 oracle oinstall 2851 May 15 2009 init.ora
```

```
-rw-r--r-- 1 oracle oinstall 1577 Dec 13 05:38 initorcl70.ora
```

```
-rw-r----- 1 oracle oinstall 24 Dec 3 08:24 lkORCL70
```

```
-rw-r----- 1 oracle oinstall 1536 Dec 3 08:26 orapworcl70
```

```
-rw-r----- 1 oracle oinstall 4608 Dec 13 05:39 spfileorcl70.ora
```

```
[oracle@redhat70 dbs]$ scp initorcl70.ora
```

```
redhat71:/u01/app/oracle/product/11.2.0.4/dbhome_1/dbs/
```

The authenticity of host 'redhat71 (192.168.133.71)' can't be established.

ECDSA key fingerprint is f8:09:85:c0:a1:2e:30:45:92:e2:19:86:ac:29:ee:ef.

```
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'redhat71,192.168.133.71' (ECDSA) to the list of
known hosts.
oracle@redhat71's password:
initiorcl70.ora          100% 1577      1.5KB/s   00:00
```

2.2.8 拷贝密码文件

```
使用 scp 命令：
[oracle@redhat70 ~]$ cd /u01/app/oracle/product/11.2.0.4/dbhome_1/dbs/
[oracle@redhat70 dbs]$ ll
total 28
-rw-rw---- 1 oracle oinstall 1544 Dec 13 05:38 hc_orcl70.dat
-rw-r--r-- 1 oracle oinstall 2851 May 15  2009 init.ora
-rw-r--r-- 1 oracle oinstall 1577 Dec 13 05:38 initorcl70.ora
-rw-r----- 1 oracle oinstall  24 Dec  3 08:24 lkORCL70
-rw-r----- 1 oracle oinstall 1536 Dec  3 08:26 orapworcl70
-rw-r----- 1 oracle oinstall 4608 Dec 13 05:39 spfileorcl70.ora
[oracle@redhat70 dbs]$ scp orapworcl70
redhat71:/u01/app/oracle/product/11.2.0.4/dbhome_1/dbs/
oracle@redhat71's password:
orapworcl70          100% 1536      1.5KB/s   00:00
```

2.2.9 修改监听配置文件

```
[oracle@redhat70 ~]$ cd
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/
[oracle@redhat70 admin]$ ll
total 12
-rw-r--r-- 1 oracle oinstall 375 Dec 13 03:42 listener.ora
drwxr-xr-x 2 oracle oinstall  61 Dec  3 08:03 samples
-rw-r--r-- 1 oracle oinstall 381 Dec 17  2012 shrept.lst
-rw-r--r-- 1 oracle oinstall 334 Dec  3 08:23 tnsnames.ora
[oracle@redhat70 admin]$ vim listener.ora
# listener.ora Network Configuration File:
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/listener.ora
# Generated by Oracle configuration tools.
```

```
LISTENER =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = TCP)(HOST = redhat70)(PORT = 1521))
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1521))
    )
  )
```

```
ADR_BASE_LISTENER = /u01/app/oracle
```

备注：如果主库上的监听已经配置，这里可以忽略。

2.2.10 修改 TNS 配置文件

```
[oracle@redhat70 ~]$ cd
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/
[oracle@redhat70 admin]$ ll
total 12
-rw-r--r-- 1 oracle oinstall 375 Dec 13 03:42 listener.ora
drwxr-xr-x 2 oracle oinstall 61 Dec 3 08:03 samples
-rw-r--r-- 1 oracle oinstall 381 Dec 17 2012 shrept.lst
-rw-r--r-- 1 oracle oinstall 334 Dec 3 08:23 tnsnames.ora
[oracle@redhat70 admin]$ vim tnsnames.ora
# tnsnames.ora Network Configuration File:
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/tnsnames.ora
# Generated by Oracle configuration tools.
```

```
ORCL70 =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = TCP)(HOST = redhat70)(PORT = 1521))
    )
    (CONNECT_DATA =
      (SERVICE_NAME = orcl70)
    )
  )
```

```
ORCL71 =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = TCP)(HOST = redhat71)(PORT = 1521))
    )
    (CONNECT_DATA =
      (SERVICE_NAME = orcl71)
    )
  )
```

2.2.11 重启监听服务

```
[oracle@redhat70 ~]$ lsnrctl stop
```

LSNRCTL for Linux: Version 11.2.0.4.0 - Production on 13-DEC-2019 05:52:34

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

Connecting to

(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=redhat70)(PORT=1521)))

The command completed successfully

```
[oracle@redhat70 ~]$ lsnrctl start
```


LSNRCTL for Linux: Version 11.2.0.4.0 - Production on 13-DEC-2019 05:52:41

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

Starting /u01/app/oracle/product/11.2.0.4/dbhome_1/bin/tnslsnr: please wait...

TNSLSNR for Linux: Version 11.2.0.4.0 - Production

System parameter file is

/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/listener.ora

Log messages written to

/u01/app/oracle/diag/tnslsnr/redhat70/listener/alert/log.xml

Listening on:

(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=redhat70)(PORT=1521)))

Listening on: (DESCRIPTION=(ADDRESS=(PROTOCOL=ipc)(KEY=EXTPROC1521)))

Connecting to

(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=redhat70)(PORT=1521)))

STATUS of the LISTENER

Alias	LISTENER
Version	TNSLSNR for Linux: Version 11.2.0.4.0 - Production
Start Date	13-DEC-2019 05:52:41
Uptime	0 days 0 hr. 0 min. 0 sec
Trace Level	off
Security	ON: Local OS Authentication
SNMP	OFF

Listener Parameter File

/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/listener.ora

Listener Log File

/u01/app/oracle/diag/tnslsnr/redhat70/listener/alert/log.xml

Listening Endpoints Summary...

(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=redhat70)(PORT=1521)))

(DESCRIPTION=(ADDRESS=(PROTOCOL=ipc)(KEY=EXTPROC1521)))

The listener supports no services

The command completed successfully

[oracle@redhat70 ~]\$ **lsnrctl status**

LSNRCTL for Linux: Version 11.2.0.4.0 - Production on 13-DEC-2019 05:54:26

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

Connecting to

(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=redhat70)(PORT=1521)))

STATUS of the LISTENER

```
-----
Alias                                LISTENER
Version                             TNSLSNR for Linux: Version 11.2.0.4.0 - Production
Start Date                          13-DEC-2019 05:52:41
Uptime                              0 days 0 hr. 1 min. 45 sec
Trace Level                          off
Security                             ON: Local OS Authentication
SNMP                                 OFF
Listener Parameter File
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/listener.ora
Listener Log File
/u01/app/oracle/diag/tnslsnr/redhat70/listener/alert/log.xml
Listening Endpoints Summary...
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=redhat70)(PORT=1521)))
  (DESCRIPTION=(ADDRESS=(PROTOCOL=ipc)(KEY=EXTPROC1521)))
Services Summary...
Service "orcl70" has 1 instance(s).
  Instance "orcl70", status READY, has 1 handler(s) for this service...
Service "orcl70XDB" has 1 instance(s).
  Instance "orcl70", status READY, has 1 handler(s) for this service...
The command completed successfully
```

2.2.12 拷贝监听配置文件

使用 scp 命令:

```
[oracle@redhat70 ~]$ cd
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/
[oracle@redhat70 admin]$ ll
total 12
-rw-r--r-- 1 oracle oinstall 375 Dec 13 03:42 listener.ora
drwxr-xr-x 2 oracle oinstall 61 Dec 3 08:03 samples
-rw-r--r-- 1 oracle oinstall 381 Dec 17 2012 shrept.lst
-rw-r--r-- 1 oracle oinstall 512 Dec 13 05:51 tnsnames.ora
[oracle@redhat70 admin]$ scp listener.ora
redhat71:/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/
oracle@redhat71's password:
listener.ora                                100% 375      0.4KB/s  00:00
```

2.2.13 拷贝 TNS 配置文件

使用 scp 命令:

```
[oracle@redhat70 ~]$ cd
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/
[oracle@redhat70 admin]$ ll
total 12
-rw-r--r-- 1 oracle oinstall 375 Dec 13 03:42 listener.ora
drwxr-xr-x 2 oracle oinstall 61 Dec 3 08:03 samples
```

```
-rw-r--r-- 1 oracle oinstall 381 Dec 17 2012 shrept.lst
-rw-r--r-- 1 oracle oinstall 512 Dec 13 05:51 tnsnames.ora
[oracle@redhat70 admin]$ scp tnsnames.ora
redhat71:/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/
oracle@redhat71's password:
tnsnames.ora                                100% 512      0.5KB/s   00:00
```

2.3 备库配置

2.3.1 重命名参数文件

重命名拷贝过来的参数文件：

```
[oracle@redhat71 ~]$ cd /u01/app/oracle/product/11.2.0.4/dbhome_1/dbs/
[oracle@redhat71 dbs]$ ll
total 12
-rw-r--r-- 1 oracle oinstall 2851 May 15 2009 init.ora
-rw-r--r-- 1 oracle oinstall 1577 Dec 13 05:43 initorcl70.ora
-rw-r----- 1 oracle oinstall 1536 Dec 13 05:45 orapworcl70
[oracle@redhat71 dbs]$ mv initorcl70.ora initorcl71.ora
[oracle@redhat71 dbs]$ ll
total 12
-rw-r--r-- 1 oracle oinstall 2851 May 15 2009 init.ora
-rw-r--r-- 1 oracle oinstall 1577 Dec 13 05:43 initorcl71.ora
-rw-r----- 1 oracle oinstall 1536 Dec 13 05:45 orapworcl70
```

2.3.2 重命名密码文件

重命名拷贝过来的密码文件：

```
[oracle@redhat71 dbs]$ ll
total 12
-rw-r--r-- 1 oracle oinstall 2851 May 15 2009 init.ora
-rw-r--r-- 1 oracle oinstall 1577 Dec 13 05:43 initorcl70.ora
-rw-r----- 1 oracle oinstall 1536 Dec 13 05:45 orapworcl70
[oracle@redhat71 dbs]$ mv orapworcl70 orapworcl71
[oracle@redhat71 dbs]$ ll
total 12
-rw-r--r-- 1 oracle oinstall 2851 May 15 2009 init.ora
-rw-r--r-- 1 oracle oinstall 1577 Dec 13 05:43 initorcl71.ora
-rw-r----- 1 oracle oinstall 1536 Dec 13 05:45 orapworcl71
```

2.3.3 修改参数文件

修改重命名后的参数文件：

```
[oracle@redhat71 dbs]$ vim initorcl71.ora
orcl70.__db_cache_size=1459617792
orcl70.__java_pool_size=16777216
orcl70.__large_pool_size=83886080
orcl70.__oracle_base='/u01/app/oracle'#ORACLE_BASE set from environment
orcl70.__pga_aggregate_target=1342177280
orcl70.__sga_target=2013265920
orcl70.__shared_io_pool_size=0
```

```

orcl70.__shared_pool_size=419430400
orcl70.__streams_pool_size=0
*.audit_file_dest='/u01/app/oracle/admin/orcl71/adump'
*.audit_trail='db'
*.compatible='11.2.0.4.0'
*.control_files='/u01/app/oracle/oradata/orcl71/control01.ctl','/u01/app/oracle/oradata/orcl71/control02.ctl'
*.db_block_size=8192
*.db_domain=''
*.db_file_name_convert='/u01/app/oracle/oradata/orcl70','/u01/app/oracle/oradata/orcl71'
*.db_name='orcl70'
*.db_recovery_file_dest_size=5368709120
*.db_recovery_file_dest='/u01/app/oracle/oradata/orcl71/flashback'
*.db_unique_name='ORCL71'
*.diagnostic_dest='/u01/app/oracle'
*.dispatchers='(PROTOCOL=TCP) (SERVICE=orcl71XDB)'
*.fal_client='ORCL71'
*.fal_server='ORCL70'
*.log_archive_config='dg_config=(orcl71,orcl70)'
*.log_archive_dest_1='location=/u01/app/oracle/oradata/orcl71/archivelog
valid_for=(all_logfiles,all_roles) db_unique_name=orcl71'
*.log_archive_dest_2='service=ORCL70 lgwr async
valid_for=(online_logfiles,primary_role) db_unique_name=orcl70'
*.log_archive_dest_state_1='enable'
*.log_archive_dest_state_2='enable'
*.log_file_name_convert='/u01/app/oracle/oradata/orcl70','/u01/app/oracle/oradata/orcl71'
*.memory_target=3341811712
*.open_cursors=300
*.processes=150
*.remote_login_passwordfile='EXCLUSIVE'
*.standby_file_management='AUTO'
*.undo_tablespace='UNDOTBS1'

```

2.3.4 创建相应的文件目录

根据修改的参数文件，为备库创建相应的文件目录：

```

[oracle@redhat71 ~]$ mkdir -p /u01/app/oracle/admin/orcl71/adump
[oracle@redhat71 ~]$ mkdir -p /u01/app/oracle/oradata/orcl71/archivelog
[oracle@redhat71 ~]$ mkdir /u01/app/oracle/oradata/orcl71/flashback

```

2.3.5 修改监听配置文件

修改拷贝过来的监听配置文件：

```

[oracle@redhat71 ~]$ cd
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/
[oracle@redhat71 admin]$ ll

```

```
total 12
-rw-r--r-- 1 oracle oinstall 375 Dec 13 05:55 listener.ora
drwxr-xr-x 2 oracle oinstall 61 Dec 3 20:36 samples
-rw-r--r-- 1 oracle oinstall 381 Dec 17 2012 shrept.lst
-rw-r--r-- 1 oracle oinstall 512 Dec 13 05:57 tnsnames.ora
[oracle@redhat71 admin]$ vim listener.ora
# listener.ora Network Configuration File:
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/listener.ora
# Generated by Oracle configuration tools.
```

```
SID_LIST_LISTENER =
  (SID_LIST =
    (SID_DESC =
      (GLOBAL_DBNAME = orcl71)
      (ORACLE_HOME = /u01/app/oracle/product/11.2.0.4/dbhome_1)
      (SID_NAME = orcl71)
    )
  )
```

```
LISTENER =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = TCP)(HOST = redhat71)(PORT = 1521))
    )
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1521))
    )
  )
```

```
ADR_BASE_LISTENER = /u01/app/oracle
```

2.3.6 修改 TNS 配置文件

修改拷贝过来的 TNS 配置文件：

```
[oracle@redhat71 ~]$ cd
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/
[oracle@redhat71 admin]$ ll
total 12
-rw-r--r-- 1 oracle oinstall 375 Dec 13 05:55 listener.ora
drwxr-xr-x 2 oracle oinstall 61 Dec 3 20:36 samples
-rw-r--r-- 1 oracle oinstall 381 Dec 17 2012 shrept.lst
-rw-r--r-- 1 oracle oinstall 512 Dec 13 05:57 tnsnames.ora
[oracle@redhat71 admin]$ vim tnsnames.ora
# tnsnames.ora Network Configuration File:
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/tnsnames.ora
# Generated by Oracle configuration tools.
```

```

ORCL70 =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = TCP)(HOST = redhat70)(PORT = 1521))
    )
    (CONNECT_DATA =
      (SERVICE_NAME = orcl70)
    )
  )

```

```

ORCL71 =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = TCP)(HOST = redhat71)(PORT = 1521))
    )
    (CONNECT_DATA =
      (SERVICE_NAME = orcl71)
    )
  )

```

备注：拷贝过来的 TNS 配置文件可不作修改。

2.3.7 重启监听服务

```
[oracle@redhat71 ~]$ lsnrctl start
```

LSNRCTL for Linux: Version 11.2.0.4.0 - Production on 13-DEC-2019 06:21:45

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

Starting /u01/app/oracle/product/11.2.0.4/dbhome_1/bin/tnslsnr: please wait...

TNSLSNR for Linux: Version 11.2.0.4.0 - Production

System parameter file is

/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/listener.ora

Log messages written to

/u01/app/oracle/diag/tnslsnr/redhat71/listener/alert/log.xml

Listening on:

(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=redhat71)(PORT=1521)))

Listening on: (DESCRIPTION=(ADDRESS=(PROTOCOL=ipc)(KEY=EXTPROC1521)))

Connecting to

(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=redhat71)(PORT=1521)))

STATUS of the LISTENER

Alias

LISTENER

Version TNSLNR for Linux: Version 11.2.0.4.0 - Production
Start Date 13-DEC-2019 06:21:45
Uptime 0 days 0 hr. 0 min. 0 sec
Trace Level off
Security ON: Local OS Authentication
SNMP OFF
Listener Parameter File
/u01/app/oracle/product/11.2.0.4/dbhome_1/network/admin/listener.ora
Listener Log File
/u01/app/oracle/diag/tnslnr/redhat71/listener/alert/log.xml
Listening Endpoints Summary...
(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=redhat71)(PORT=1521)))
(DESCRIPTION=(ADDRESS=(PROTOCOL=ipc)(KEY=EXTPROC1521)))
Services Summary...
Service "orcl71" has 1 instance(s).
Instance "orcl71", status UNKNOWN, has 1 handler(s) for this service...
The command completed successfully

2.3.8 启动备库到 nomount 状态

指定 pfile 文件启动:

```
[oracle@redhat71 ~]$ sqlplus / as sysdba
```

SQL*Plus: Release 11.2.0.4.0 Production on Fri Dec 13 06:23:35 2019

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

Connected to an idle instance.

```
SQL> startup nomount
```

```
pfile='/u01/app/oracle/product/11.2.0.4/dbhome_1/dbs/initorcl71.ora'
```

ORACLE instance started.

Total System Global Area 3340451840 bytes

Fixed Size 2257840 bytes

Variable Size 1862274128 bytes

Database Buffers 1459617792 bytes

Redo Buffers 16302080 bytes

```
SQL> create spfile from pfile;#用 pfile 文件创建 spfile 文件
```

File created.

```
SQL> shutdown immediate;#关闭数据库
```

ORA-01507: database not mounted

ORACLE instance shut down.
 SQL> exit
 Disconnected from Oracle Database 11g Enterprise Edition Release 11.2.0.4.0 -
 64bit Production
 With the Partitioning, OLAP, Data Mining and Real Application Testing options
 [oracle@redhat71 ~]\$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Fri Dec 13 06:35:18 2019

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

Connected to an idle instance.

SQL> startup nomount;#从 spfile 启动到 nomount 状态
 ORACLE instance started.

Total System Global Area 3340451840 bytes
 Fixed Size 2257840 bytes
 Variable Size 1862274128 bytes
 Database Buffers 1459617792 bytes
 Redo Buffers 16302080 bytes
 SQL> select status from v\$instance;#查看备库状态

STATUS

 STARTED

2.4 验证监听和 TNS 配置

2.4.1 主库验证

[oracle@redhat70 ~]\$ sqlplus sys/oracle@orcl70 as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Fri Dec 13 06:27:46 2019

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, OLAP, Data Mining and Real Application Testing options

SQL> show parameter db_unique_name;#查看 orcl70 主库唯一名字

NAME	TYPE	VALUE
db_unique_name	string	ORCL70


```
SQL> exit
Disconnected from Oracle Database 11g Enterprise Edition Release 11.2.0.4.0 -
64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options
[oracle@redhat70 ~]$ sqlplus sys/oracle@orcl71 as sysdba
```

SQL*Plus: Release 11.2.0.4.0 Production on Fri Dec 13 06:28:45 2019

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, OLAP, Data Mining and Real Application Testing options

```
SQL> show parameter db_unique_name;#查看 orcl71 备库唯一名字
```

NAME	TYPE	VALUE
db_unique_name	string	ORCL71

2.4.2 备库验证

```
[oracle@redhat71 ~]$ sqlplus sys/oracle@orcl71 as sysdba
```

SQL*Plus: Release 11.2.0.4.0 Production on Fri Dec 13 06:30:20 2019

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, OLAP, Data Mining and Real Application Testing options

```
SQL> show parameter db_unique_name;查看 orcl71 备库唯一名字
```

NAME	TYPE	VALUE
db_unique_name	string	ORCL71

```
SQL> exit
Disconnected from Oracle Database 11g Enterprise Edition Release 11.2.0.4.0 -
64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options
[oracle@redhat71 ~]$ sqlplus sys/oracle@orcl70 as sysdba
```

SQL*Plus: Release 11.2.0.4.0 Production on Fri Dec 13 06:30:35 2019

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, OLAP, Data Mining and Real Application Testing options

SQL> show parameter db_unique_name;#查看 orcl70 主库唯一名字

NAME	TYPE	VALUE
db_unique_name	string	ORCL70

备注：在主备库上都能测试通过才能执行下面步骤

2.5 恢复数据库

2.5.1 恢复数据库

[oracle@redhat71 ~]\$ rman target sys/oracle@orcl70 auxiliary sys/oracle@orcl71

Recovery Manager: Release 11.2.0.4.0 - Production on Fri Dec 13 06:36:37 2019

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

connected to target database: ORCL70 (DBID=491844425)

connected to auxiliary database: ORCL70 (not mounted)

RMAN> duplicate target database for standby from active database;

#复制文件到备库

具体执行过程如下：

Starting Duplicate Db at 13-DEC-19

using target database control file instead of recovery catalog

allocated channel: ORA_AUX_DISK_1

channel ORA_AUX_DISK_1: SID=22 device type=DISK

contents of Memory Script:

```
{
  backup as copy reuse
    targetfile '/u01/app/oracle/product/11.2.0.4/dbhome_1/dbs/orapworcl70'
  auxiliary format
    '/u01/app/oracle/product/11.2.0.4/dbhome_1/dbs/orapworcl71' ;
}
```

executing Memory Script

Starting backup at 13-DEC-19

allocated channel: ORA_DISK_1

channel ORA_DISK_1: SID=51 device type=DISK

Finished backup at 13-DEC-19

contents of Memory Script:

```
{
    backup as copy current controlfile for standby auxiliary format
    '/u01/app/oracle/oradata/orcl71/control01.ctl';
    restore clone controlfile to   '/u01/app/oracle/oradata/orcl71/control02.ctl'
```

from

```
    '/u01/app/oracle/oradata/orcl71/control01.ctl';
}
```

executing Memory Script

Starting backup at 13-DEC-19

using channel ORA_DISK_1

channel ORA_DISK_1: starting datafile copy

copying standby control file

output file

name=/u01/app/oracle/product/11.2.0.4/dbhome_1/dbs/snapcf_orcl70.f

tag=TAG20191213T082300 RECID=2 STAMP=1026894183

channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:07

Finished backup at 13-DEC-19

Starting restore at 13-DEC-19

using channel ORA_AUX_DISK_1

channel ORA_AUX_DISK_1: copied control file copy

Finished restore at 13-DEC-19

contents of Memory Script:

```
{
    sql clone 'alter database mount standby database';
}
```

executing Memory Script

sql statement: alter database mount standby database

contents of Memory Script:

```
{
    set newname for tempfile 1 to
    '/u01/app/oracle/oradata/orcl71/temp01.dbf';
    switch clone tempfile all;
    set newname for datafile 1 to
    '/u01/app/oracle/oradata/orcl71/system01.dbf';
```

```

        set newname for datafile 2 to
"/u01/app/oracle/oradata/orcl71/sysaux01.dbf";
        set newname for datafile 3 to
"/u01/app/oracle/oradata/orcl71/undotbs01.dbf";
        set newname for datafile 4 to
"/u01/app/oracle/oradata/orcl71/users01.dbf";
        set newname for datafile 5 to
"/u01/app/oracle/oradata/orcl71/example01.dbf";
        backup as copy reuse
        datafile 1 auxiliary format
"/u01/app/oracle/oradata/orcl71/system01.dbf" datafile
2 auxiliary format
"/u01/app/oracle/oradata/orcl71/sysaux01.dbf" datafile
3 auxiliary format
"/u01/app/oracle/oradata/orcl71/undotbs01.dbf" datafile
4 auxiliary format
"/u01/app/oracle/oradata/orcl71/users01.dbf" datafile
5 auxiliary format
"/u01/app/oracle/oradata/orcl71/example01.dbf" ;
        sql 'alter system archive log current';
}

```

executing Memory Script

executing command: SET NEWNAME

renamed tempfile 1 to /u01/app/oracle/oradata/orcl71/temp01.dbf in control file

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

Starting backup at 13-DEC-19

using channel ORA_DISK_1

channel ORA_DISK_1: starting datafile copy

input datafile file number=00001

name=/u01/app/oracle/oradata/orcl70/system01.dbf

output file name=/u01/app/oracle/oradata/orcl71/system01.dbf

tag=TAG20191213T082325

channel ORA_DISK_1: datafile copy complete, elapsed time: 00:05:49
channel ORA_DISK_1: starting datafile copy
input datafile file number=00002
name=/u01/app/oracle/oradata/orcl70/sysaux01.dbf

output file name=/u01/app/oracle/oradata/orcl71/sysaux01.dbf
tag=TAG20191213T082325
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:02:25
channel ORA_DISK_1: starting datafile copy
input datafile file number=00005
name=/u01/app/oracle/oradata/orcl70/example01.dbf
output file name=/u01/app/oracle/oradata/orcl71/example01.dbf
tag=TAG20191213T082325
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:01:45
channel ORA_DISK_1: starting datafile copy
input datafile file number=00003
name=/u01/app/oracle/oradata/orcl70/undotbs01.dbf
output file name=/u01/app/oracle/oradata/orcl71/undotbs01.dbf
tag=TAG20191213T082325
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:45
channel ORA_DISK_1: starting datafile copy
input datafile file number=00004
name=/u01/app/oracle/oradata/orcl70/users01.dbf
output file name=/u01/app/oracle/oradata/orcl71/users01.dbf
tag=TAG20191213T082325
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:03
Finished backup at 13-DEC-19

sql statement: alter system archive log current

contents of Memory Script:

```
{  
    switch clone datafile all;  
}
```

executing Memory Script

datafile 1 switched to datafile copy
input datafile copy RECID=2 STAMP=1026894854 file
name=/u01/app/oracle/oradata/orcl71/system01.dbf
datafile 2 switched to datafile copy
input datafile copy RECID=3 STAMP=1026894854 file
name=/u01/app/oracle/oradata/orcl71/sysaux01.dbf
datafile 3 switched to datafile copy

```
input datafile copy RECID=4 STAMP=1026894854 file
name=/u01/app/oracle/oradata/orcl71/undotbs01.dbf
datafile 4 switched to datafile copy
input datafile copy RECID=5 STAMP=1026894854 file
name=/u01/app/oracle/oradata/orcl71/users01.dbf
datafile 5 switched to datafile copy
input datafile copy RECID=6 STAMP=1026894854 file
name=/u01/app/oracle/oradata/orcl71/example01.dbf
```

Finished Duplicate Db at 13-DEC-19

2.5.2 开启实时同步

```
SQL> alter database open;#open 数据库
```

Database altered.

```
SQL> select status from v$instance; #查看备库状态
```

STATUS

OPEN

```
SQL> select open_mode from v$database;#查看备库状态
```

OPEN_MODE

READ ONLY

```
SQL> alter database recover managed standby database using current logfile
disconnect from session;
```

#开启实时同步

Database altered.

2.5.3 开启闪回

Data Guard 搭建好后，开启备库的闪回：

```
SQL> alter database recover managed standby database cancel;
```

#关闭实时同步

Database altered.

```
SQL> shutdown immediate;#关闭数据库
```

Database closed.

Database dismounted.

ORACLE instance shut down.

```
SQL> startup mount;#启动到 mount 状态
```

ORACLE instance started.

Total System Global Area 3340451840 bytes

Fixed Size 2257840 bytes
Variable Size 1862274128 bytes
Database Buffers 1459617792 bytes
Redo Buffers 16302080 bytes

Database mounted.

SQL> alter database flashback on;#开启备库闪回

Database altered.

SQL> alter database open;#open 数据库

Database altered.

SQL> alter database recover managed standby database using current logfile
disconnect from session;

 #开启实时同步

Database altered.

2.6 验证 DG 同步

2.6.1 查询主库最大归档序号

主库执行:

SQL> select max(sequence#) from v\$archived_log;

MAX(SEQUENCE#)

13

备库验证:

SQL> select max(sequence#) from v\$archived_log;

MAX(SEQUENCE#)

13

2.6.2 日志切换

主库执行:

SQL> alter system archive log current;

System altered.

SQL> select max(sequence#) from v\$archived_log;

MAX(SEQUENCE#)

14

备库验证:

```
SQL> select max(sequence#) from v$archived_log;
```

```
MAX(SEQUENCE#)
```

```
-----
```

14

2.6.3 查看主备库状态

主库执行:

```
SQL> select switchover_status,database_role from v$database;
```

```
SWITCHOVER_STATUS    DATABASE_ROLE
```

```
-----
```

```
SESSIONS ACTIVE      PRIMARY
```

备库执行:

```
SQL> select switchover_status,database_role from v$database;
```

```
SWITCHOVER_STATUS    DATABASE_ROLE
```

```
-----
```

```
NOT ALLOWED          PHYSICAL STANDBY
```

2.6.4 创建一个 table 测试

主库执行:

```
SQL> create table dg(id number);#创建 dg 表
```

Table created.

```
SQL> insert into dg values(1);#插入数据
```

1 row created.

```
SQL> commit;#提交事务
```

Commit complete.

```
SQL> select * from dg;#主库查询 dg 表
```

```
      ID
```

```
-----
```

1

备库验证:

```
SQL> select * from dg;#备库查询 dg 表
```

```
      ID
```

```
-----
```

1

2.6.5 备注: DG 是同步的