上海黄金交易所

Oracle Active Dataguard

容灾实施报告

****

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# 概述

本文档为RAC TO RAC的ADG部署手册。根据“深圳灾备中心”和“模拟环境”的数据库复制环境架构，主要包含如下要点：

1. 主备均为RAC架构，且使用专线进行数据复制，需提前将专线网卡加入集群，配置专用监听。
2. 专线网络存在带宽限制，故采用RMAN备份还原的方式搭建DG。通过提前将备份文件传输至深圳灾备中心，缩短DG搭建时间；
3. 专线网络传输距离远且存在带宽限制，故使用ASYNC传输方式且启用压缩功能。
4. 为减少日志应用LAG，缩短FAILOVER时间，备库使用Real-Time Apply。
5. 备库端需启用最小附加日志，standby log member为2个。
6. 为满足切换演练需求，备库需提前做好SNAPSHOT STANDBY相关配置。
7. 备库角色切换为primary/snapshot standby后，需自动启用与上海生产中心数据库一致的服务名。

**数据复制关系参考：**

深圳灾备数据中心

上海生产数据中心

ADG

DSG

DSG

图1：上海生产中心与深圳灾备中心数据复制关系图

# 实施步骤

## 1、基本信息

(如下是tra主、备库基本信息)主库使用两节点RAC，备库也使用两节点RAC进行搭建ADG，具体信息如下表格：

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **DB类型** | **主机名** | **DB\_NAME** | **DB\_UNIQUE\_NAME** | **INSTANCE** | **ASM DG** |
| 主库 | traracdb1 | sgetradb | sgetradb | sgetradb1 | DATA,ARCH |
| traracdb2 | sgetradb2 |
| 备库 | traracdb1 | sgetradb | sgetradbdg | sgetradbdg1 | DATA,ARCH |
| traracdb2 | sgetradbdg2 |

灾备网络地址

|  |  |  |  |
| --- | --- | --- | --- |
| **数据中心** | **主机** | **灾备IP** | **灾备VIP** |
| 上海 | traracdb1 | 12.1.101.10 | 12.1.101.11 |
|  | traracdb2 | 12.1.101.20 | 12.1.101.21 |
| 深圳 | traracdb1 | 20.1.101.10 | 20.1.101.11 |
|  | traracdb2 | 20.1.101.20 | 20.1.101.21 |

## 2、准备工作

### 2.1、删除旧库（备库端）

dbca删除旧库sgetradbdg，清空+DATA,+ARCH磁盘组

### 2.2、RMAN备份主库（主库端）

1）查看数据库大小

SQL> SELECT SUM(DS.BYTES)/1024/1024/1024 "SIZE(G)" FROM DBA\_SEGMENTS ds;

2）编写脚本进行全库备份

|  |
| --- |
| [oracle@traracdb1 bak]$ vi fullbak.sh  export ORACLE\_SID=sgetradb1  export ORACLE\_BASE=/app/oracle  export ORACLE\_HOME=$ORACLE\_BASE/product/11.2.0/db\_1  export LD\_LIBRARY\_PATH=$ORACLE\_HOME/lib  export NLS\_DATE\_FORMAT="yyyy-mm-dd hh24:mi:ss"  export NLS\_LANG="AMERICAN\_AMERICA.ZHS16GBK"  export PATH=$PATH:$HOME/bin:$ORACLE\_HOME/bin  bak\_host=$(hostname)  bak\_date=$(date '+%Y%m%d')  bak\_dir=/backup/rman/${bak\_host}\_${bak\_date}  mkdir -p $bak\_dir  rman target / <<EOF  run{  CONFIGURE DEVICE TYPE DISK PARALLELISM 4 BACKUP TYPE TO COMPRESSED BACKUPSET;  configure channel device type disk maxpiecesize 4G;  BACKUP  FORMAT='$bak\_dir/data\_%U\_%T.dbf'  DATABASE;  BACKUP SPFILE FORMAT '$bak\_dir/spfile\_%U\_%T.ora';  backup current controlfile for standby format'$bak\_dir/ctl\_stand\_con.ctl';  }  EXIT;  EOF |

[oracle@traracdb1 bak]$ chmod 755 fullbak.sh

[oracle@traracdb1 bak]$ nohup sh fullbak.sh > fullbak.log &

说明：做以上备份操作后，参考4.1节将主库的参数文件进行备份

### 2.3、传输RMAN备份文件至备库服务器（主库端）

将2.2节的全库备份通过灾备复制网络传输至深圳traracdb1服务器的/backup目录中。

### 2.4、修改/etc/hosts(备库端)

添加DG专用IP、VIP、远端IP

[root@traracdb1 ~]# vi /etc/hosts

127.0.0.1 traracdb1 localhost localhost.localdomain localhost4 localhost4.localdomain4

#public

20.1.2.31 traracdb1

20.1.2.41 traracdb2

#priv

1.1.1.1 traracdb1-priv

1.1.1.2 traracdb2-priv

#vip

20.1.2.30 traracdb1-vip

20.1.2.40 traracdb2-vip

#scan

20.1.2.38 traracdb-scan

20.1.124.8 tradgdb

192.21.1.3 nas\_nfs

**#shanghai\_moni**

**12.1.101.10 traracdb1\_sh**

**12.1.101.20 traracdb2\_sh**

**12.1.101.11 traracdb1\_sh-vip**

**12.1.101.21 traracdb2\_sh-vip**

**#shenzhen**

**20.1.101.10 traracdb1\_dg**

**20.1.101.20 traracdb2\_dg**

**20.1.101.11 traracdb1\_dg-vip**

**20.1.101.21 traracdb2\_dg-vip**

### 2.5、RAC集群加入专用网卡及监听（备库端）

1）检查已配置添加的network

[root@traracdb1 ~]# /app/11.2.0/grid/bin/srvctl config network

Network exists: 1/20.1.2.0/255.255.255.0/team0, type static

Network exists: 2/20.1.101.0/255.255.255.0/team1, type static

2）验证集群资源和状态

[root@traracdb1 ~]# /app/11.2.0/grid/bin/crsctl stat res -t

--------------------------------------------------------------------------------

NAME TARGET STATE SERVER STATE\_DETAILS

--------------------------------------------------------------------------------

Local Resources

--------------------------------------------------------------------------------

ora.ARCH.dg

ONLINE ONLINE traracdb1

ONLINE ONLINE traracdb2

ora.DATA.dg

ONLINE ONLINE traracdb1

ONLINE ONLINE traracdb2

ora.LISTENER.lsnr

ONLINE ONLINE traracdb1

ONLINE ONLINE traracdb2

**ora.LISTENER\_DG.lsnr**

**ONLINE ONLINE traracdb1**

**ONLINE ONLINE traracdb2**

ora.OCR.dg

ONLINE ONLINE traracdb1

ONLINE ONLINE traracdb2

ora.asm

ONLINE ONLINE traracdb1 Started

ONLINE ONLINE traracdb2 Started

ora.gsd

OFFLINE OFFLINE traracdb1

OFFLINE OFFLINE traracdb2

**ora.net1.network**

**ONLINE ONLINE traracdb1**

**ONLINE ONLINE traracdb2**

**ora.net2.network**

**ONLINE ONLINE traracdb1**

**ONLINE ONLINE traracdb2**

ora.ons

ONLINE ONLINE traracdb1

ONLINE ONLINE traracdb2

ora.LISTENER\_SCAN1.lsnr

1 ONLINE ONLINE traracdb2

ora.cvu

1 ONLINE ONLINE traracdb1

ora.oc4j

1 ONLINE ONLINE traracdb1

ora.scan1.vip

1 ONLINE ONLINE traracdb2

ora.traracdb1.vip

1 ONLINE ONLINE traracdb1

**ora.traracdb1\_dg-vip.vip**

**1 ONLINE ONLINE traracdb1**

ora.traracdb2.vip

1 ONLINE ONLINE traracdb2

**ora.traracdb2\_dg-vip.vip**

**1 ONLINE ONLINE traracdb2**

### 2.6、添加tnsnames.ora文件信息

1）配置主备端四个节点的tnsnames.ora，添加如下信息：

|  |
| --- |
| SGETRADB =  (DESCRIPTION =  (ADDRESS = (PROTOCOL = TCP)(HOST = 12.1.101.11)(PORT = 1521))  (ADDRESS = (PROTOCOL = TCP)(HOST = 12.1.101.21)(PORT = 1521))  (CONNECT\_DATA =  (SERVER = DEDICATED)  (SERVICE\_NAME = sgetradb)  )  )  SGETRADBDG =  (DESCRIPTION =  (ADDRESS = (PROTOCOL = TCP)(HOST = 20.1.101.11)(PORT = 1521))  (CONNECT\_DATA =  (SERVER = DEDICATED)  (SERVICE\_NAME = sgetradbdg)  )  ) |

2）在备库端两节点的tnsnames.ora添加如下：

traracdb1:

listener\_net1 =

(DESCRIPTION =

(ADDRESS = (PROTOCOL = TCP)(HOST = 20.1.2.30)(PORT = 1521))

)

listener\_net2 =

(DESCRIPTION =

(ADDRESS = (PROTOCOL = TCP)(HOST =20.1.101.11)(PORT = 1521))

)

remote\_net2 =

(DESCRIPTION\_LIST =

(DESCRIPTION = (ADDRESS = (PROTOCOL = TCP)(HOST = 20.1.101.11)(PORT = 1521)))

(DESCRIPTION = (ADDRESS = (PROTOCOL = TCP)(HOST = 20.1.101.21)(PORT = 1521)))

)

traracdb2:

listener\_net1 =

(DESCRIPTION =

(ADDRESS = (PROTOCOL = TCP)(HOST =20.1.2.40)(PORT = 1521))

)

listener\_net2 =

(DESCRIPTION =

(ADDRESS = (PROTOCOL = TCP)(HOST = 20.1.101.21)(PORT = 1521))

)

remote\_net2 =

(DESCRIPTION\_LIST =

(DESCRIPTION = (ADDRESS = (PROTOCOL = TCP)(HOST = 20.1.101.11)(PORT = 1521)))

(DESCRIPTION = (ADDRESS = (PROTOCOL = TCP)(HOST = 20.1.101.21)(PORT = 1521)))

)

**#以上已添加可通过lsnrctl status查看状态**

### 2.7、拷贝密码文件

1）**主库端**传输口令文件到备库端如下：

scp orapwsgetradb1 traracdb1:/app/oracle/product/11.2.0/db\_1/dbs/

scp orapwsgetradb1 traracdb2:/app/oracle/product/11.2.0/db\_1/dbs/

2）**备库端**修改口令文件名如下：

cd $ORACLE\_HOME/dbs

mv orapwsgetradb1 orapwsgetradbdg1

scp orapwsgetradb1 traracdb2:/app/oracle/product/11.2.0/db\_1/dbs/ orapwsgetradb2

## 3、主库检查（主库端）

### 3.1、是否安装相关组件

SQL> SELECT \* FROM V$OPTION WHERE PARAMETER in ('Oracle Data Guard',’Advanced Compression’);

PARAMETER VALUE

----------------- ----------

Oracle Data Guard TRUE

Advanced Compression TRUE

### 3.2、FORCE\_LOGGING模式

select force\_logging from v$database;

(开启：alter database force logging;)

### 3.3、最小附件日志

SQL> SELECT INST\_ID,SUPPLEMENTAL\_LOG\_DATA\_MIN FROM GV$DATABASE;

INST\_ID SUPPLEME

---------- ---

1 YES

2 YES

### 3.4、归档模式

SQL> archive log list;

Database log mode Archive Mode

Automatic archival Enabled

Archive destination +DATA

Oldest online log sequence 63

Next log sequence to archive 64

Current log sequence 64

### 3.5、 remote\_login\_passwordfile配置

show parameter remote\_login\_passwordfile

（remote\_login\_passwordfile应为EXCLUSIVE）

## 4、修改参数文件

### 4.1、修改主库参数

1）将主库备份的参数文件传送至备库进行修改

su – oracle

sqlplus / as sysdba

create pfile='/tmp/oracle/initsgetradb1.ora.bak' from spfile;

2）修改主库参数

alter system set log\_archive\_config='dg\_config=(sgetradb,sgetradg,sgetradbdg)' scope=both sid='\*';

alter system set log\_archive\_dest\_state\_3='defer' scope=both sid='\*';

#等备库实例启动，再开启enabled

alter system set log\_archive\_dest\_3=

'service=sgetradbdg ASYNC compression=enable valid\_for=(ONLINE\_LOGFILE,PRIMARY\_ROLE) DB\_UNIQUE\_NAME='sgetradbdg' scope=both sid='\*';

alter system set fal\_client=' sgetradb' scope=both sid='\*';

alter system set fal\_server='sgetradg' ,'sgetradbdg' scope=both sid='\*';

alter system set standby\_file\_management=AUTO scope=both sid='\*';

alter system set log\_archive\_max\_processes = 8 scope=both sid='\*';

### 4.2、修改备库参数

1）将主库备份的参数文件传送至备库进行修改(主库)

scp initsgetradb1.ora.bak traracdb1:/app/oracle/product/11.2.0/db\_1/dbs

mv initsgetradb1.ora.bak initsgetradbdg1.ora

2）修改备库参数文件(备库)

\*.\_cleanup\_rollback\_entries=2000

\*.\_datafile\_write\_errors\_crash\_instance=FALSE

\*.\_disable\_streams\_pool\_auto\_tuning=TRUE

\*.\_optimizer\_mjc\_enabled=FALSE

\*.\_optimizer\_use\_feedback=FALSE

\*.\_PX\_use\_large\_pool=TRUE

\*.archive\_lag\_target=3600

4\*.cluster\_database=true

\*.audit\_file\_dest='/app/oracle/admin/sgetradbdg/adump'

\*.audit\_trail='XML','EXTENDED'

\*.compatible='11.2.0.4.0'

\*.control\_file\_record\_keep\_time=30

\*.control\_files='+data/sgetradbdg/controlfile/control01.ctl','+arch/sgetradbdg/controlfile/control02.ctl'

\*.db\_block\_checking='FULL'

\*.db\_block\_size=8192

\*.db\_cache\_size=25769803776

\*.db\_create\_file\_dest='+data'

\*.db\_domain=''

\*.db\_files=2048

\*.db\_flashback\_retention\_target=240

\*.db\_name='sgetradb'

\*.db\_recovery\_file\_dest='+arch'

\*.db\_recovery\_file\_dest\_size=21474836480

\*.db\_writer\_processes=2

\*.deferred\_segment\_creation=FALSE

\*.diagnostic\_dest='/app/oracle'

\*.dispatchers='(PROTOCOL=TCP) (SERVICE=sgetradbdgXDB)'

\*.enable\_ddl\_logging=TRUE

\*.event='28401 TRACE NAME CONTEXT FOREVER, LEVEL 1'

\*.filesystemio\_options='SETALL'

\*.job\_queue\_processes=10

\*.large\_pool\_size=268435456

\*.log\_archive\_dest\_1='LOCATION=+ARCH'

\*.log\_archive\_format='%t\_%s\_%r.dbf'

\*.open\_cursors=1000

\*.parallel\_max\_servers=12

\*.pga\_aggregate\_target=20G

\*.processes=2000

\*.remote\_login\_passwordfile='EXCLUSIVE'

\*.resource\_limit=TRUE

\*.resource\_manager\_plan=''

\*.service\_names='sgetradbdg'

\*.session\_cached\_cursors=100

\*.sga\_target=80G

\*.cluster\_database=TRUE

\*cluster\_database\_instances=2

sgetradbdg2.thread=2

sgetradbdg1.thread=1

sgetradbdg1.undo\_tablespace='UNDOTBS1'

sgetradbdg2.undo\_tablespace='UNDOTBS2'

sgetradbdg1.instance\_number=1

sgetradbdg2.instance\_number=2

sgetradbdg1.listener\_networks='((NAME=network1)(LOCAL\_LISTENER=listener\_net1)(REMOTE\_LISTENER=traracdb-scan:1521))','((NAME=network2)(LOCAL\_LISTENER=listener\_net2)(REMOTE\_LISTENER=remote\_net2))'

sgetradbdg2.listener\_networks='((NAME=network1)(LOCAL\_LISTENER=listener\_net1)(REMOTE\_LISTENER=traracdb-scan:1521))','((NAME=network2)(LOCAL\_LISTENER=listener\_net2)(REMOTE\_LISTENER=remote\_net2))'

\*.db\_file\_name\_convert='/oradata/sgetradb','+data/sgetradbdg/datafile'

\*.log\_file\_name\_convert='/oraredo/sgetradb','+data/sgetradbdg/onlinelog','/oraarch/sgetradb','+arch/sgetradbdg/onlinelog'

\*.log\_archive\_dest\_1='LOCATION=+ARCH VALID\_FOR=(ALL\_LOGFILES,ALL\_ROLES) DB\_UNIQUE\_NAME=sgetradbdg'

\*.log\_archive\_dest\_3='SERVICE=sgetradb ASYNC compression=enable valid\_for=(ONLINE\_LOGFILE,PRIMARY\_ROLE) DB\_UNIQUE\_NAME=sgetradb'

\*.log\_archive\_dest\_state\_3='enable'

\*.db\_unique\_name='sgetradbdg'

\*.fal\_client='sgetradbdg'

\*.fal\_server='sgetradb'

\*.log\_archive\_config='dg\_config=(sgetradb,sgetradbdg)'

\*.standby\_file\_management='AUTO'

\*.log\_archive\_max\_processes=4

#注：如果log\_file\_name\_convert里面有logfile,需要提前在DATA和ARCH磁盘组里面添加目录。

su - grid

asmcmd

cd data

cd sgetradbdg

mkdir logfile

cd arch

cd sgetradbdg

mkdir logfile

1. 创建文件夹（备库）

mkdir -p /app/oracle/admin/sgetradbdg/adump

1. 检查以上文件夹是否已创建（备库）

## 5创建并恢复备库实例（备库端）

### 5.1 启动实例至nomount

SQL>create spfile='+DATA/sgetradbdg/spfilesgetradbdg.ora'

from pfile='/app/oracle/product/11.2.0/db\_1/dbs/initsgetradbdg1.ora';

cp initsgetradbdg1.ora initsgetradbdg1.ora.bak

vi initsgetradbdg1.ora

SPFILE='+DATA/sgetradbdg/spfilesgetradbdg.ora'

vi initsgetradbdg2.ora --节点2

SPFILE='+DATA/sgetradbdg/spfilesgetradbdg.ora'

SQL> startup nomount

#检查数据库是否使用spfile启动及参数：

show parameter spfile

show parameter name

show parameter standby

show parameter cluster

show parameter listerner

### 5.2 恢复控制文件

RMAN> restore controlfile from '/backup/ctl\_stand\_con.ctl';

RMAN> alter database mount;

database mounted

released channel: ORA\_DISK\_1

### 5.3 恢复数据库

RMAN> catalog start with ' /backup/rmanfromsh';

RMAN> crosscheck backupset;

RMAN> delete noprompt expired backup;

RMAN> restore database;

## 6 创建standby redo

### 6.1、查看原库日志文件大小（主备库）

col group# for 99

col thread# for 99

col member for a60

col bytes for 99999999

col status for a10

col type for a20

set linesize 200

set pagesize 100

SELECT L.GROUP#, L.THREAD#, LF.MEMBER, L.BYTES/1024/1024, L.STATUS, LF.TYPE

FROM V$LOG L, V$LOGFILE LF

WHERE L.GROUP# = LF.GROUP#;

### 6.2、创建standby日志组（主备库）

1) 先确认控制文件中已有的standby logfile信息，删除之后再新建

select group#,status,type,member from v$logfile;

Alter database drop standby logfile group n;

…

2）添加备库端两节点的standby日志组

alter database add standby logfile thread 1 group 20 ('+DATA','+ARCH') size 1024M;

alter database add standby logfile thread 1 group 21 ('+DATA','+ARCH') size 1024M;

alter database add standby logfile thread 1 group 22 ('+DATA','+ARCH') size 1024M;

alter database add standby logfile thread 1 group 23 ('+DATA','+ARCH') size 1024M;

alter database add standby logfile thread 1 group 24 ('+DATA','+ARCH') size 1024M;

alter database add standby logfile thread 1 group 25 ('+DATA','+ARCH') size 1024M;

alter database add standby logfile thread 2 group 26 ('+DATA','+ARCH') size 1024M;

alter database add standby logfile thread 2 group 27 ('+DATA','+ARCH') size 1024M;

alter database add standby logfile thread 2 group 28 ('+DATA','+ARCH') size 1024M;

alter database add standby logfile thread 2 group 29 ('+DATA','+ARCH') size 1024M;

alter database add standby logfile thread 2 group 30 ('+DATA','+ARCH') size 1024M;

alter database add standby logfile thread 2 group 31 ('+DATA','+ARCH') size 1024M;

### 6.3开启日志投递（主库端）

alter system set log\_archive\_dest\_state\_3='enable' scope=both sid=’\*’;

alter system switch logfile;

### 6.4、备库介质恢复（备库端）

alter database recover managed standby database using current logfile

disconnect from session nodelay;

#日志应用完成

alter database recover managed standby database cancel;

alter database open;

## 7 备库添加相关资源（备库端）

### 7.1、将库添加到CRS资源

/app/11.2.0/grid/bin/srvctl add database -d sgetradbdg -n sgetradb -o /app/oracle/product/11.2.0/db\_1 -p +DATA/sgetradbdg/spfilesgetradbdg.ora -r physical\_standby -a DATA,ARCH

/app/11.2.0/grid/bin/srvctl add instance -d sgetradbdg -i sgetradbdg1 -n traracdb1

/app/11.2.0/grid/bin/srvctl add instance -d sgetradbdg -i sgetradbdg2 -n traracdb2

### 7.2、 启动数据库

srvctl start database -d sgetradbdg

### 7.3、 查看数据库资源状态

[root@traracdb1 ~]# /app/11.2.0/grid/bin/crsctl stat res ora.sgetradbdg.db -t

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NAME TARGET STATE SERVER STATE\_DETAILS

-------------------------------------------------------------------------------

Cluster Resources

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ora.sgetradbdg.db

1 ONLINE ONLINE traracdb1 Open,Readonly

2 ONLINE ONLINE traracdb2 Open,Readonly

### 7.4、新增服务名到CRS资源

srvctl add service -d sgetradbdg -s sgetra -r sgetradbdg2 -a sgetradbdg1 -P BASIC -m BASIC -e SELECT -w 5 -z 3 -l PRIMARY,SNAPSHOT\_STANDBY

sql> ALTER SYSTEM SET service\_names='sgetradbdg','sgetra' SCOPE=BOTH;

#sgetra服务供应用连接

srvctl start service -d sgetradbdg -s sgetra

### 7.5、查看服务资源状态

/app/11.2.0/grid/bin/crsctl stat res -t

Ora.sgetradbdg.sgetra.svc

OFFLINE OFFLINE

## 8 备库开启日志应用（备库端）

1）连接到节点1上的实例，开启日志应用：

SQL> alter database recover managed standby database using current logfile

disconnect from session nodelay;

2）查看状态，表示主备库同步状态正常。

SQL>select inst\_id,process,status,thread#,sequence#,block# from gv$managed\_standby where PROCESS like 'MRP%';

## 9 SNAPSHOT STANDBY相关配置

SQL> alter system set DB\_RECOVERY\_FILE\_DEST\_SIZE=20G scope=both sid='\*';

System altered.

SQL> alter system set db\_recovery\_file\_dest='+DATA' scope=both sid='\*';

System altered.

## 10 检查集群状态及监听服务状态

$ su – grid

$ crsctl stat res -t

$ srvctl status service -d sgetradbdg -s sgetra

$ lsnrctl status

$ lsnrctl status LISTENER\_SCAN1