

MAA / Data Guard 10g Release 2 Setup Guide –
Creating a RAC Logical Standby
for a RAC Primary

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Maximum Availability Architecture

Oracle Best Practices For High Availability

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OVERVIEW

[Oracle Maximum Availability Architecture \(MAA\)](#) [1] is Oracle's best practices blueprint based on proven Oracle high-availability technologies and recommendations. The goal of MAA is to remove the complexity in designing the optimal high-availability architecture.

Published as part of the MAA series of white papers, this paper focuses on creating a RAC logical standby database for a RAC primary database. This document assumes that there is an existing Oracle Data Guard configuration consisting of a RAC primary database that has been configured with a RAC physical standby database and that you want to convert this configuration to a RAC primary database with a RAC logical standby database. The steps to create the initial RAC primary database with a RAC physical standby database are described separately in the white paper [MAA 10g Setup Guide: Creating a RAC Physical Standby Database for a RAC Primary Database](#) [2]. The steps outlined in this document use SQL*Plus and srvctl and apply to Oracle Database 10g Release 2 databases already configured with Oracle Data Guard and do not require any primary database downtime.

The example used in this document has the database unique name of the RAC primary database as CHICAGO. The instance names of the two RAC primary instances are CHICAGO1 (on node chicago_host1) and CHICAGO2 (on node chicago_host2). The database unique name of the RAC standby database is BOSTON, and the two standby instance names are BOSTON1 (on node boston_host1) and BOSTON2 (on node boston_host2).

This document includes the following tasks:

- Task 1: Prepare the Physical Standby Environment
- Task 2: Convert the Physical Standby to a Logical Standby
- Task 3: Verify the Data Guard Configuration

This document assumes that the following conditions are met:

- The primary and standby databases are using ASM.

- The primary and standby databases are using a flash recovery area.
- Oracle Managed Files (OMF) is used for all storage except as specifically noted.

TASK 1: PREPARE THE PHYSICAL STANDBY ENVIRONMENT

1. If the Data Guard configuration is operating in an elevated protection mode, change the protection mode to Maximum Performance so that stopping the standby database will not impact operations on the primary database. For example, on the primary database:

```
SQL> ALTER DATABASE SET STANDBY DATABASE TO MAXIMIZE  
PERFORMANCE;
```

2. Stop redo apply on the physical standby database. For example, on the standby database:

```
SQL> ALTER DATABASE RECOVER MANAGED STANDBY DATABASE CANCEL;
```

3. On the primary database, build a logical standby dictionary, then archive the current logs on the primary database several times to ensure that the log files with the dictionary are shipped to the standby:

```
SQL> EXECUTE DBMS_LOGSTDBY.BUILD;  
SQL> ALTER SYSTEM ARCHIVE LOG CURRENT;  
SQL> ALTER SYSTEM ARCHIVE LOG CURRENT;
```

4. If you are using Enterprise Manager Grid Control and the Data Guard broker, turn off the broker by issuing the following command on both the primary and standby databases:

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

With the broker turned off, delete the Data Guard configuration files for each database (the locations of these files are specified by the database initialization parameters `DG_BROKER_CONFIG_FILE1` and `DG_BROKER_CONFIG_FILE2`). Then remove the primary and standby databases from the list of database targets monitored by Grid Control.

5. Note that for Oracle 10g, the flash recovery area is not supported as a standby archive log destination for logical standby databases. However, you can create a directory within the flash recovery area diskgroup for the standby archive log destination. Connect to the ASM instance on one standby host and create a directory in the data or flash recovery area disk group to hold standby archive log files. For example:

```
SQL> ALTER DISKGROUP data ADD DIRECTORY '+RECO/BOSTON/ARC';
```

Then connect to the ASM instance on one primary host and create a similar directory so that the current primary database can operate as a logical standby in the event of a future role transition:

```
SQL> ALTER DISKGROUP data ADD DIRECTORY '+RECO/CHICAGO/ARC';
```

6. Configure the parameters on each database as appropriate for the logical standby configuration. If Data Guard broker was previously enabled, LOG_ARCHIVE_DEST_10 may have been defined automatically by the broker to be the flash recovery area. The SQL commands that follow unset this destination and define appropriate destinations for a logical standby configuration.

On the standby database:

```
SQL> ALTER SYSTEM SET STANDBY_ARCHIVE_DEST='+RECO/BOSTON/ARC/'
  2 SCOPE=BOTH SID='*';
SQL> ALTER SYSTEM SET
  2 LOG_ARCHIVE_DEST_1='LOCATION=USE_DB_RECOVERY_FILE_DEST
  3 VALID_FOR=(ONLINE_LOGFILES,ALL_ROLES)
  4 DB_UNIQUE_NAME=BOSTON' SCOPE=BOTH;
SQL> ALTER SYSTEM SET LOG_ARCHIVE_DEST_STATE_1=ENABLE
  2 SCOPE=BOTH;
SQL> ALTER SYSTEM SET LOG_ARCHIVE_DEST_2='SERVICE=CHICAGO
  2 VALID_FOR=(ONLINE_LOGFILES,PRIMARY_ROLE) LGWR SYNC AFFIRM
  3 DB_UNIQUE_NAME=CHICAGO' SCOPE=BOTH;
SQL> ALTER SYSTEM SET LOG_ARCHIVE_DEST_STATE_2=ENABLE
  2 SCOPE=BOTH;
SQL> ALTER SYSTEM SET
  2 LOG_ARCHIVE_DEST_3='LOCATION=+RECO/BOSTON/ARC/
  3 VALID_FOR=(STANDBY_LOGFILES, STANDBY_ROLE)
  4 DB_UNIQUE_NAME=BOSTON' SCOPE=BOTH;
SQL> ALTER SYSTEM SET LOG_ARCHIVE_DEST_STATE_3=ENABLE
  2 SCOPE=BOTH;
SQL> ALTER SYSTEM SET LOG_ARCHIVE_DEST_10='' SCOPE=BOTH;
SQL> ALTER SYSTEM SET PARALLEL_MAX_SERVERS=9 SCOPE=BOTH;
```

On the primary database:

```
SQL> ALTER SYSTEM SET STANDBY_ARCHIVE_DEST='+RECO/CHICAGO/ARC/'
  2 SCOPE=BOTH SID='*';
SQL> ALTER SYSTEM SET
  2 LOG_ARCHIVE_DEST_1='LOCATION=USE_DB_RECOVERY_FILE_DEST
  3 VALID_FOR=(ONLINE_LOGFILES,ALL_ROLES)
  4 DB_UNIQUE_NAME=CHICAGO' SCOPE=BOTH;
SQL> ALTER SYSTEM SET LOG_ARCHIVE_DEST_STATE_1=ENABLE
  2 SCOPE=BOTH;
SQL> ALTER SYSTEM SET LOG_ARCHIVE_DEST_2='SERVICE=BOSTON
  2 VALID_FOR=(ONLINE_LOGFILES,PRIMARY_ROLE) LGWR SYNC AFFIRM
  3 DB_UNIQUE_NAME=BOSTON' SCOPE=BOTH;
SQL> ALTER SYSTEM SET LOG_ARCHIVE_DEST_STATE_2=ENABLE
  2 SCOPE=BOTH;
SQL> ALTER SYSTEM SET
  2 LOG_ARCHIVE_DEST_3='LOCATION=+RECO/CHICAGO/ARC/
  3 VALID_FOR=(STANDBY_LOGFILES, STANDBY_ROLE)
  4 DB_UNIQUE_NAME=CHICAGO' SCOPE=BOTH;
SQL> ALTER SYSTEM SET LOG_ARCHIVE_DEST_STATE_3=ENABLE
  2 SCOPE=BOTH;
SQL> ALTER SYSTEM SET LOG_ARCHIVE_DEST_10='' SCOPE=BOTH;
SQL> ALTER SYSTEM SET PARALLEL_MAX_SERVERS=9 SCOPE=BOTH;
```

TASK 2: CONVERT THE PHYSICAL STANDBY TO A LOGICAL STANDBY

1. After shutting down all standby instance except for one set cluster_database to false and start the standby database as a single instance in mount exclusive mode:

```
SQL> ALTER SYSTEM SET CLUSTER_DATABASE=FALSE SCOPE=SPFILE;  
SQL> SHUTDOWN ABORT;  
SQL> STARTUP MOUNT EXCLUSIVE;
```

2. From SQL*Plus, issue the ALTER DATABASE RECOVER TO LOGICAL STANDBY command. For example:

```
SQL> ALTER DATABASE RECOVER TO LOGICAL STANDBY boston;
```

3. Set cluster database to true and bring the database to the mount state. From the mount state perform an open resetlogs.

```
SQL> ALTER SYSTEM SET CLUSTER_DATABASE=TRUE SCOPE=SPFILE  
SQL> STARTUP MOUNT FORCE;  
SQL> ALTER DATABASE OPEN RESETLOGS;
```

4. Startup all other standby instances.

5. Start logical standby apply on only one standby instance:

```
SQL> ALTER DATABASE START LOGICAL STANDBY APPLY IMMEDIATE;
```

6. On the primary database archive the current log to begin sending redo to the new logical standby:

```
SQL> ALTER SYSTEM ARCHIVE LOG CURRENT;
```

7. If you plan to use Enterprise Manager Grid Control and the Data Guard broker to manage the configuration, perform the following steps using Enterprise Manager Grid Control:

- a. From the Targets Databases page, manually discover, configure, and re-add the primary and standby database targets.
- b. From the Setup page, enable Management Pack Access for the new targets
- c. From the Preferred Credentials page, set preferred credentials for the new targets
- d. From the primary database page, navigate to the Data Guard Setup and Manage page and invoke the Add Standby Database wizard. Use the option to add an existing standby database (note that you may get ORA-16825, ORA-16824, ORA-16821, or ORA-16810 warnings when the logical standby is initially added to the configuration). Wait (several minutes) while the logical standby database dictionary finishes loading and until any initial errors clear. Use EM GC to monitor the log apply services and, if necessary, restart the apply services to clear any errors.

- e. Use the DGMGRL command-line interface to confirm that the `locallisteneraddress` parameter has been correctly discovered for each database instance. For example:

```
DGMGRL> show instance boston1 locallisteneraddress
LocalListenerAddress =
'(ADDRESS=(PROTOCOL=TCP)(HOST=boston2_host-
vip)(PORT=1521))'
DGMGRL> edit instance boston1 set property locallisteneraddress=
'(ADDRESS=(PROTOCOL=TCP)(HOST=boston1_host-
vip)(PORT=1521))'
```

TASK 3: VERIFY THE DATA GUARD CONFIGURATION

1. If you are managing the Data Guard configuration using SQL*Plus, refer to Section 4.2.6 of the Data Guard Concepts and Administration manual for information on how to verify that the logical standby database is configured correctly. In general, you should confirm that changes made to the primary database are received and applied on the standby database.
2. If you are using Enterprise Manager Grid Control with the Oracle Data Guard Broker, navigate to the Data Guard primary database page and click Verify. Correct any problems that are discovered. If adding any recommended standby redo log files to the databases results in an ORA-16826 error, use EM GC to reset the log apply services to clear the error and enable real-time apply. Note that status information displayed by the GUI may lag the actual configuration status by several minutes.
3. Once the logical standby is healthy, with logs being correctly received and applied, add standby redo logs, change the protection mode, enable fast-start failover, etc. to prepare the new logical standby configuration for production use.

REFERENCES

1. Oracle Maximum Availability Architecture website on OTN
<http://www.oracle.com/technology/deploy/availability/htdocs/maa.htm>
2. http://www.oracle.com/technology/deploy/availability/pdf/MAA_WP_10g_RACPrimary_RACPhysicalStandby.pdf



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