Create Physical Standby Database using duplicate

Customer: Guarantee Trust Bank plc Nigeria

Project: 19c Multitenant implementation and migration

Target: Create Physical standby database.

Technology: Recovery manager, OraNet services, Data Guard.

Table of contents:

1- **Purpose of this Document**

The purpose of this document is to provide a step-by-step guide for creating a standby database.

2- **Introduction:**

There are several ways to create physical standby database, which include the below:

- Create physical standby database using RMAN backup sets.
- Create physical standby database using RMAN DUPLICATE.

Usually RMAN backup, transfer, restore is an easier option, but due the large database size duplicate is more efficient and the target of the document is to achieve an onsite destination to offload reporting systems and to have High Availability is case of disasters.

3- **Primary database prerequisites and Parameters.**

a. Enabled forced logging and flashback by issuing the following commands:

```
ALTER DATABASE FORCE LOGGING;

ALTER DATABASE FLASHBACK ON;
```

Confirm settings:

```
Select database_role, force_logging,flashback_on,log_mode,db_unqiue_name from v$database;
```

```
  1* select database_role,FORCE_LOGGING,FLASHBACK_ON,LOG_MODE,DB_UNIQUE_NAME from v$database
SQL> /

DATABASE_ROLE    FORCE_LOGGING   FLASHBACK_ON    LOG_MODE     DB_UNIQUE_NAME
---------------- --------------- --------------- ------------ --------------------
PRIMARY          YES             YES             ARCHIVELOG   HOBANK
```

b. Copy password file from ASM both onsite and DR site by following below steps:

- Confirm the default password file for the database by checking the configuration of the database using srvctl:

```
srvctl config database -d HOBANK
```

```
[grid@banksdb1 ~]$ srvctl config database -d HOBANK
Database unique name: HOBANK
Database name: HOBANK
Oracle home: /u01/app/oracle/product/19c/dbhome_1
Oracle user: oracle
Spfile: +DATA/HOBANK/PARAMETERFILE/spfileHOBANK.ora
Password file: +DATA/HOBANK/PASSWORD/orapwhobank
Domain: WORLD4
```

- copy password file from ASM to file system , as grid user execute the below:

```
asmcmd pwcopy  +DATA/HOBANK/PASSWORD/orapwhobank /home/grid/pwfile_temp.ora
```

- transfer pwfile_temp.ora from main site to onsite ADG and to both DR nodes as grid user.

At Onsite ADG, place the file under $ORACLE_HOME/dbs and name it orapwHOBANK

AT DR site, place the file under $ORACLE_HOME/dbs and name it orapwHOBANKDR1 for node1 and HOBANKDR2 for node2.

c. Create standby logs at main site , standby logs should meet the below:

- Size of standby redo should be the same as the size of online redo.
- Number of groups should be equal or greater in one for each instance in the cluster.

d. Ensure that tablespacesare available and no OFFLINE status:
At container level:

```
Select distinct status from cdb_tablespaces;
```

```
SQL> select distinct STATUS from cdb_tablespaces;

STATUS
---------
READ ONLY
ONLINE
```

```
Select distinct status from cdb_data_files;
```

```
SQL> select distinct status from cdb_data_files;

STATUS
---------
AVAILABLE
```

Primary site Parameters:

```
select name,value from v$parameter where name in
('db_unique_name','log_archive_config','log_archive_dest_1','log_archive_dest_2','log_archive_dest_3','l
og_archive_dest_state_1','log_archive_dest_state_2','log_archive_dest_state_3','standby_file_managem
ent','log_archive_max_processes');
```

NAME	VALUE
db_unique_name	HOBANK
Log_archive_config	dg_config=(HOBANK,HOBANKREP,HOBANKDR)
Log_archive_dest_1	LOCATION=USE_DB_RECOVERY_FILE_DEST valid_for=(ALL_LOGFILES,ALL_ROLES) db_unique_name=HOBANK
Log_archive_dest_2	service="**REP**", ASYNC NOAFFIRM delay=1 optional compression=disable max_failure=0 reopen=300 db_unique_name="HOBANKREP" net_timeout=30, valid_for=(online_logfile,all_roles)
Log_archive_dest_3	service="**DR**", ASYNC NOAFFIRM delay=1 optional compression=disable max_failure=0 reopen=300 db_unique_name="HOBANKDR" net_timeout=30, valid_for=(online_logfile,all_roles)
Log_archive_dest_state_1	ENABLE
Log_archive_dest_state_2	ENABLE
Log_archive_dest_state_3	ENABLE
standby_file_management	AUTO
log_archive_max_processes	30
listener_networks	((NAME=net2)(LOCAL_LISTENER=(ADDRESS=(PROTOCOL=TCP)(HOST=60.60. 60.55)(PORT=1530))))

4- Net Service Entries:

Below entries are used for TNS naming at Primary nodes of the cluster:

Onsite ADG-private network 60.60.60.X:

```
REP =
 (DESCRIPTION =
  (ADDRESS = (PROTOCOL = TCP)(HOST = 60.60.60.48)(PORT = 1530))
  (CONNECT_DATA =
   (SERVER = DEDICATED)
   (SERVICE_NAME = HOBANK.WORLD4)
   (UR=A)
  )
```

DR Site:

```
DR =
 (DESCRIPTION =
  (ADDRESS = (PROTOCOL = TCP)(HOST = 10.0.21.84)(PORT = 1525))
  (ADDRESS = (PROTOCOL = TCP)(HOST = 10.0.21.85)(PORT = 1525))
  (LOAD_BALANCE = yes)
  (CONNECT_DATA =
   (SERVER = DEDICATED)
   (SERVICE_NAME = HOBANK.WORLD4)
   (UR=A)
  ))
```

Listener.ora entries (/u01/app/grid/network/admin):

Public Listener:

```
SID_LIST_LISTENER=
 (SID_LIST=
  (SID_DESC=
   (SID_NAME=HOBANK)
   (GLOBAL_DBNAME=HOBANK.WORLD4)
   (ORACLE_HOME=/u01/app/oracle/product/19c/dbhome_1)
  )
 )
```

Private Listener:

```
SID_LIST_LISTENER_DG=
 (SID_LIST=
  (SID_DESC=
   (SID_NAME=HOBANK)
   (GLOBAL_DBNAME=HOBANK.WORLD4)
   (ORACLE_HOME=/u01/app/oracle/product/19c/dbhome_1)
  )
 )
```

5- Onsite ADG Net Services and Parameters:

Net Service Entries:

```
PRIMARY =
 (DESCRIPTION =
  (ADDRESS = (PROTOCOL = TCP)(HOST = 60.60.60.55)(PORT = 1530))
  (CONNECT_DATA =
   (SERVER = DEDICATED)
   (SERVICE_NAME = HOBANK.WORLD4)
   (UR=A)
  )
 )
REP =
 (DESCRIPTION =
  (ADDRESS = (PROTOCOL = TCP)(HOST = 60.60.60.48)(PORT = 1530))
  (CONNECT_DATA =
   (SERVER = DEDICATED)
   (SERVICE_NAME = HOBANK.WORLD4)
   (UR=A)
  )
 )
```

Listener.ora entries (/u01/app/grid/network/admin):

Public Listener:

```
SID_LIST_LISTENER =
 (SID_LIST =
  (SID_DESC =
   (SID_NAME = HOBANK)
   (GLOBAL_DBNAME = HOBANK.WORLD4)
   (ORACLE_HOME = /u01/app/oracle/product/19c/dbhome_1)
  )
```

```
 )
```

Private Listener:

```
SID_LIST_LISTENER_DG =
 (SID_LIST =
  (SID_DESC =
   (SID_NAME = HOBANK)
   (GLOBAL_DBNAME = HOBANK.WORLD4)
   (ORACLE_HOME = /u01/app/oracle/product/19c/dbhome_1)
  )
 )
```

Parameters:

```
select name,value from v$parameter where name in
('db_unique_name','log_archive_config','log_archive_dest_1','log_archive_dest_2','log_archive_dest_3','log_archiv
e_dest_state_1','log_archive_dest_state_2','log_archive_dest_state_3','standby_file_management','log_archive_
max_processes','fal_server','fal_client','db_file_name_convert','log_file_name_convert','pdb_file_name_convert');
```

NAME	VALUE
db_unique_name	HOBANKREP
Log_archive_config	dg_config=(HOBANK,HOBANKREP)
Log_archive_dest_1	LOCATION=USE_DB_RECOVERY_FILE_DEST valid_for=(ALL_LOGFILES,ALL_ROLES) db_unique_name=HOBANKREP
Log_archive_dest_2	service="PRIMARY", ASYNC NOAFFIRM delay=1 optional compression=disable max_failu re=0 reopen=300 db_unique_name="HOBANK" net_timeout=30, valid_for=(online_logfil e,all_roles)
Log_archive_dest_state_1	ENABLE
Log_archive_dest_state_2	ENABLE
standby_file_management	AUTO
log_archive_max_processes	30
db_file_name_convert	HOBANK, HOBANKREP
log_file_name_convert	HOBANK, HOBANKREP
pdb_file_name_convert	HOBANK, HOBANKREP
fal_client	REP
fal_server	PRIMARY

6- DR Net Service and Parameters:

Net Service Entries:

Below entries are used for TNS naming at Primary nodes of the cluster:

```
PRIMARY =
 (DESCRIPTION =
  (ADDRESS = (PROTOCOL = TCP)(HOST = 10.0.1.67)(PORT = 1525))
  (ADDRESS = (PROTOCOL = TCP)(HOST = 10.0.1.68)(PORT = 1525))
  (LOAD_BALANCE = yes)
  (CONNECT_DATA =
   (SERVER = DEDICATED)
   (SERVICE_NAME = HOBANK.WORLD4)
   (UR=A)
  )
 )

DR =
 (DESCRIPTION =
  (ADDRESS = (PROTOCOL = TCP)(HOST = 10.0.21.84)(PORT = 1525))
  (ADDRESS = (PROTOCOL = TCP)(HOST = 10.0.21.85)(PORT = 1525))
  (LOAD_BALANCE = yes)
  (CONNECT_DATA =
   (SERVER = DEDICATED)
   (SERVICE_NAME = HOBANK.WORLD4)
   (UR=A)
  )
 )
```

Listener.ora entries (/u01/app/grid/network/admin):

Public Listener:

```
SID_LIST_LISTENER=
 (SID_LIST=
  (SID_DESC=
   (SID_NAME=HOBANKDR)
   (GLOBAL_DBNAME=HOBANKDR.WORLD4)
   (ORACLE_HOME=/u01/app/oracle/product/19c/dbhome_1)
  )
 )
```

Parameters:

```
select name,value from v$parameter where name in
('db_unique_name','log_archive_config','log_archive_dest_1','log_archive_dest_2','log_archive_dest_3','log_archiv
e_dest_state_1','log_archive_dest_state_2','log_archive_dest_state_3','standby_file_management','log_archive_
max_processes','fal_server','fal_client','db_file_name_convert','log_file_name_convert','pdb_file_name_convert');
```

NAME	VALUE
db_unique_name	HOBANKREP
Log_archive_config	dg_config=(HOBANK,HOBANKDR)
Log_archive_dest_1	LOCATION=USE_DB_RECOVERY_FILE_DEST valid_for=(ALL_LOGFILES,ALL_ROLES) db_unique_name=HOBANKDR
Log_archive_dest_2	service="**PRIMARY**", ASYNC NOAFFIRM delay=1 optional compression=disable max_failu re=0 reopen=300 db_unique_name="HOBANK" net_timeout=30, valid_for=(online_logfil e,all_roles)
Log_archive_dest_state_1	ENABLE
Log_archive_dest_state_2	ENABLE
standby_file_management	AUTO
log_archive_max_processes	30
db_file_name_convert	HOBANK, HOBANKDR
log_file_name_convert	HOBANK, HOBANKDR
pdb_file_name_convert	HOBANK, HOBANKDR
fal_client	DR
fal_server	PRIMARY

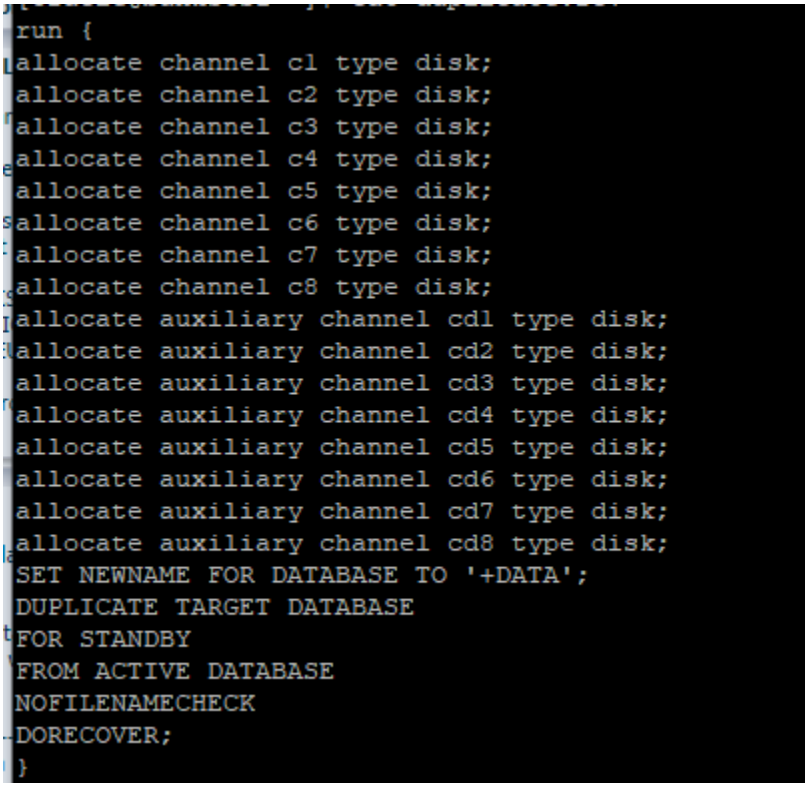
7- Duplicate Onsite ADG:

Below steps can be used to duplicate Onsite ADG from point zero:

a. Ensure that all ASM disk groups are empty and it has no contents.
b. Start the database in no mount stage.
   Note: database SPFILE in under $ORACLE_HOME/dbs/
c. Start the duplicate process:
   - Navigate as Oracle to /home/oracle/scripts under 10.0.4.123
   - Run the duplicate script: nohup ./dup.sh &
     dup.sh: has the rman string for primary and auxiliary instance along with duplicate script.

```
rman target sys/sys@primary auxiliary sys/sys@rep cmdfile=duplicate.rcv log=duplicate.log
```

duplicate.rcv: this script has the duplicate RMAN run block:



```
run {
allocate channel c1 type disk;
allocate channel c2 type disk;
allocate channel c3 type disk;
allocate channel c4 type disk;
allocate channel c5 type disk;
allocate channel c6 type disk;
allocate channel c7 type disk;
allocate channel c8 type disk;
allocate auxiliary channel cd1 type disk;
allocate auxiliary channel cd2 type disk;
allocate auxiliary channel cd3 type disk;
allocate auxiliary channel cd4 type disk;
allocate auxiliary channel cd5 type disk;
allocate auxiliary channel cd6 type disk;
allocate auxiliary channel cd7 type disk;
allocate auxiliary channel cd8 type disk;
SET NEWNAME FOR DATABASE TO '+DATA';
DUPLICATE TARGET DATABASE
FOR STANDBY
FROM ACTIVE DATABASE
NOFILENAMECHECK
DORECOVER;
}
```

- Monitor duplicate.log till the end.
- Once the duplicate is finished , drop standby logs by executing: drop_standby.sql
- Clear Redo log groups by running: cl1.sql, cl2.sql, cls.sql
- Add standby redo log groups: add_standby.sql

Note: above scripts should be changed in case customer added/removed redo log groups.

- Start replication:
  Alter database recover managed standby database disconnect from session;

8- Open Onsite ADG for reporting:

Once database is in SYNC state with Primary, the database can be opened for Read only access, to achieve this, follow the below:

- Stop replication: alter database recover managed standby database cancel;
- Open DB: alter database open;
- Open PDBs: alter pluggable database all open;
- Start replication: alter database recover managed standby database disconnect from session;
- Login to container , and the navigate to BANKS PDB:
  Alter session set container=BANKS;
  Alter system set remote_listener='' scope=memory;
  Alter session set container=WLS_REP;
  Alter system set remote_listener='' scope=memory;

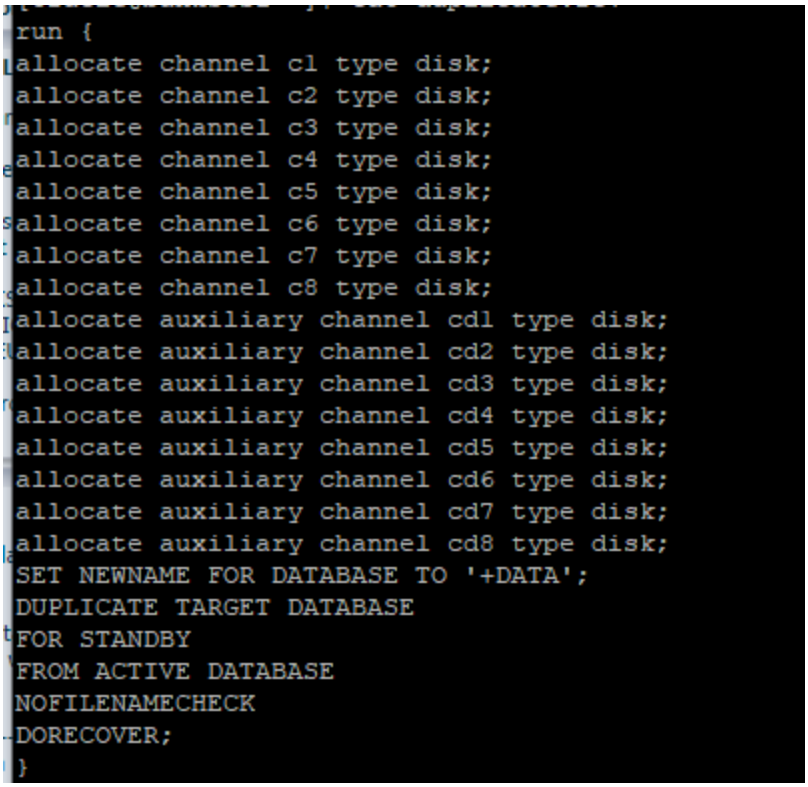
9- Duplicate DR:

Below steps can be used to duplicate DR ADG from point zero:

a. Ensure that all ASM disk groups are empty and it has no contents.
b. Ensure that both nodes are down and cluster database is set to FALSE.
c. Start the database at one node in no mount stage.
   Note: database SPFILE in under $ORACLE_HOME/dbs/
d. Start the duplicate process:
   - Navigate as Oracle to /home/oracle/scripts under 10.0.21.66
   - Run the duplicate script: nohup ./dup.sh &
     dup.sh: has the rman string for primary and auxiliary instance along with duplicate script.

```
rman target sys/sys@primary auxiliary sys/sys@DR cmdfile=duplicate.rcv log=duplicate.log
```

duplicate.rcv: this script has the duplicate RMAN run block:



```
run {
allocate channel c1 type disk;
allocate channel c2 type disk;
allocate channel c3 type disk;
allocate channel c4 type disk;
allocate channel c5 type disk;
allocate channel c6 type disk;
allocate channel c7 type disk;
allocate channel c8 type disk;
allocate auxiliary channel cd1 type disk;
allocate auxiliary channel cd2 type disk;
allocate auxiliary channel cd3 type disk;
allocate auxiliary channel cd4 type disk;
allocate auxiliary channel cd5 type disk;
allocate auxiliary channel cd6 type disk;
allocate auxiliary channel cd7 type disk;
allocate auxiliary channel cd8 type disk;
SET NEWNAME FOR DATABASE TO '+DATA';
DUPLICATE TARGET DATABASE
FOR STANDBY
FROM ACTIVE DATABASE
NOFILENAMECHECK
DORECOVER;
}
```

- Monitor duplicate.log till the end.
- Once the duplicate is finished , drop standby logs by executing: drop_standby.sql
- Clear Redo log groups by running: cl1.sql, cl2.sql, cls.sql
- Add standby redo log groups: add_standby.sql

Note: above scripts should be changed in case customer added/removed redo log groups.

- Stop both nodes and change cluster database to TRUE.
- Start both nodes at mount stage:
- Start replication:

  Alter database recover managed standby database disconnect from session;