Setting up DG in 12cR2 (Linux)

Contents

Contents

Configuration Reference

Primary ORACLE_SID : orcl12c
Standby ORACLE_SID STDB

Dropping the existing Standby Database

(if necessary)

```
$sqlplus '/ as sysdba'

SQL*Plus: Release 12.2.0.1.0 Production on Mon Mar 8 13:08:49 2021

Copyright (c) 1982, 2016, Oracle.  All rights reserved.

Connected to an idle instance.

SQL> startup mount restrict;
ORACLE instance started.

Total System Global Area  419430400 bytes
Fixed Size            8793496 bytes
Variable Size             247464552 bytes
Database Buffers    155189248 bytes
Redo Buffers                7983104 bytes
Database mounted.
SQL> select name, database_role from v$database;

NAME    DATABASE_ROLE
--------- ----------------
ORCL12C   PHYSICAL STANDBY

SQL>
SQL> select substr(name,1,40) from v$datafile order by file#;

SUBSTR(NAME,1,40)
--------------------------------------------------------------------------------
----------------------------------------------------------
/STANDBY/database/STDB/datafile/o1_mf_sy
/STANDBY/database/STDB/datafile/o1_mf_sy
/STANDBY/database/STDB/49BFE9E2D73E2038E
/STANDBY/database/STDB/49BFE9E2D73E2038E
/STANDBY/database/STDB/datafile/o1_mf_us
/STANDBY/database/STDB/49BFE9E2D73E2038E
/STANDBY/database/STDB/49BFF8A6BB912582E
/STANDBY/database/STDB/49BFF8A6BB912582E
/STANDBY/database/STDB/49BFF8A6BB912582E
/STANDBY/database/STDB/49BFF8A6BB912582E
/STANDBY/database/STDB/49BFF8A6BB912582E
/STANDBY/database/STDB/49BFF8A6BB912582E
/STANDBY/database/STDB/datafile/o1_mf_un
/STANDBY/database/STDB/A84987FDF4C51164E
/STANDBY/database/STDB/A84987FDF4C51164E
/STANDBY/database/STDB/A84987FDF4C51164E
/STANDBY/database/STDB/A84987FDF4C51164E
```

```
17 rows selected.

SQL>
SQL> drop database;

Database dropped.

Disconnected from Oracle Database 12c Enterprise Edition Release 12.2.0.1.0
- 64bit Production
SQL>
```

The DROP DATABASE command deletes all Datafiles, Redo Log files, ArchiveLog files, Control files, alert log trace, all database backups present on the server (registered in the RMAN Repository) an the parameter SPFILE (you should create a preserve an init<SID>.ora PFILE)

Pre-Setup on the Primary

Force Logging with ArchiveLog

```
SQL> select force_logging, log_mode from v$database;

FORCE_LOGGING                         LOG_MODE
------------------------------------- ------------
NO                            NOARCHIVELOG

SQL> shutdown immediate;
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL> startup mount
ORACLE instance started.

Total System Global Area  838860800 bytes
Fixed Size            8798312 bytes
Variable Size             343936920 bytes
Database Buffers    478150656 bytes
Redo Buffers                7974912 bytes
Database mounted.
SQL> alter database archivelog;

Database altered.

SQL> alter database force logging;

Database altered.

SQL> select force_logging, log_mode from v$database;

FORCE_LOGGING                         LOG_MODE
------------------------------------- ------------
YES                           ARCHIVELOG

SQL> alter database open;

Database altered.

SQL>
SQL> archive log list;
Database log mode        Archive Mode
Automatic archival             Enabled
Archive destination            USE_DB_RECOVERY_FILE_DEST
Oldest online log sequence     137
Next log sequence to archive   139
Current log sequence           139
SQL>
```

(FLASHBACK ON is not mandatory)

Instance Parameters

```
*._ash_size=25165824
*.audit_file_dest='/u01/app/oracle/admin/orcl12c/adump'
```

```
*.audit_trail='db'
*.compatible='12.2.0'
*.control_files='/u01/app/oracle/oradata/orcl12c/control01.ctl','/u01/app/o
racle/fast_recovery_area/orcl12c/control02.ctl'
*.db_block_size=8192
*.db_name='orcl12c'
*.db_recovery_file_dest='/u01/app/oracle/fast_recovery_area/orcl12c'
*.db_recovery_file_dest_size=5g
*.diagnostic_dest='/u01/app/oracle'
*.dispatchers='(PROTOCOL=TCP) (SERVICE=orcl12cXDB)'
*.enable_pluggable_database=true
*.local_listener='LISTENER_ORCL12C'
*.log_archive_dest_1='location=USE_DB_RECOVERY_FILE_DEST
valid_for=(all_logfiles,all_roles)'
*.log_archive_dest_2='service=STDB sync affirm reopen=15
valid_for=(all_logfiles,primary_role) db_unique_name=STDB'
*.log_archive_dest_state_2='enable'
*.nls_language='AMERICAN'
*.nls_territory='AMERICA'
*.open_cursors=300
*.pga_aggregate_target=200m
*.processes=300
*.remote_login_passwordfile='EXCLUSIVE'
*.sga_target=800m
*.shared_servers=25
*.standby_file_management='AUTO'
*.undo_tablespace='UNDOTBS2'
```

Parameters that are important for DataGuard (other than DataGuard Broker configuration) are highlighted. For a Standby database server that is close by with low latency configure “sync” instead of “async” in log_archive_dest_2

I use “db_create_file_dest” to specify the target folder for all datafiles to be created automatically a Oracle-Managed Files. So, I do not have to provide specific filenames when adding datafiles.

listener.ora

```
LISTENER =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = TCP)(HOST = 0.0.0.0)(PORT = 1521))
    )
  )

SID_LIST_LISTENER =
  (SID_LIST =
    (SID_DESC =
      (GLOBAL_DBNAME = orcl12c)
      (SID_NAME = orcl12c)
      (ORACLE_HOME = /u01/app/oracle/product/12.2/db_1)
    )
  )
```

tnsnames.ora

```
ORCL12C =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = 0.0.0.0)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = orcl12c)
    )
  )

STDB =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = 0.0.0.0)(PORT = 1524))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = STDB)
    )
  )

LISTENER_ORCL12C =
  (ADDRESS = (PROTOCOL = TCP)(HOST = 0.0.0.0)(PORT = 1521))
```

Add 3 Standby Logs

```
alter database add standby logfile
'/u01/app/oracle/oradata/orcl12c/st_redo01.log' size 200M

Completed: alter database add standby logfile
'/u01/app/oracle/oradata/orcl12c/st_redo01.log' size 200M

alter database add standby logfile
'/u01/app/oracle/oradata/orcl12c/st_redo02.log' size 200M

Completed: alter database add standby logfile
'/u01/app/oracle/oradata/orcl12c/st_redo02.log' size 200M

alter database add standby logfile
'/u01/app/oracle/oradata/orcl12c/st_redo03.log' size 200M

Completed: alter database add standby logfile
'/u01/app/oracle/oradata/orcl12c/st_redo03.log' size 200M
```

Pre-Setup on the Standby

Instance Parameters

```
*.audit_file_dest='/u01/app/oracle/admin/orcl12c/adump'
*.audit_trail='db'
*.compatible='12.2.0'
*.control_files='/STANDBY/database/stdb/control01.ctl','/STANDBY/fast_recov
ery_area/stdb/control02.ctl'
*.db_block_size=8192
*.db_name='orcl12c'
*.db_unique_name='stdb'
*.db_create_file_dest='/STANDBY/database'
*.db_recovery_file_dest='/STANDBY/fast_recovery_area/stdb'
*.db_recovery_file_dest_size=5g
*.diagnostic_dest='/u01/app/oracle'
*.dispatchers='(PROTOCOL=TCP) (SERVICE=stdbXDB)'
*.enable_pluggable_database=true
*.local_listener='LISTENER_STDB'
*.processes=300
*.nls_language='AMERICAN'
*.nls_territory='AMERICA'
*.open_cursors=300
*.pga_aggregate_target=100m
*.remote_login_passwordfile='EXCLUSIVE'
*.sga_target=420m
#*.shared_servers=25
*.undo_tablespace='UNDOTBS2'
*.standby_file_management='AUTO'
*.log_archive_dest_1='location=USE_DB_RECOVERY_FILE_DEST
valid_for=(all_logfiles,all_roles)'
*.log_archive_dest_2='service=ORCL12C sync affirm reopen=15
valid_for=(all_logfiles,primary_role) db_unique_name=ORCL12C'
*.log_archive_dest_state_2='enable'
```

db_unique_name defaults to the same as db_name so it is recommended that you configure this to be a different value

I use “db_create_file_dest” to specify the target folder for all datafiles to be created automatically a Oracle-Managed Files. So, I do not have to provide specific filenames when adding datafiles.

Note that my Instance Memory parameters on the Standby are lower than the Primary because I do not have enough resources to run the larger memory VM on my PC. Technically, a Standby database can run with smaller memory and other parameters because it is only doing Recovery of Redo when in the Standby role. If you set these parameters lower on the Standby, you will have to increase them when doing a Switchover or Failover to make the Standby the new Primary so that it can support the same user load as the old (eixisting) Primary

listener.ora

```
LISTENER_STDB =
  (DESCRIPTION_LIST =
```

```
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = TCP)(HOST = 0.0.0.0)(PORT = 1524))
    )
  )

SID_LIST_LISTENER_STDB =
  (SID_LIST =
    (SID_DESC =
      (GLOBAL_DBNAME = STDB)
      (SID_NAME = STDB)
      (ORACLE_HOME = /u01/app/oracle/product/12.2/db_1)
    )
  )
```

tnsnames.ora

```
ORCL12C =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = 0.0.0.0)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = orcl12c)
    )
  )

STDB =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = 0.0.0.0)(PORT = 1524))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = STDB)
    )
  )

LISTENER_STDB =
  (ADDRESS = (PROTOCOL = TCP)(HOST = 0.0.0.0)(PORT = 1524))
```

Copy the Primary DB Password File to the Standby

Copy `$ORACLE_HOME/dbs/orapworcl12c` from the Primary to `$ORACLE_HOME/dbs/orapwSTDB`
Note how the file name that includes the ORACLE_SID is case-sensitive to the actual ORACLE_SID although other parameter files like the pfile/spfile, listener.ora and tnsnames.ore are not case-sensitive
The password file must be an exact binary copy because Oracle reads the SYS password from this file for authentication when running DataGuard Redo Transport

Start the Standby Listener

```
$lsnrctl start listener_stdb

LSNRCTL for Linux: Version 12.2.0.1.0 - Production on 08-MAR-2021 13:48:38

Copyright (c) 1991, 2016, Oracle.  All rights reserved.

Starting /u01/app/oracle/product/12.2/db_1/bin/tnslsnr: please wait...
```

```
TNSLSNR for Linux: Version 12.2.0.1.0 - Production
System parameter file is
/u01/app/oracle/product/12.2/db_1/network/admin/listener.ora
Log messages written to
/u01/app/oracle/diag/tnslsnr/vbgeneric/listener_stdb/alert/log.xml
Listening on:
(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=0.0.0.0)(PORT=1524)))

Connecting to
(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=0.0.0.0)(PORT=1524)))
STATUS of the LISTENER
------------------------
Alias                     listener_stdb
Version                   TNSLSNR for Linux: Version 12.2.0.1.0 -
Production
Start Date                08-MAR-2021 13:48:39
Uptime                    0 days 0 hr. 0 min. 0 sec
Trace Level               off
Security                  ON: Local OS Authentication
SNMP                      OFF
Listener Parameter File
/u01/app/oracle/product/12.2/db_1/network/admin/listener.ora
Listener Log File
/u01/app/oracle/diag/tnslsnr/vbgeneric/listener_stdb/alert/log.xml
Listening Endpoints Summary...
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=0.0.0.0)(PORT=1524)))
Services Summary...
Service "STDB" has 1 instance(s).
  Instance "STDB", status UNKNOWN, has 1 handler(s) for this service...
The command completed successfully
$
```

Start the Standby Instance (NoMount)

```
$sqlplus '/ as sysdba'

SQL*Plus: Release 12.2.0.1.0 Production on Mon Mar 8 13:50:18 2021

Copyright (c) 1982, 2016, Oracle.  All rights reserved.

Connected to an idle instance.

SQL> startup nomount
ORACLE instance started.

Total System Global Area  440401920 bytes
Fixed Size            8793736 bytes
Variable Size             301990264 bytes
Database Buffers    121634816 bytes
Redo Buffers                7983104 bytes
SQL>
```

Execute DUPLICATE DATABASE

From the Primary Server

```
$echo $ORACLE_SID
orcl12c
$rman

Recovery Manager: Release 12.2.0.1.0 - Production on Mon Mar 8 13:58:43
2021

Copyright (c) 1982, 2017, Oracle and/or its affiliates.  All rights
reserved.

RMAN> connect target sys/oracle

connected to target database: ORCL12C (DBID=768045447)

RMAN> connect auxiliary sys/oracle@stdb

connected to auxiliary database: ORCL12C (not mounted)

RMAN>
RMAN> DUPLICATE TARGET DATABASE FOR STANDBY FROM ACTIVE DATABASE ;

Starting Duplicate Db at 08-MAR-21
using target database control file instead of recovery catalog
allocated channel: ORA_AUX_DISK_1
channel ORA_AUX_DISK_1: SID=255 device type=DISK

contents of Memory Script:
{
   backup as copy reuse
   targetfile  '/u01/app/oracle/product/12.2/db_1/dbs/orapworcl12c'
auxiliary format
 '/u01/app/oracle/product/12.2/db_1/dbs/orapwSTDB'   ;
}
executing Memory Script

Starting backup at 08-MAR-21
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=266 device type=DISK
Finished backup at 08-MAR-21

contents of Memory Script:
{
   backup as copy current controlfile for standby auxiliary format
'/STANDBY/database/stdb/control01.ctl';
   restore clone primary controlfile to
'/STANDBY/fast_recovery_area/stdb/control02.ctl' from
 '/STANDBY/database/stdb/control01.ctl';
}
executing Memory Script

Starting backup at 08-MAR-21
using channel ORA_DISK_1
channel ORA_DISK_1: starting datafile copy
```

```
copying standby control file
output file name=/u01/app/oracle/product/12.2/db_1/dbs/snapcf_orcl12c.f
tag=TAG20210308T140000
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:08
Finished backup at 08-MAR-21

Starting restore at 08-MAR-21
using channel ORA_AUX_DISK_1

channel ORA_AUX_DISK_1: copied control file copy
Finished restore at 08-MAR-21

contents of Memory Script:
{
   sql clone 'alter database mount standby database';
}
executing Memory Script

sql statement: alter database mount standby database

contents of Memory Script:
{
   set newname for clone tempfile  1 to new;
   set newname for clone tempfile  2 to new;
   set newname for clone tempfile  3 to new;
   set newname for clone tempfile  4 to new;
   switch clone tempfile all;
   set newname for clone datafile  1 to new;
   set newname for clone datafile  3 to new;
   set newname for clone datafile  5 to new;
   set newname for clone datafile  6 to new;
   set newname for clone datafile  7 to new;
   set newname for clone datafile  8 to new;
   set newname for clone datafile  9 to new;
   set newname for clone datafile  10 to new;
   set newname for clone datafile  11 to new;
   set newname for clone datafile  12 to new;
   set newname for clone datafile  13 to new;
   set newname for clone datafile  14 to new;
   set newname for clone datafile  15 to new;
   set newname for clone datafile  41 to new;
   set newname for clone datafile  42 to new;
   set newname for clone datafile  43 to new;
   set newname for clone datafile  44 to new;
   backup as copy reuse
   datafile  1 auxiliary format new
   datafile  3 auxiliary format new
   datafile  5 auxiliary format new
   datafile  6 auxiliary format new
   datafile  7 auxiliary format new
   datafile  8 auxiliary format new
   datafile  9 auxiliary format new
   datafile  10 auxiliary format new
   datafile  11 auxiliary format new
   datafile  12 auxiliary format new
   datafile  13 auxiliary format new
   datafile  14 auxiliary format new
   datafile  15 auxiliary format new
   datafile  41 auxiliary format new
   datafile  42 auxiliary format new
   datafile  43 auxiliary format new
```

```
   datafile  44 auxiliary format new
   ;
   sql 'alter system archive log current';
}
executing Memory Script

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

renamed tempfile 1 to /STANDBY/database/STDB/datafile/o1_mf_temp_%u_.tmp in
control file
renamed tempfile 2 to
/STANDBY/database/STDB/49BFE9E2D73E2038E0530100007F846C/datafile/o1_mf_temp
_%u_.tmp in control file
renamed tempfile 3 to
/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf_temp
_%u_.tmp in control file
renamed tempfile 4 to
/STANDBY/database/STDB/A84987FDF4C51164E0530100007FEB9C/datafile/o1_mf_temp
_%u_.tmp in control file

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

executing command: SET NEWNAME

Starting backup at 08-MAR-21
```

```
using channel ORA_DISK_1
channel ORA_DISK_1: starting datafile copy
input datafile file number=00010
name=/u01/app/oracle/oradata/orcl12c/orcl/sysaux01.dbf
output file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_sysaux_4rvp7qjn_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:01:18
channel ORA_DISK_1: starting datafile copy
input datafile file number=00001
name=/u01/app/oracle/oradata/orcl12c/system01.dbf
output file name=/STANDBY/database/STDB/datafile/o1_mf_system_4svp7qm6_.dbf
tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:02:13
channel ORA_DISK_1: starting datafile copy
input datafile file number=00003
name=/u01/app/oracle/oradata/orcl12c/sysaux01.dbf
output file name=/STANDBY/database/STDB/datafile/o1_mf_sysaux_4tvp7qqc_.dbf
tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:01:10
channel ORA_DISK_1: starting datafile copy
input datafile file number=00011
name=/u01/app/oracle/oradata/orcl12c/orcl/undotbs01.dbf
output file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_undotbs1_4uvp7qsn_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:56
channel ORA_DISK_1: starting datafile copy
input datafile file number=00042
name=/u01/app/oracle/oradata/ORCL12C/A84987FDF4C51164E0530100007FEB9C/dataf
ile/o1_mf_sysaux_hgnbd6c1_.dbf
output file
name=/STANDBY/database/STDB/A84987FDF4C51164E0530100007FEB9C/datafile/o1_mf
_sysaux_4vvp7quf_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:25
channel ORA_DISK_1: starting datafile copy
input datafile file number=00009
name=/u01/app/oracle/oradata/orcl12c/orcl/system01.dbf
output file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_system_50vp7qv9_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:35
channel ORA_DISK_1: starting datafile copy
input datafile file number=00006
name=/u01/app/oracle/oradata/orcl12c/pdbseed/sysaux01.dbf
output file
name=/STANDBY/database/STDB/49BFE9E2D73E2038E0530100007F846C/datafile/o1_mf
_sysaux_51vp7r0d_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:25
channel ORA_DISK_1: starting datafile copy
input datafile file number=00005
name=/u01/app/oracle/oradata/orcl12c/pdbseed/system01.dbf
output file
name=/STANDBY/database/STDB/49BFE9E2D73E2038E0530100007F846C/datafile/o1_mf
_system_52vp7r16_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:16
channel ORA_DISK_1: starting datafile copy
input datafile file number=00041
name=/u01/app/oracle/oradata/ORCL12C/A84987FDF4C51164E0530100007FEB9C/dataf
ile/o1_mf_system_hgnbd696_.dbf
```

```
output file
name=/STANDBY/database/STDB/A84987FDF4C51164E0530100007FEB9C/datafile/o1_mf
_system_53vp7r1m_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:15
channel ORA_DISK_1: starting datafile copy
input datafile file number=00012
name=/u01/app/oracle/oradata/orcl12c/orcl/users01.dbf
output file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_users_54vp7r26_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:15
channel ORA_DISK_1: starting datafile copy
input datafile file number=00008
name=/u01/app/oracle/oradata/orcl12c/pdbseed/undotbs01.dbf
output file
name=/STANDBY/database/STDB/49BFE9E2D73E2038E0530100007F846C/datafile/o1_mf
_undotbs1_55vp7r2m_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:07
channel ORA_DISK_1: starting datafile copy
input datafile file number=00015
name=/u01/app/oracle/oradata/orcl12c/undotbs2.dbf
output file
name=/STANDBY/database/STDB/datafile/o1_mf_undotbs2_56vp7r2t_.dbf
tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:07
channel ORA_DISK_1: starting datafile copy
input datafile file number=00043
name=/u01/app/oracle/oradata/ORCL12C/A84987FDF4C51164E0530100007FEB9C/dataf
ile/o1_mf_undotbs1_hgnbd6c2_.dbf
output file
name=/STANDBY/database/STDB/A84987FDF4C51164E0530100007FEB9C/datafile/o1_mf
_undotbs1_57vp7r34_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:07
channel ORA_DISK_1: starting datafile copy
input datafile file number=00044
name=/u01/app/oracle/oradata/ORCL12C/A84987FDF4C51164E0530100007FEB9C/dataf
ile/o1_mf_my_user__hgnbjwg7_.dbf
output file
name=/STANDBY/database/STDB/A84987FDF4C51164E0530100007FEB9C/datafile/o1_mf
_my_user__58vp7r3b_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:07
channel ORA_DISK_1: starting datafile copy
input datafile file number=00013
name=/u01/app/oracle/oradata/orcl12c/orcl/APEX_1991375173370654.dbf
output file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_apex_199_59vp7r3i_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting datafile copy
input datafile file number=00007
name=/u01/app/oracle/oradata/orcl12c/users01.dbf
output file name=/STANDBY/database/STDB/datafile/o1_mf_users_5avp7r3k_.dbf
tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting datafile copy
input datafile file number=00014
name=/u01/app/oracle/oradata/orcl12c/orcl/APEX_1993195660370985.dbf
output file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_apex_199_5bvp7r3l_.dbf tag=TAG20210308T140022
channel ORA_DISK_1: datafile copy complete, elapsed time: 00:00:01
```

```
Finished backup at 08-MAR-21

sql statement: alter system archive log current

contents of Memory Script:
{
   switch clone datafile all;
}
executing Memory Script

datafile 1 switched to datafile copy
input datafile copy RECID=61 STAMP=1066658937 file
name=/STANDBY/database/STDB/datafile/o1_mf_system_4svp7qm6_.dbf
datafile 3 switched to datafile copy
input datafile copy RECID=62 STAMP=1066658937 file
name=/STANDBY/database/STDB/datafile/o1_mf_sysaux_4tvp7qqc_.dbf
datafile 5 switched to datafile copy
input datafile copy RECID=63 STAMP=1066658937 file
name=/STANDBY/database/STDB/49BFE9E2D73E2038E0530100007F846C/datafile/o1_mf
_system_52vp7r16_.dbf
datafile 6 switched to datafile copy
input datafile copy RECID=64 STAMP=1066658937 file
name=/STANDBY/database/STDB/49BFE9E2D73E2038E0530100007F846C/datafile/o1_mf
_sysaux_51vp7r0d_.dbf
datafile 7 switched to datafile copy
input datafile copy RECID=65 STAMP=1066658937 file
name=/STANDBY/database/STDB/datafile/o1_mf_users_5avp7r3k_.dbf
datafile 8 switched to datafile copy
input datafile copy RECID=66 STAMP=1066658937 file
name=/STANDBY/database/STDB/49BFE9E2D73E2038E0530100007F846C/datafile/o1_mf
_undotbs1_55vp7r2m_.dbf
datafile 9 switched to datafile copy
input datafile copy RECID=67 STAMP=1066658938 file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_system_50vp7qv9_.dbf
datafile 10 switched to datafile copy
input datafile copy RECID=68 STAMP=1066658938 file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_sysaux_4rvp7qjn_.dbf
datafile 11 switched to datafile copy
input datafile copy RECID=69 STAMP=1066658938 file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_undotbs1_4uvp7qsn_.dbf
datafile 12 switched to datafile copy
input datafile copy RECID=70 STAMP=1066658938 file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_users_54vp7r26_.dbf
datafile 13 switched to datafile copy
input datafile copy RECID=71 STAMP=1066658938 file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_apex_199_59vp7r3i_.dbf
datafile 14 switched to datafile copy
input datafile copy RECID=72 STAMP=1066658938 file
name=/STANDBY/database/STDB/49BFF8A6BB912582E0530100007F8BE4/datafile/o1_mf
_apex_199_5bvp7r3l_.dbf
datafile 15 switched to datafile copy
input datafile copy RECID=73 STAMP=1066658938 file
name=/STANDBY/database/STDB/datafile/o1_mf_undotbs2_56vp7r2t_.dbf
datafile 41 switched to datafile copy
```

```
input datafile copy RECID=74 STAMP=1066658938 file
name=/STANDBY/database/STDB/A84987FDF4C51164E0530100007FEB9C/datafile/o1_mf
_system_53vp7r1m_.dbf
datafile 42 switched to datafile copy
input datafile copy RECID=75 STAMP=1066658938 file
name=/STANDBY/database/STDB/A84987FDF4C51164E0530100007FEB9C/datafile/o1_mf
_sysaux_4vvp7quf_.dbf
datafile 43 switched to datafile copy
input datafile copy RECID=76 STAMP=1066658938 file
name=/STANDBY/database/STDB/A84987FDF4C51164E0530100007FEB9C/datafile/o1_mf
_undotbs1_57vp7r34_.dbf
datafile 44 switched to datafile copy
input datafile copy RECID=77 STAMP=1066658938 file
name=/STANDBY/database/STDB/A84987FDF4C51164E0530100007FEB9C/datafile/o1_mf
_my_user__58vp7r3b_.dbf
Finished Duplicate Db at 08-MAR-21

RMAN>
```

(The “SYS” account password is “oracle” in this example)
(The Hexadecimal folder names are because I have two PDBs in this database so Oracle Managed Files creates a separate unique folder name for each PDB)

Post-Duplication Steps

At the Standby

Verify/Add Standby Log and SPFILE

```
SQL> shutdown
ORA-01109: database not open


Database dismounted.
ORACLE instance shut down.
SQL> startup mount;
ORACLE instance started.

Total System Global Area  440401920 bytes
Fixed Size                  8793736 bytes
Variable Size             301990264 bytes
Database Buffers          121634816 bytes
Redo Buffers                7983104 bytes
Database mounted.
SQL>
SQL> select thread#, sequence#, bytes/1048576, status
  2  from v$standby_log
  3  order by status, sequence#
  4  /

   THREAD#  SEQUENCE# BYTES/1048576 STATUS
---------- ---------- ------------- ----------
         1        144           200 ACTIVE
         1          0           200 UNASSIGNED
         1          0           200 UNASSIGNED

SQL>
SQL> ALTER DATABASE ADD STANDBY LOGFILE  ;

Database altered.

SQL> select thread#, sequence#, bytes/1048576, status
  2  from v$standby_log
  3  order by status, sequence#
  4  /

   THREAD#  SEQUENCE# BYTES/1048576 STATUS
---------- ---------- ------------- ----------
         1        144           200 ACTIVE
         0          0           100 UNASSIGNED
         1          0           200 UNASSIGNED
         1          0           200 UNASSIGNED

SQL>
SQL> create spfile from pfile;

File created.

SQL> shutdown immediate;
ORA-01109: database not open


Database dismounted.
```

```
ORACLE instance shut down.
SQL> startup mount
ORACLE instance started.

Total System Global Area  440401920 bytes
Fixed Size            8793736 bytes
Variable Size             301990264 bytes
Database Buffers    121634816 bytes
Redo Buffers                7983104 bytes
Database mounted.
SQL> show parameter spfile;

NAME                                 TYPE        VALUE
------------------------------------ ----------- ------------------------------
----
spfile                               string      /u01/app/oracle/product/12.2/d
                                                 b_1/dbs/spfileSTDB.ora
SQL>
SQL> alter database recover managed standby database disconnect from
session;

Database altered.

SQL>
SQL> select force_logging, log_mode, protection_mode, protection_level
  2  from v$database;

FORCE_LOGGING                        LOG_MODE     PROTECTION_MODE
PROTECTION_LEVEL
------------------------------------ ------------ -------------------- -
-------------------
YES                           ARCHIVELOG   MAXIMUM PERFORMANCE  MAXIMUM
PERFORMANCE

SQL>
```

Increase level of protection to MAXIMUM AVAILABILITY

This can only be done **from the Primary with the Primary in STARTUP MOUNT mode**

```
$echo $ORACLE_SID
orcl12c
$sqlplus '/ as sysdba'

SQL*Plus: Release 12.2.0.1.0 Production on Mon Mar 8 14:34:55 2021

Copyright (c) 1982, 2016, Oracle.  All rights reserved.


Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit
Production

SQL> shutdown immediate;
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL> startup mount;
ORACLE instance started.
```

```
Total System Global Area  838860800 bytes
Fixed Size                  8798312 bytes
Variable Size             343936920 bytes
Database Buffers          478150656 bytes
Redo Buffers                7974912 bytes
Database mounted.
SQL> alter database set standby to maximize availability;

Database altered.

SQL> alter database open;

Database altered.

SQL>
```

Re-Query at the Standby (the Standby does NOT need a Restart)

```
SQL> select protection_mode, protection_level
  2  from v$database;

PROTECTION_MODE      PROTECTION_LEVEL
-------------------- --------------------
MAXIMUM AVAILABILITY MAXIMUM AVAILABILITY

SQL>
```

ARCHIVE LOG LIST command will always show “0” at the Standby

```
SQL> archive log list;
Database log mode        Archive Mode
Automatic archival             Enabled
Archive destination            USE_DB_RECOVERY_FILE_DEST
Oldest online log sequence     0
Next log sequence to archive   0
Current log sequence           0
SQL>
```

Verify that Redo Shipping and Apply are running

Execute transactions and force archive log at Primary

```
SQL> alter system archive log current;

System altered.

SQL> archive log list;
Database log mode        Archive Mode
Automatic archival           Enabled
Archive destination          USE_DB_RECOVERY_FILE_DEST
Oldest online log sequence   147
Next log sequence to archive   149
Current log sequence         149
SQL> alter system archive log current;

System altered.

SQL> archive log list;
Database log mode        Archive Mode
Automatic archival           Enabled
Archive destination          USE_DB_RECOVERY_FILE_DEST
Oldest online log sequence   148
Next log sequence to archive   150
Current log sequence         150
SQL>
```

Check the Standby : Queries

```
SQL> select name, value from v$dataguard_stats;

NAME                             VALUE
-------------------------------- ----------------------------------------
transport lag                     +00 00:00:00
apply lag                         +00 00:00:00
apply finish time                 +00 00:00:00.000
estimated startup time            20

SQL>
SQL> l
  1  select client_process, process, thread#, sequence#, status
  2  from v$managed_standby
  3  where
  4  (
  5  client_process='LGWR'
  6  or
  7  process='MRP0'
  8* )
SQL> /

CLIENT_P PROCESS      THREAD#  SEQUENCE# STATUS
-------- --------- ---------- ---------- ------------
LGWR     RFS                1        150 IDLE
N/A      MRP0               1        150 APPLYING_LOG

SQL>
```

Check the Standby : alert log messages

```
Recovery of Online Redo Log: Thread 1 Group 5 Seq 149 Reading mem 0
  Mem# 0: /STANDBY/database/STDB/onlinelog/o1_mf_5_j4chxbd2_.log
  Mem# 1:
/STANDBY/fast_recovery_area/stdb/STDB/onlinelog/o1_mf_5_j4chxfkd_.log

Standby controlfile consistent with primary
RFS[4]: Selected log 4 for T-1.S-150 dbid 768045447 branch 937554761

Archived Log entry 10 added for T-1.S-149 ID 0x2dc76487 LAD:1

Media Recovery Waiting for thread 1 sequence 150 (in transit)

Recovery of Online Redo Log: Thread 1 Group 4 Seq 150 Reading mem 0
  Mem# 0: /STANDBY/database/STDB/onlinelog/o1_mf_4_j4chx42z_.log
  Mem# 1:
/STANDBY/fast_recovery_area/stdb/STDB/onlinelog/o1_mf_4_j4chx756_.log
```

(Timestamps removed for better readability)

Check the Primary : alert log messages

```
2021-03-08T14:42:03.361616+08:00
LGWR: Standby redo logfile selected to archive thread 1 sequence 149
LGWR: Standby redo logfile selected for thread 1 sequence 149 for
destination LOG_ARCHIVE_DEST_2
2021-03-08T14:42:03.567069+08:00
Thread 1 advanced to log sequence 149 (LGWR switch)
  Current log# 2 seq# 149 mem# 0:
/u01/app/oracle/oradata/orcl12c/redo02.log
2021-03-08T14:42:04.590571+08:00
Archived Log entry 197 added for T-1.S-148 ID 0x2dc76487 LAD:1
2021-03-08T14:42:16.538588+08:00
ALTER SYSTEM ARCHIVE LOG
2021-03-08T14:42:16.641138+08:00
LGWR: Standby redo logfile selected to archive thread 1 sequence 150
LGWR: Standby redo logfile selected for thread 1 sequence 150 for
destination LOG_ARCHIVE_DEST_2
2021-03-08T14:42:16.706101+08:00
Thread 1 advanced to log sequence 150 (LGWR switch)
  Current log# 3 seq# 150 mem# 0:
/u01/app/oracle/oradata/orcl12c/redo03.log
2021-03-08T14:42:16.779430+08:00
Archived Log entry 199 added for T-1.S-149 ID 0x2dc76487 LAD:1
```

Reference : Oracle Documentation on the SET STANDBY TO MAXIMIZE clause

maximize_standby_db_clause

Use this clause to specify the level of protection for the data in your database environment. You specify this clause from the primary database.

Note:

The `PROTECTED` and `UNPROTECTED` keywords have been replaced for clarity but are still supported. `PROTECTED` is equivalent to `TO MAXIMIZE PROTECTION`. `UNPROTECTED` is equivalent to `TO MAXIMIZE PERFORMANCE`.

TO MAXIMIZE PROTECTION

This setting establishes **maximum protection mode** and offers the highest level of data protection. A transaction does not commit until all data needed to recover that transaction has been written to at least one physical standby database that is configured to use the `SYNC` log transport mode. If the primary database is unable to write the redo records to at least one such standby database, then the primary database is shut down. This mode guarantees zero data loss, but it has the greatest potential impact on the performance and availability of the primary database.

Restriction on Establishing Maximum Protection Mode

You can specify `TO MAXIMIZE PROTECTION` on an open database only if the current data protection mode is `MAXIMUM AVAILABILITY` and there is at least one synchronized standby database.

TO MAXIMIZE AVAILABILITY

This setting establishes **maximum availability mode** and offers the next highest level of data protection. A transaction does not commit until all data needed to recover that transaction has been written to at least one physical or logical standby database that is configured to use the `SYNC` log transport mode. Unlike maximum protection mode, the primary database does not shut down if it is unable to write the redo records to at least one such standby database. Instead, the protection is lowered to maximum performance mode until the fault has been corrected and the standby database has caught up with the primary database. This mode guarantees zero data loss unless the primary database fails while in maximum performance mode. Maximum availability mode provides the highest level of data protection that is possible without affecting the availability of the primary database.

TO MAXIMIZE PERFORMANCE

This setting establishes **maximum performance mode** and is the default setting. A transaction commits before the data needed to recover that transaction has been written to a standby database. Therefore, some transactions may be lost if the primary database fails and you are unable to recover the redo records from the primary database. This mode provides the highest level of data protection that is possible without affecting the performance of the primary database.

To determine the current mode of the database, query the `PROTECTION_MODE` column of the `V$DATABASE` dynamic performance view.