Practice Title	**Perform Role Transitions**
Purpose	This practice takes you through the procedure to perform switchover and failover in a Data Guard environment that is managed by the Broker.
Software version	Oracle database version 12.1.0.2 on Oracle Linux 6.7 64-bit.
Document version	1.2, Jul-2016
Required Software / Files	**VirtualBox Appliance** The practice has been implemented on an Oracle virtual appliances that have been created in “Practice 3 Configure the Broker”.
Hardware	About 85 GB of free disk space to be used by the appliances of this practice.

Data Guard Configuration Specifications

Protection Mode	Maximum Performance
fast-start failover	Disabled
The management interface	Broker
Standby Database Type	Physical Standby
Standby Database Unique Name	ORADB_S2
Standby Database Hostname	srv2

The Practice Overview

The Practice Environment

- We will work on the appliances that we created in the practice number 3. We will make a copy of the folder that contains the appliances.

Perform Switchover

- Carry out the switchover procedure on our Data Guard configuration.

Perform Failover

- Mimic a primary database disaster and perform the failover procedure.
- Run the steps to reinstate the failed primary database.

Practice Procedure

Get the Environment Ready

1. Work on the appliances that were created in the practice number 3. Make a copy of the folder that contains the appliances. Let's give the copied folder the name "**Practice 7 Role Transition**".

2. In VirtualBox open the two appliances in the folder "Perform Role Transitions"

3. Make sure the databases are up and running.

4. Verify the Broker configuration is enabled. No need to start the MRP at this step.

```
dgmgrl sys/oracle@oradb
show configuration
show database oradb
show database oradb_s2
```

5. On both databases, create a Flashback Database Guaranteed Restore Point (GRP). GRP will be used to restore the databases, in case the switchover failed.

```
# on the primary:
sqlplus sys/oracle@oradb as sysdba
CREATE RESTORE POINT before_switchover GUARANTEE FLASHBACK DATABASE;

# on the standby (cannot be done, if the MRP is running)
conn sys/oracle@oradb_s2 as sysdba
CREATE RESTORE POINT before_switchover GUARANTEE FLASHBACK DATABASE;
```

6. Start the Apply process (MRP):

```
dgmgrl sys/oracle@oradb
edit database oradb_s2 set state=apply-on;
show database oradb_s2
```

7. Make sure the database is statically registered in the listener. Remember, you need to switch to grid user.

   You have already made a static registry for the standby database. Do the same for the primary database.

   Note: as with all TNS files, do **not** copy/paste from the PDF file. Copy the code from the text file attached to the lecture files.

```
su – grid
vi $TNS_ADMIN/listener.ora
...
SID_LIST_LISTENER =
(SID_LIST =
  (SID_DESC=
   (GLOBAL_DBNAME=ORADB.localdomain)
     (SID_NAME=ORADB)
     (ORACLE_HOME=/u01/app/oracle/product/12.1.0/db_1)
   )
 (SID_DESC =
   (GLOBAL_DBNAME = ORADB_DGMGRL.localdomain)
   (ORACLE_HOME = /u01/app/oracle/product/12.1.0/db_1)
   (SID_NAME = ORADB)
  )
)
...

# re-start the listener
srvctl stop listener
srvctl start listener

# test the connection:
su – oracle
sqlplus sys/oracle@oradb as sysdba
```

Perform Switchover

Preparatory Steps

8. Verify that the standby has received all redo

```
connect sys/oracle@oradb as sysdba
SELECT THREAD#,SEQUENCE#,STATUS FROM V$LOG;

connect sys/oracle@oradb_s2 as sysdba
SELECT CLIENT_PROCESS,PROCESS,SEQUENCE#,STATUS FROM V$MANAGED_STANDBY;

# alternative method:
dgmgrl sys/oracle@oradb_s2
show database oradb_s2
```

9. Verify that the MRP process status is APPLYING_LOG:

```
connect sys/oracle@oradb_s2 as sysdba
SELECT STATUS FROM V$MANAGED_STANDBY  WHERE PROCESS LIKE 'MRP%';
```

10. Start monitoring the alert log files

```
# on srv1
tail -f /u01/app/oracle/diag/rdbms/oradb/ORADB/trace/alert_ORADB.log
tail -f /u01/app/oracle/diag/rdbms/oradb/ORADB/trace/drcORADB.log

# on srv2
tail -f /u01/app/oracle/diag/rdbms/oradb_s2/ORADB_S2/trace/alert_ORADB_S2.log
```

Switchover to the Standby Database

11. Start the DGMGRL and issue the following commands:

```
dgmgrl sys/oracle@oradb_s2
VALIDATE DATABASE oradb_s2;
SWITCHOVER TO oradb_s2;

# Verify the new configuration:
SHOW CONFIGURATION
SHOW DATABASE ORADB
SHOW DATABASE ORADB_S2
```

12. Try connecting to both databases as non-SYS user. You should not be able to connect to ORADB now because it is running in STANDBY role and MOUNT state.

```
sqlplus system/oracle@oradb
sqlplus system/oracle@oradb_s2
```

13. Switchover to ORADB again:

```
dgmgrl sys/oracle@oradb_s2
SWITCHOVER TO oradb

# Verify the new configuration
# Note: do not check the configuration straight away after the previous command is finished. Wait for a few minutes. The Broker takes some time before it reports about the new configuration.
SHOW CONFIGURATION
SHOW DATABASE ORADB
SHOW DATABASE ORADB_S2
```

14. Drop the GRP created earlier:

```
sqlplus sys/oracle@oradb as sysdba
DROP RESTORE POINT before_switchover;

# Note: no need to stop the MRP
connect sys/oracle@oradb_s2 as sysdba
DROP RESTORE POINT before_switchover;
```

Perform Failover

Perform Failover

15. Mimic a primary database failover

```
# on primary database appliance (srv1):
conn / as sysdba
show parameter db_unique_name
shutdown abort
```

16. Connect to the standby database via DGMGRL and issue the command:

```
dgmgrl sys/oracle@oradb_s2
FAILOVER TO oradb_s2

# Verify the new configuration:
SHOW CONFIGURATION
SHOW DATABASE ORADB
```

17. Test connecting to the new primary database, as normal user.

```
sqlplus system/oracle@oradb_s2
```

Perform Primary Database Reinstate

Caution: as this stage do not disable the Broker configuration. If you do that now, you may end up with a situation to re-create the configuration again.

18. Mount the old primary database:

```
conn / as sysdba
STARTUP MOUNT
```

19. Reinstate the database using the Broker command line. Connect to the new primary database.

```
# connect to ORADB_S2 ( because it is the primary database now. Don't connect to ORADB!)
dgmgrl sys/oracle@oradb_s2

DGMGRL> REINSTATE DATABASE oradb;
```

20. Verify the configuration

```
SHOW CONFIGURATION
SHOW DATABASE ORADB
SHOW DATABASE ORADB_S2
```

Note: You can test switching over back to ORADB. It should go smoothly with no issue.

Notes

Shutting Down the Broker Configuration Members

- Stop the Broker configuration members:

```
connect sys/oracle@oradb_s2
EDIT DATABASE oradb_s2 SET STATE=APPLY-OFF;
```

- Shutdown the databases and then the appliances

Note: the appliances used in this practice (which are saved in "Perform Role Transition" folder) will **not** be needed anymore in this course. You can delete the folder, if you wish.