

Configuration of 10g Data Guard Broker and Observer for Switchover

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Configuring Data Guard Broker for Switchover, General Review.

On a previous document, [10g Data Guard, Physical Standby Creation, step by step](#) I did describe how to implement a Data Guard configuration; on this document I'm adding how to configure the broker and observer, setup the database to Maximum Availability and managing switchover from Data Guard Manager, DGMGRL.

Data Guard Broker permit to manage a Data Guard Configuration, from both the Enterprise Manager Grid Control console, or from a terminal in command line mode. In this document I will explore command line mode.

Pre requisites include the use of 10g Oracle server, using spfile on both the primary and standby and a third server for the Observer, and configure the listeners to include a service for the Data Guard Broker.

The Enviroment

- 2 Linux servers, Oracle Distribution 2.6.9-55 EL i686 i386 GNU/Linux, the Primary and Standby databases are located on these servers.
- 1 Linux server, RH Linux 2.6.9-42.ELsmp x86_64 GNU/Linux, The Data Guard Broker Observer is located on this server
- Oracle Database 10g Enterprise Edition Release 10.2.0.1.0
ssh is configured for user oracle on both nodes
- Oracle Home is on identical path on both nodes
- Primary database WHITEOWL
- Standby database BLACKOWL

Implementation notes:

Once you have your primary and standby databases up and running these are the steps to follow:

1. [Enable Data Guard Broker Start on the Primary and Standby databases.](#)

2. [Setup the Local Listener parameter if the listener port is not the standard 1521, on both the Primary and Standby databases.](#)
3. [Setup the listener and tnsnames to enable communication with both the Primary and Standby databases.](#)
4. [Setup the Broker configuration files](#)
5. [Check and edit properties](#)
6. [Enable the configuration and databases](#)
7. [Enable Fast Start Failover and the Observer](#)

Step by Step Implementation of Data Guard Broker

Enable Data Guard Broker Start on the Primary and Standby databases

```
SQL> ALTER SYSTEM SET DG_BROKER_START=TRUE SCOPE=BOTH;
```

System altered.

Setup the Local Listener parameter on both the Primary and Standby databases

```
SQL> ALTER SYSTEM SET LOCAL_LISTENER='LISTENER_VMRATEST' SCOPE=BOTH;
```

System altered.

Setup the tnsnames to enable communication with both the Primary and Standby databases

The listener.ora should include a service named *global_db_nameDGMGRL* to enable the broker to start the databases on the event of switchover. This configuration needs to be included on both servers.

Listener.ora on Node 1

```
LISTENER_VMRATEST =  
  (DESCRIPTION_LIST =  
    (DESCRIPTION =  
      (ADDRESS = (PROTOCOL = TCP)(HOST = vmratest2)(PORT = 1522)(IP = FIRST))  
    )  
  )
```

```
SID_LIST_LISTENER_VMRATEST =  
  (SID_LIST =  
    (SID_DESC =  
      (GLOBAL_DBNAME = whiteowl)  
      (ORACLE_HOME = /oradisk/app01/oracle/product/10gDB )  
      (SID_NAME = whiteowl)  
    )  
    (SID_DESC =  
      (SID_NAME=whiteowl)  
      (GLOBAL_DBNAME = whiteowl_DGMGRL)  
      (ORACLE_HOME = /oradisk/app01/oracle/product/10gDB )  
    )  
  )
```

Listener.ora on Node 2

```
LISTENER_VMRATEST =  
  (DESCRIPTION_LIST =  
    (DESCRIPTION =  
      (ADDRESS = (PROTOCOL = TCP)(HOST = vmratest2)(PORT = 1522)(IP = FIRST))
```

```
)  
)
```

Tnsnames.ora on Node 1, 2 and the observer node

```
whiteowl=  
  (DESCRIPTION =  
    (ADDRESS = (PROTOCOL = TCP)(HOST = vmractest1)(PORT = 1522))  
    (CONNECT_DATA =  
      (SERVER = DEDICATED)  
      (SERVICE_NAME = whiteowl_DGMGRL)  
    )  
  )  
)
```

```
blackowl=  
  (DESCRIPTION =  
    (ADDRESS = (PROTOCOL = TCP)(HOST = vmractest2)(PORT = 1522))  
    (CONNECT_DATA =  
      (SERVER = DEDICATED)  
      (SERVICE_NAME = blackowl_DGMGRL)  
    )  
  )  
)
```

Setup the Broker configuration files

The broker configuration files are automatically created when the broker is started using ALTER SYSTEM SET DG_BROKER_START=TRUE.

The default destination can be modified using the parameters DG_BROKER_CONFIG_FILE1 and DG_BROKER_CONFIG_FILE2

On Primary:

```
SQL> show parameters DG_BROKER_CONFIG
```

NAME	TYPE	VALUE
dg_broker_config_file1	string	/oradisk/app01/oracle/product/ 10gDB/dbs/dr1whiteowl.dat
dg_broker_config_file2	string	/oradisk/app01/oracle/product/ 10gDB/dbs/dr2whiteowl.dat

On Standby:

```
SQL> show parameters DG_BROKER_CONFIG
```

NAME	TYPE	VALUE
dg_broker_config_file1	string	/oradisk/app01/oracle/product/ 10gDB/dbs/dr1blackowl.dat
dg_broker_config_file2	string	/oradisk/app01/oracle/product/ 10gDB/dbs/dr2blackowl.dat

Next create from within the DGMGRL the configuration

```
[vmractest1] > dgmgrl
```

DGMGRL for Linux: Version 10.2.0.1.0 - Production

Copyright (c) 2000, 2005, Oracle. All rights reserved.

Welcome to DGMGRL, type "help" for information.

```
DGMGRL> CONNECT sys/oracle@whiteowl
```

Connected.

```
DGMGRL> CREATE CONFIGURATION WHITEOWL AS  
> PRIMARY DATABASE IS whiteowl  
> CONNECT IDENTIFIER IS whiteowl;
```

Configuration "whiteowl" created with primary database "whiteowl"

Add the standby to the configuration and check it

```
DGMGRL> ADD DATABASE blackowl AS  
> CONNECT IDENTIFIER IS blackowl  
> MAINTAINED AS PHYSICAL;
```

Database "blackowl" added

```
DGMGRL> SHOW CONFIGURATION;
```

Configuration

Name: whiteowl

Enabled: NO

Protection Mode: MaxPerformance

Fast-Start Failover: DISABLED

Databases:

whiteowl - Primary database

blackowl - Physical standby database

Current status for "whiteowl":
DISABLED

Check and edit database properties

In this case parameter DbFileNameConvert has an error, it lacks the leading backslash:

```
DGMGRL> SHOW DATABASE VERBOSE blackowl;
```

Database

```
Name:      blackowl  
Role:      PHYSICAL STANDBY  
Enabled:    NO  
Intended State: OFFLINE  
Instance(s):  
  blackowl
```

Properties:

```
InitialConnectIdentifier    = 'blackowl'  
LogXptMode                  = 'ASYNC'  
Dependency                  = ''  
DelayMins                   = '0'  
Binding                     = 'OPTIONAL'  
MaxFailure                  = '0'  
MaxConnections              = '1'  
ReopenSecs                  = '300'  
NetTimeout                  = '180'  
LogShipping                  = 'ON'  
PreferredApplyInstance      = ''  
ApplyInstanceTimeout        = '0'  
ApplyParallel               = 'AUTO'  
StandbyFileManagement       = 'auto'
```



```
ArchiveLagTarget          = '0'
LogArchiveMaxProcesses    = '30'
LogArchiveMinSucceedDest  = '1'
DbFileNameConvert         = 'vmasmtest/od01/WHITEOWL/WHITEOWL/datafile/, /oradisk/od01/BLACKOWL/datafile/'
LogFileNameConvert        = '/vmasmtest/od01/WHITEOWL/WHITEOWL/onlinelog/, /oradisk/od01/BLACKOWL/onlinelog/'
FastStartFailoverTarget   = ''
StatusReport              = '(monitor)'
InconsistentProperties     = '(monitor)'
InconsistentLogXptProps   = '(monitor)'
SendQEntries              = '(monitor)'
LogXptStatus              = '(monitor)'
RecvQEntries              = '(monitor)'
HostName                  = 'vmractest2.partneresm.co.il'
SidName                   = 'blackowl'
LocalListenerAddress      = '(ADDRESS=(PROTOCOL=TCP)(HOST=vmractest2)(PORT=1522)(IP=FIRST))'
StandbyArchiveLocation    = '/oradisk/od01/BLACKOWL/archives/'
AlternateLocation         = ''
LogArchiveTrace           = '0'
LogArchiveFormat          = '%t_%s_%r.arc'
LatestLog                 = '(monitor)'
TopWaitEvents             = '(monitor)'
```

Current status for "blackowl":
DISABLED

```
DGMGRL> EDIT DATABASE "blackowl" SET PROPERTY 'DbFileNameConvert' =
'/vmasmtest/od01/WHITEOWL/WHITEOWL/datafile/, /oradisk/od01/BLACKOWL/datafile/';
```

Property "DbFileNameConvert" updated

The parameter DbFileNameConvert will be updated on the database also on the next restart.

Enabling the configuration and databases

```
DGMGRL> enable configuration;  
Enabled.  
DGMGRL> show configuration;
```

Configuration

```
Name:          whiteowl  
Enabled:       YES  
Protection Mode:  MaxPerformance  
Fast-Start Failover: DISABLED  
Databases:  
  whiteowl - Primary database  
  blackowl - Physical standby database
```

```
Current status for "whiteowl":  
SUCCESS
```

```
DGMGRL> enable database blackowl;  
Enabled.
```

```
DGMGRL> SHOW DATABASE VERBOSE blackowl;
```

Database

```
Name:          blackowl  
Role:          PHYSICAL STANDBY  
Enabled:       YES  
Intended State: ONLINE
```

Instance(s):

blackowl

Properties:

InitialConnectIdentifier = 'blackowl'
LogXptMode = 'ASYNC'
Dependency = ''
DelayMins = '0'
Binding = 'OPTIONAL'
MaxFailure = '0'
MaxConnections = '1'
ReopenSecs = '300'
NetTimeout = '180'
LogShipping = 'ON'
PreferredApplyInstance = ''
ApplyInstanceTimeout = '0'
ApplyParallel = 'AUTO'
StandbyFileManagement = 'auto'
ArchiveLagTarget = '0'
LogArchiveMaxProcesses = '30'
LogArchiveMinSucceedDest = '1'
DbFileNameConvert = '/vmasmtest/od01/WHITEOWL/WHITEOWL/datafile/ , /oradisk/od01/BLACKOWL/datafile/'
LogFileNameConvert = '/vmasmtest/od01/WHITEOWL/WHITEOWL/onlinelog/, /oradisk/od01/BLACKOWL/onlinelog/'
FastStartFailoverTarget = ''
StatusReport = '(monitor)'
InconsistentProperties = '(monitor)'
InconsistentLogXptProps = '(monitor)'
SendQEntries = '(monitor)'
LogXptStatus = '(monitor)'
RecvQEntries = '(monitor)'
HostName = 'vmractest2.partnerergsm.co.il'
SidName = 'blackowl'

```
LocalListenerAddress      = '(ADDRESS=(PROTOCOL=TCP)(HOST=vmractest2)(PORT=1522)(IP=FIRST))'  
StandbyArchiveLocation   = '/oradisk/od01/BLACKOWL/archives/'  
AlternateLocation        = ''  
LogArchiveTrace          = '0'  
LogArchiveFormat         = '%t_%s_%r.arc'  
LatestLog                = '(monitor)'  
TopWaitEvents            = '(monitor)'
```

Current status for "blackowl":
SUCCESS

Enabling Fast Start Failover and the Observer

These are the steps required to enable and check Fast Start Failover and the Observer:

1. [Ensure standby redo logs are configured on all databases.](#)
2. [Ensure the LogXptMode Property is set to SYNC.](#)
3. [Specify the FastStartFailoverTarget property.](#)
4. [Upgrade the protection mode to MAXAVAILABILITY, if necessary.](#)
5. [Enable Flashback Database on the primary and standby databases, if necessary.](#)
6. [Enable fast start failover.](#)
7. [Start the observer.](#)
8. [Verify the fast-start failover configuration.](#)
9. [Performing a Switchover Operation](#)

Ensure standby redo logs are configured on all databases

This database is using Oracle Managed files so it is not necessary to pass a member name, i.e.:

```
ALTER DATABASE ADD STANDBY LOGFILE GROUP 4 SIZE 50M;
```

```
SQL> set lines 120
```

```
SQL> col member for a80
```

```
SQL> select type,member from v$logfile order by type
```

```
2 /
```

```
TYPE      MEMBER
```

```
-----  
ONLINE    /vmasmtest/whiteowl/recovery/WHITEOWL/onlinelog/o1_mf_2_3hkno95x_.log  
ONLINE    /vmasmtest/whiteowl/recovery/WHITEOWL/onlinelog/o1_mf_1_3hkno7jb_.log  
ONLINE    /vmasmtest/od01/WHITEOWL/WHITEOWL/onlinelog/o1_mf_1_3hkno747_.log  
ONLINE    /vmasmtest/od01/WHITEOWL/WHITEOWL/onlinelog/o1_mf_3_3hknoy2_.log  
ONLINE    /vmasmtest/whiteowl/recovery/WHITEOWL/onlinelog/o1_mf_3_3hkno8mw_.log  
ONLINE    /vmasmtest/od01/WHITEOWL/WHITEOWL/onlinelog/o1_mf_2_3hkno8rq_.log  
STANDBY   /vmasmtest/od01/WHITEOWL/WHITEOWL/onlinelog/o1_mf_6_3gznrd7_.log  
STANDBY   /vmasmtest/od01/WHITEOWL/WHITEOWL/onlinelog/o1_mf_4_3gznjc9v_.log  
STANDBY   /vmasmtest/od01/WHITEOWL/WHITEOWL/onlinelog/o1_mf_5_3gznrh0_.log
```

```
9 rows selected.
```

Ensure the LogXptMode Property is set to SYNC

These commands will succeed only if database is configured with standby redo logs.

```
DGMGRL> connect sys/oracle@whiteowl
```

```
Connected.
```

```
DGMGRL> EDIT DATABASE whiteowl SET PROPERTY 'LogXptMode'='SYNC';
```

```
Property "LogXptMode" updated
```

```
DGMGRL> EDIT DATABASE blackowl SET PROPERTY 'LogXptMode'='SYNC';
```

```
Property "LogXptMode" updated
```

Specify the FastStartFailoverTarget property

```
DGMGRL> EDIT DATABASE whiteowl SET PROPERTY FastStartFailoverTarget='blackowl';  
Property "faststartfailovertarget" updated  
DGMGRL> EDIT DATABASE blackowl SET PROPERTY FastStartFailoverTarget='whiteowl';  
Property "faststartfailovertarget" updated
```

Upgrade the protection mode to MAXAVAILABILITY, if necessary.

```
DGMGRL> EDIT CONFIGURATION SET PROTECTION MODE AS MAXAVAILABILITY;  
Operation requires shutdown of instance "whiteowl" on database "whiteowl"  
Shutting down instance "whiteowl"..  
Database closed.  
Database dismounted.  
ORACLE instance shut down.  
Operation requires startup of instance "whiteowl" on database "whiteowl"  
Starting instance "whiteowl"..  
Unable to connect to database  
ORA-12514: TNS:listener does not currently know of service requested in connect descriptor  
  
Failed.  
You are no longer connected to ORACLE  
Please connect again.  
Unable to start instance "whiteowl"  
You must start instance "whiteowl" manually
```

Enable Flashback Database on the Primary and Standby databases.

```
SQL> conn / as sysdba  
Connected to an idle instance.
```

```
SQL> startup mount;  
ORACLE instance started.
```

```
Total System Global Area 285212672 bytes  
Fixed Size                1218992 bytes  
Variable Size             92276304 bytes  
Database Buffers         188743680 bytes  
Redo Buffers              2973696 bytes  
Database mounted.
```

On Both databases

To enter the standby into Flashback mode you must shutdown the both databases, then while the primary is down execute the following commands on the standby:

```
SQL> ALTER SYSTEM SET UNDO_RETENTION=3600 SCOPE=SPFILE;  
System altered.
```

```
SQL> ALTER SYSTEM SET UNDO_MANAGEMENT='AUTO' SCOPE=SPFILE;  
System altered.
```

```
SQL> startup mount;  
ORACLE instance started.
```

```
Total System Global Area 285212672 bytes  
Fixed Size                1218992 bytes  
Variable Size             92276304 bytes  
Database Buffers         188743680 bytes  
Redo Buffers              2973696 bytes  
Database mounted.
```

```
SQL> ALTER DATABASE FLASHBACK ON;
```

Database altered.

Enable fast start failover

```
[vmrctest1] > dgmgrl
DGMGRL for Linux: Version 10.2.0.1.0 - Production

Copyright (c) 2000, 2005, Oracle. All rights reserved.

Welcome to DGMGRL, type "help" for information.
DGMGRL> connect sys/oracle@whiteowl
Connected.
DGMGRL> SHOW CONFIGURATION;
```

```
Configuration
Name:          whiteowl
Enabled:       YES
Protection Mode:  MaxAvailability
Fast-Start Failover: DISABLED
Databases:
  whiteowl - Primary database
  blackowl - Physical standby database
```

```
Current status for "whiteowl":
SUCCESS
```

```
DGMGRL> SHOW DATABASE blackowl;
```

```
Database
Name:      blackowl
```


Role: PHYSICAL STANDBY
Enabled: YES
Intended State: ONLINE
Instance(s):
blackowl

Current status for "blackowl":
SUCCESS

```
DGMGRL> ENABLE FAST_START FAILOVER;  
Enabled.  
DGMGRL> SHOW CONFIGURATION;
```

Configuration

Name: whiteowl
Enabled: YES
Protection Mode: MaxAvailability
Fast-Start Failover: ENABLED
Databases:
whiteowl - Primary database
blackowl - Physical standby database
- Fast-Start Failover target

Current status for "whiteowl":

Start the observer

Start the observer from a third server on background. You may use a script like this:

```
----- script start on next line -----  
#!/bin/ksh  
# startobserver
```

```
export ORACLE_BASE=/vmractst3/app01/oracle
export ORACLE_HOME=/vmractst3/app01/oracle/product/10.2
export
BASE_PATH=/vmractst3/app01/oracle/scripts/general:/opt/CTEact/bin:/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/bin:/etc:/usr/local/maint/oracle:/usr/ccs/bin:/usr/openwin/bin:/usr/dt/bin:/usr/local/bin:
export PATH=$ORACLE_HOME/bin:$BASE_PATH
```

```
dgmgrl << eof
connect sys/oracle@whiteowl
START OBSERVER;
eof
----- script end on previous line -----
```

```
[vmractst3] > nohup ./startobserver &
[2] 22182
<oracle> /vmractst3/app01/oracle/product/10.2/dbs > DGMGRL for Linux: Version 10.2.0.3.0 - 64bit Production
```

Copyright (c) 2000, 2005, Oracle. All rights reserved.

```
Welcome to DGMGRL, type "help" for information.
DGMGRL> Connected.
DGMGRL> Observer started
```

Verify the fast-start failover configuration.

```
DGMGRL> SHOW CONFIGURATION VERBOSE;
```

```
Configuration
Name:          whiteowl
Enabled:       YES
Protection Mode:  MaxAvailability
```

Fast-Start Failover: ENABLED

Databases:

whiteowl - Primary database

blackowl - Physical standby database

- Fast-Start Failover target

Fast-Start Failover

Threshold: 30 seconds

Observer: vmractest3

Current status for "whiteowl":

SUCCESS

DGMGRL> **SHOW DATABASE blackowl;**

Database

Name: blackowl

Role: PHYSICAL STANDBY

Enabled: YES

Intended State: ONLINE

Instance(s):

blackowl

Current status for "blackowl":

SUCCESS

Perform a Switchover

Connect to DGMGRL on the observer server:

ORA Environment Variables:

```
ORACLE_BASE=/vmractst3/app01/oracle
ORACLE_HOME=/ vmractst 3/app01/oracle/product/10.2
```

```
[vmractst3] > dgmgri
DGMGRL for Linux: Version 10.2.0.3.0 - 64bit Production
```

Copyright (c) 2000, 2005, Oracle. All rights reserved.

```
Welcome to DGMGRL, type "help" for information.
DGMGRL> connect sys/oracle@whiteowl
Connected.
DGMGRL>
```

Check that primary and standby are healthy

This check must return 'SUCCESS' as the status for both databases, otherwise it means there is a configuration problem.

```
DGMGRL> show database whiteowl;
```

```
Database
Name:      whiteowl
Role:      PRIMARY
Enabled:   YES
Intended State: ONLINE
Instance(s):
whiteowl
```

```
Current status for "whiteowl":
SUCCESS
```

```
DGMGRL> show database blackowl;
```

Database
Name: blackowl
Role: PHYSICAL STANDBY
Enabled: YES
Intended State: ONLINE
Instance(s):
blackowl

Current status for "blackowl":
SUCCESS

Execute the switchover

```
DGMGRL> SWITCHOVER TO blackowl;  
Performing switchover NOW, please wait...  
Operation requires shutdown of instance "whiteowl" on database "whiteowl"  
Shutting down instance "whiteowl"...  
ORA-01109: database not open  
  
Database dismounted.  
ORACLE instance shut down.  
Operation requires shutdown of instance "blackowl" on database "blackowl"  
Shutting down instance "blackowl"...  
ORA-01109: database not open  
  
Database dismounted.  
ORACLE instance shut down.  
Operation requires startup of instance "whiteowl" on database "whiteowl"  
Starting instance "whiteowl"...  
ORACLE instance started.  
Database mounted.
```

Operation requires startup of instance "blackowl" on database "blackowl"

Starting instance "blackowl" ..

ORACLE instance started.

Database mounted.

Switchover succeeded, new primary is "blackowl"

DGMGRL> show database blackowl

Database

Name: blackowl
Role: PRIMARY
Enabled: YES
Intended State: ONLINE
Instance(s):
blackowl

Current status for "blackowl":

SUCCESS

DGMGRL> show database whiteowl

Database

Name: whiteowl
Role: PHYSICAL STANDBY
Enabled: YES
Intended State: ONLINE
Instance(s):
whiteowl

Current status for "whiteowl":

SUCCESS

Reference:

Oracle® Data Guard Concepts and Administration

10g Release 2 (10.2)

Part Number B14239-04

http://download.oracle.com/docs/cd/B19306_01/server.102/b14230/cli.htm#BGBFEAFG