Oracle Active Data Guard Setup

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Reviewers:

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Contents

1. Objective

Purpose of this document is to setup & configure active data guard in Exadata environment and switchover to standby. However this document can also be used in non-exadata environments.

Transport methods within Exadata environment are depending how the environment is architected.

1. Standard Client Network which would be used by SCAN/VIP Network, typically 1Ge or 10Ge
2. IB/SDP Protocol Deployment, this is only applicable if the Primary/Standby are connected via Spine switches.   Located in the same data center physically connected to each other.
3. High Speed Transport using 10gE Interface SFP Module over LAN or WAN

2. Pre-Requisites

2.1. Hardware

- The standby or DR site will most likely be hosted on same or similar hardware as primary to able to support the primary site's workload. While this is not mandatory, it ensures to meet same SLAs and capacity to support workload at standby site until primary site became available.

2.2. Network

- Maximum Protection and Maximum Availability require high network bandwidth and low latency to facilitate SYNC redo transport mode.
- In high latency and low bandwidth environments, consider ASYNC option.
- Make sure the network is reliable, no packet losses, or network congestion.
- Dedicate required bandwidth to synchronize data at DR site
- A suitable bandwidth must be accommodated based on primary database's redo rate.
- Allow sufficient bandwidth growth projects per redo and workload load growth on primary

2.3. Software

- Make sure to maintain same version and patch levels on primary and all standby sites.
- If primary database uses ASM, then always consider using ASM for standby database.
- If primary database is RAC database then preferred storage method is ASM.
- If primary database is on RAC and using raw devices as storage, then standby must use raw devices. However, if primary database is not on RAC and using raw devices as storage, the standby database is not required to use raw devices.

3. Validate Pre-Requisites

3.1. Calculate Primary's current REDO rate bytes/sec

- This can be calculated several ways. Below are the options.
- From AWR report
- From V$ views

```
SELECT SUM(blocks*block_size)/3600 total_bytes_per_sec FROM
gv$archived_log WHERE first_time BETWEEN SYSDATE -1/24 AND
SYSDATE;
```

3.2. Calculate Primary's future growth projections

- Check with Application team on data volume growth.

3.3. Check current network bandwidth

- Bandwidth is not speed, it's a capacity where how many bytes can be sent across the network. Use network utilities to monitor bandwidth usage. For example netstat helps determine route table information, packets information. What ports are being used and how many packets are sent/received. Check network switch, Ethernet ports capacity.

```
[oracle@odevx2db01 ~]$ netstat -ar
Kernel IP routing table
Destination    Gateway        Genmask          Flags   MSS Window  irtt Iface

gp-rhel-prod-or 172.16.100.76  255.255.255.255 UGH      0 0         0 trunk0.100

gp-rhel-prod-or 172.16.100.76  255.255.255.255 UGH      0 0         0 trunk0.100

10.10.0.0      *              255.255.255.0   U        0 0         0 trunk0.2253

10.10.114.0    *              255.255.255.0   U        0 0         0 eth2.2014

10.10.254.0    *              255.255.255.0   U        0 0         0 eth7

172.16.100.0   *              255.255.252.0   U        0 0         0 trunk0.100

link-local     *              255.255.0.0     U        0 0         0 eth2

link-local     *              255.255.0.0     U        0 0         0 eth7

link-local     *              255.255.0.0     U        0 0         0 trunk0

link-local     *              255.255.0.0     U        0 0         0 eth2.2014

link-local     *              255.255.0.0     U        0 0         0 trunk0.100

link-local     *              255.255.0.0     U        0 0         0 trunk0.2253

default        172.16.100.1   0.0.0.0         UG       0 0         0 trunk0.100
```

```
[oracle@odevx2db01 ~]$ netstat -s
Ip:
    227929855 total packets received
    78662 with invalid addresses
    0 forwarded
    0 incoming packets discarded
    227850769 incoming packets delivered
    162319771 requests sent out
    486 reassemblies required
    81 packets reassembled ok
    2 fragments received ok
    4 fragments created
Icmp:
```

```
     122150 ICMP messages received
     15860 input ICMP message failed.
     ICMP input histogram:
         destination unreachable: 2104
         redirects: 6
         echo requests: 104842
         echo replies: 3
         address mask request: 88
     107771 ICMP messages sent
     0 ICMP messages failed
     ICMP output histogram:
         destination unreachable: 3502
         echo request: 3
         echo replies: 104266
IcmpMsg:
         InType0: 3
         InType3: 2104
         InType5: 6
         InType8: 104842
         InType9: 14532
         InType10: 575
         InType17: 88
         OutType0: 104266
         OutType3: 3502
         OutType8: 3
Tcp:
     4688577 active connections openings
     325078 passive connection openings
     4601061 failed connection attempts
     80158 connection resets received
     151 connections established
     219979785 segments received
     166465952 segments send out
     163290 segments retransmited
     0 bad segments received.
     4818362 resets sent
Udp:
     33801 packets received
     1424 packets to unknown port received.
     0 packet receive errors
     101187 packets sent
UdpLite:
TcpExt:
     69162 invalid SYN cookies received
     2860 resets received for embryonic SYN_RECV sockets
     699 packets pruned from receive queue because of socket buffer
overrun
     105 ICMP packets dropped because they were out-of-window
     36222 TCP sockets finished time wait in fast timer
     2116023 delayed acks sent
     138 delayed acks further delayed because of locked socket
     Quick ack mode was activated 3462 times
     73192777 packets directly queued to recvmsg prequeue.
     35775519 packets directly received from backlog
     13413491596 packets directly received from prequeue
     73366974 packets header predicted
     52889017 packets header predicted and directly queued to user
     40415825 acknowledgments not containing data received
     72563994 predicted acknowledgments
     13 times recovered from packet loss due to fast retransmit
     31447 times recovered from packet loss due to SACK data
     TCPDSACKUndo: 395
     1819 congestion windows recovered after partial ack
     106035 TCP data loss events
     TCPLostRetransmit: 7945
     26 timeouts after reno fast retransmit
     229 timeouts after SACK recovery
     135 timeouts in loss state
     126828 fast retransmits
     5215 forward retransmits
     15028 retransmits in slow start
     9340 other TCP timeouts
     TCPRenoRecoveryFail: 8
     702 sack retransmits failed
     22010 packets collapsed in receive queue due to low socket buffer
     2969 DSACKs sent for old packets
     2602 DSACKs received
     11 DSACKs for out of order packets received
     15387 connections reset due to unexpected data
     76271 connections reset due to early user close
```

```
        108 connections aborted due to timeout
        TCPDSACKIgnoredNoUndo: 195
        TCPSpuriousRTOs: 2
        TCPSackShifted: 227642
        TCPSackMerged: 155899
        TCPSackShiftFallback: 61281
        TCPBacklogDrop: 27363
        TCPChallengeACK: 5
IpExt:
        InMcastPkts: 143103
        InBcastPkts: 12105050
        InOctets: 1124106223548
        OutOctets: 867090253457
        InMcastOctets: 4463948
        InBcastOctets: 1227347796
```

```
[oracle@odevx2db01 ~]$ grep net /etc/sysctl.conf
net.ipv4.ip_forward = 0
net.ipv4.conf.default.rp_filter = 1
net.ipv4.conf.default.accept_source_route = 0
net.ipv4.tcp_syncookies = 1
net.ipv4.ip_forward = 0
net.ipv4.conf.default.rp_filter = 1
net.ipv4.conf.default.accept_source_route = 0
net.ipv4.tcp_syncookies = 1
net.bridge.bridge-nf-call-ip6tables = 0
net.bridge.bridge-nf-call-iptables = 0
net.bridge.bridge-nf-call-arptables = 0
net.core.rmem_default = 262144
net.core.rmem_max = 4194304
net.core.wmem_default = 262144
net.core.wmem_max = 1048576
net.ipv4.ip_local_port_range = 9000 65500
net.core.wmem_max = 1048576
```

3.4 Check current network speed (Primary ←→ Standby)

Use normal OS file transfer utilities like ftp, sftp or scp to transfer a few giga bytes file to see what is the network transfer rate. This gives a rough idea how much redo data can be sent per second. This gives rough estimate of network transfer rate and result in goodput which typically less than maximum theoretical maximum throughput and influenced by network transmission overheads, latency, TCP receive window size, system limitations.

```
[oraupgd@saprq-ora02 data]$ scp *temp* oracle@saqaexadbadm01:/u01/app/software/test
oracle@saqaexadbadm01's password:
temp04a.dbf                                            100%   10GB  10.8MB/s   15:26
temp04b.dbf                                             1%  155MB  10.8MB/s   15:16 ETA
```

In theory, maximum network bandwidth is calculated based on formula below.

Maximum Network throughput <= TCP receive Window/Round Trip Time.

3.5 Check network latency and Round Trip Time (RTT) (Primary ←→ Standby)

- Latency is delay typically incurred in processing of network data.
- RTT is the length of time it takes for a data packet to be sent plus the length of time it takes for acknowledgement of that data packet to be received.
- Use OS utilities to check latency across data centers.
- For example:

```
[oraupgd@saprq-ora02 ~]$ ping -c3 -s 8192 saqaexadbadm01
PING saqaexadbadm01.bh.intra (10.10.127.12) 8192(8220) bytes of data.
8200 bytes from saqaexadbadm01.bh.intra (10.10.127.12): icmp_seq=1 ttl=63 time=2.57 ms
8200 bytes from saqaexadbadm01.bh.intra (10.10.127.12): icmp_seq=2 ttl=63 time=2.48 ms
8200 bytes from saqaexadbadm01.bh.intra (10.10.127.12): icmp_seq=3 ttl=63 time=2.65 ms

--- saqaexadbadm01.bh.intra ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2006ms
rtt min/avg/max/mdev = 2.487/2.574/2.656/0.069 ms
[oraupgd@saprq-ora02 ~]$
```

3.6 Check network bandwidth requirements

This can be calculated per below formula. Once you know what is redo rate bytes/sec , then you can determine bandwidth calculations requirements.

> Network Bandwidth = ((Redo rate bytes per sec. / 0.7) * 8) / 1,000,000
> in Mega bits/sec
> Example: A Redo rate of 89205 kb/sec requires 1.043 Giga bits/sec bandwidth.
> Network Bandwidth = ((91345920/ 0.7) * 8) /1,000,000 = 1043 Mega bits/sec or 1.043 Giga bits/sec

3.7 Check network latency requirements

- To Local Standby site <= 1 ms
- To remote (DR) site not more than 5 ms is recommended.

3.8 Check BDP (bandwidth delay product)

> BDP = Bandwidth x Latency

3.9 Calculate Maximum BDP and required bandwidth (Mbits/sec) for ASYNC

> Maximum BDP = 3 x Bandwidth x Latency

3.10 Check hardware, software, network, storage provisions, configured that match primary.

- Make sure to install and configure OS, Clusterware, ASM, RAC/RDBMS software per requirements, and on same versions and patch releases. Check oracle support site for any known issues with hardware and software versions.

3.11 Check connectivity among primary and all standby sites.

- Establish connections among primary and all standby sites.

4. Setup & Configuration

4.1. Primary and Standby Hosts & Database information

Primary Site:

> Hosts Name: odevx2db01, odevx2db02
> Virtual IP: odevx2db01-vip, odevx2db02-vip
> Scan Address: odevx2-scan
> OS User: oracle
> Scan Listener: LISTENER_SCAN1, LISTENER_SCAN2, LISTENER_SCAN3
> Primary Database Name: IGAPROD
> Primary Database unique name: IGAPROD

Primary Database local listener: LISTENER
Primary Database local listener port#: 1523
Primary Database scan listener port#: 1523
Primary Database binary install owner: oracle
ASM HOME: /u01/app/11.2.0.3/grid
ASM & GRID owner:
ORACLE_BASE: /u01/app/oracle
ORACLE_HOME: /u01/app/oracle/product/11.2.0.3/dbhome_1
Storage: ASM
ASM Disk Groups: DATA_ODEVX2, RECO_ODEVX2, DBFS_DG

Standby Site:

Hosts Name: odevx3db01, odevx3db02
Virtual IP: odevx3db01-vip, odevx3db02-vip
Scan Address: odevx3-scan
OS User: oracle
Scan Listener: LISTENER_SCAN1, LISTENER_SCAN2, LISTENER_SCAN3
Standby Database Name: IGAPROD
Standby database unique name: IGAPRODSB
Standby Database local listener: LISTENER
Standby Database local listener port#: 1523
Standby Database remote listener port#: 1523
Standby Database binary install owner: oracle
ASM HOME: /u01/app/11.2.0.3/grid
ASM & GRID owner:
ORACLE_BASE: /u01/app/oracle
ORACLE_HOME: /u01/app/oracle/product/11.2.0.3/dbhome_1
Storage: ASM
ASM Disk Groups: DATA_ODEVX3, RECO_ODEVX3, DBFS_DG

4.2 On the Primary Database
   4.2.1   Enable Force logging
           SQL> **ALTER DATABASE FORCE LOGGING;**
   4.2.2   Create standby logs
           Sufficient standby logs must be created for redo apply.
               1. Each standby redo log file must be at least as large as the largest redo log
                  file in the primary database. It is recommended that all redo log files in
                  the primary database and the standby redo logs in the respective standby
                  database(s) be of the same size.
               2. The recommended number of SRLs is: (number of online redo logs per
                  instance + 1) * number of instances. The primary database 2 node RAC
                  database will have 8 redo groups per instance, hence number of SRLs
                  needed (8 + 1) X 2 = 18
               3. Do not multiplex SRL. This will lead to performance issues.

4. While the standby site only uses standby redo logs, they should be defined on both the primary as well as the standby sites.
5. This will ensure that if the two databases change their roles (primary-> standby and standby -> primary) then no extra configuration will be required.
6. The standby database must be mounted before SRLs are created.
7. SRLs are created as follows (the size given below is just an example and has to be adjusted to the current environment):

```
Primary: odevx2db01
export ORACLE_SID= IGAPROD
sqlplus / as sysdba

SELECT STATUS from V$INSTANCE;
SELECT GROUP#,THREAD#,SEQUENCE#,ARCHIVED,STATUS
FROM V$STANDBY_LOG;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX2' size
1024M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX2' size
1024M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX2' size
1024M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX2' size
1024M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX2' size
1024M;

For Standby Site: ODEVX3DB02 , add standby redo logs

ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX2' size
1024M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX2' size
1024M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX2' size
1024M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX2' size
1024M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX2' size
1024M;

SELECT GROUP#,THREAD#,SEQUENCE#,ARCHIVED,STATUS
FROM V$STANDBY_LOG;
```

```
SELECT GROUP#,THREAD#, SEQUENCE#,ARCHIVED,STATUS
FROM V$STANDBY_LOG;
```

8. **On primary adjust following parameters**

```
SQL> alter system set standby_file_management='AUTO' scope=both;
SQL> alter system set fal_server='IGAPRODSB' scope=both;
SQL>  alter system set fal_client='IGAPROD' scope=both;
SQL> alter system set LOG_ARCHIVE_DEST_1='LOCATION=
+RECO_ODEVX2 VALID_FOR=(ALL_LOGFILES,ALL_ROLES)
DB_UNIQUE_NAME=IGAPROD' scope=both;
SQL> alter system set
log_archive_config='DG_CONFIG=(IGAPROD,IGAPRODSB)' scope=both;
```

<div style="border:1px solid black">

SQL> alter system set LOG_ARCHIVE_DEST_2='SERVICE=IGAPRODSB
LGWR ASYNC VALID_FOR=(ONLINE_LOGFILES,PRIMARY_ROLE)
DB_UNIQUE_NAME=IGAPRODSB NOAFFIRM NET_TIMEOUT=30
REOPEN=30 max_failure=0 max_connections=1' scope=both;
SQL> alter system set LOG_ARCHIVE_DEST_STATE_1=ENABLE scope=both;
SQL> alter system set LOG_ARCHIVE_DEST_STATE_2=ENABLE scope=both;

</div>

9. Complete this step on all DR/Standby nodes (later after building standby)

4.3 On Primary and Standby databases.

4.3.1 Setup entries in listener.ora & tnsnames.ora

4.3.2 Configure listeners on each site of data guard configuration.

4.3.3 Each Site will have a listener defined which will be running from grid home (on Exadata).

> Primary Site Listeners:
> LISTENER
> Standby site Listeners:
> LISTENER

4.3.4 Static registration

4.3.4.1 Oracle should be able to access all instances of both databases in all modes (open, mount and nomount)

4.3.4.2 In order to do this, you must add static listener entries for database.

4.3.4.3 Before configure listener and TNS entries make sure to calculate correct kernel network settings, system TCP settings, session data unit (SDU) and bandwidth delay protocol (BDP) to be used. BDP will vary depending on network latency for each DR.

4.3.4.4 **SDU Size**: Oracle net buffers data into session data unit (SDU), with default size of 8192 bytes (usually size of db_block). These data units are then sent to network layer. Data Guard usually send much larger size than the default, hence this default size is insufficient as a result data is sent in small chunks. Since large amount of data are usually shipped to standby sites, increasing SDU size improves the performance and network utilization. To configure SDU globally add the following line in sqlnet.ora file. The maximum size of SDU will be 32767 bytes in version 11.1 and 65535 in version 11.2.

DEFAULT_SDU_SIZE=32767

4.3.4.5 TCP Tuning

4.3.4.5.1 Setting the Oracle Net SDU is the first part, the Oracle part. But the large amount of redo data should be handled by TCP network layer. Of several aspects of TCP layer, the most important is the amount of system memory a single TCP connection can use. All systems have limitations on how much memory can be used at TCP layer called the *maximum TCP buffer space*. This is OS dependent.

4.3.4.5.2 Use OS command to see what the values of TCP buffers. This shows maximum memory that a TCP connection can use. For most data guard configuration it may be sufficient, but it could be necessary to have system administrator increase the maximum.

```
[oraupgd@saprq-ora02 ~]$ cat /etc/sysctl.conf | grep net.core | grep max
net.core.rmem_max = 4194304
net.core.wmem_max = 1048576
net.core.wmem_max = 1048576
[oraupgd@saprq-ora02 ~]$ []
```

These parameters define the values, that a TCP connection will use for its
send and receive buffers. Check with System Admin to see what
maximum values should be set for these kernel parameters.

For example see the highlighted table values below.

```
[oraupgd@saprq-ora02 ~]$ sysctl -a | grep net.ipv4 | grep mem|grep tcp
error: permission denied on key 'kernel.cad_pid'
error: permission denied on key 'kernel.usermodehelper.bset'
error: permission denied on key 'kernel.usermodehelper.inheritable'
net.ipv4.tcp_mem = 24794304      33059072       49588608
net.ipv4.tcp_wmem = 4096         16384    4194304
net.ipv4.tcp_rmem = 4096         87380    4194304
[oraupgd@saprq-ora02 ~]$ []
```

4.3.4.6 Bandwidth Delay Product (BDP)

BDP = Bandwidth X Latency X 3
Suppose if bandwidth is 45 Mbits/sec and latency is 5 sec then
BDP = 128 X 0.005 X 3 Mbits
BDP = 128 X 0.005 X 3 X 1000,000 Bits
BDP = 128 X 0.005 X 3 X 1000,000/8 Bytes
BDP = 240,000 bytes

Assuming same bandwidth capacity requirement locally with latency of 1
ms.
BDP = 128 X 0.001 X 3 X 1000,000/8 Bytes
BDP= 48,000 bytes

Use this BDP to configure listener with send buffer and receive buffer sizes.
And these values may vary for each DR site depending on latency. Use actual
bandwidth for BDP calculation, this is an example. And local standby will
use much smaller BDP value considering very low latency usually < =1 ms
within same data center. Below values should be set on Oracle listener.
SEND_BUF_SIZE=<BDP Value>
RECEV_BUF_SIZE==<BDP Value>

For example:

On Primary Site: ODEVX2DB01

IGAPROD =
 (DESCRIPTION_LIST =

```
 (DESCRIPTION =
   (SEND_BUFF_SIZE=84375)
   (RECV_BUFF_SIZE=84375)
 (ADDRESS = (PROTOCOL = TCP)(HOST = odevx2db01-vip)(PORT = 1521))
 (ADDRESS = (PROTOCOL = TCP)(HOST = odevx2db01)(PORT = 1521))
  )
 )

SID_LIST_ LISTENER_ODEVX2DB01 =
 (SID_LIST =
  (SID_DESC =
    (SDU=32767)
   (ORACLE_HOME= /u01/app/oracle/product/11.2.0.3/dbhome_1)
    (GLOBAL_DBNAME= IGAPROD_DGMGRL)
   (SID_NAME = IGAPROD)
  )
 )
```

On Primary Site: ODEVX2DB02

```
IGAPROD =
 (DESCRIPTION_LIST =
  (DESCRIPTION =
    (SEND_BUFF_SIZE=84375)
    (RECV_BUFF_SIZE=84375)
 (ADDRESS = (PROTOCOL = TCP)(HOST = odevx2db02-vip)(PORT = 1521))
 (ADDRESS = (PROTOCOL = TCP)(HOST = odevx2db02)(PORT = 1521))
  )
 )

SID_LIST_ LISTENER_ODEVX2DB02 =
 (SID_LIST =
  (SID_DESC =
    (SDU=32767)
   (ORACLE_HOME= /u01/app/oracle/product/11.2.0.3/dbhome_1)
    (GLOBAL_DBNAME= IGAPROD_DGMGRL)
   (SID_NAME = IGAPROD)
  )
 )
```

On Standby site: ODEVX3DB01

```
LISTENER_ODEVX3DB01=
(DESCRIPTION=
(SEND_BUFF_SIZE=240000)
(RECV_BUFF_SIZE=240000)
(ADDRESS_LIST=
(ADDRESS=(PROTOCOL=TCP)(HOST=odevx3db01-
vip)(PORT=1521))(ADDRESS=(PROTOCOL=TCP)(HOST=10.10.127.12)(PORT=1521)
(IP=FIRST))))
```

```
SID_LIST_ LISTENER_ODEVX3DB01 =
  (SID_LIST =
    (SID_DESC =
    (SDU=32767)
      (GLOBAL_DBNAME= IGAPRODSB_DGMGRL)
      (SID_NAME = IGAPRODSB)
      (ORACLE_HOME = /u01/app/oracle/product/11.2.0.3/dbhome_1)
    )
  )
```

On Standby site: ODEVX3DB02

```
LISTENER_ODEVX3DB02=
(DESCRIPTION=
(SEND_BUFF_SIZE=240000)
(RECV_BUFF_SIZE=240000)
(ADDRESS_LIST=
(ADDRESS=(PROTOCOL=TCP)(HOST=odevx3db02-
vip)(PORT=1521))(ADDRESS=(PROTOCOL=TCP)(HOST=10.10.127.13)(PORT=1521)
(IP=FIRST))))

SID_LIST_ LISTENER_ODEVX3DB02 =
  (SID_LIST =
    (SID_DESC =
    (SDU=32767)
      (GLOBAL_DBNAME= IGAPRODSB_DGMGRL)
      (SID_NAME = IGAPRODSB)
      (ORACLE_HOME = /u01/app/oracle/product/11.2.0.3/dbhome_1)
    )
  )
```

Sample TNS entries on primary odevx2db01. Complete similar TNS entries on all primary and standby nodes accordingly.
On Primary set following entries in tnsnames.ora

```
IGAPROD=
(DESCRIPTION=
(SEND_BUFF_SIZE=240000)
(RECV_BUFF_SIZE=240000)
(ADDRESS=(PROTOCOL=tcp)(HOST= odevx2-scan)(PORT=1521))
 (CONNECT_DATA=
(SID=IGAPROD)
))

IGAPRODSB=
(DESCRIPTION=
(SEND_BUFF_SIZE=240000)
(RECV_BUFF_SIZE=240000)
(ADDRESS=(PROTOCOL=tcp)(HOST= odevx3-scan)(PORT=1521))
(CONNECT_DATA=
 (SERVER = DEDICATED)
```

```
 (SERVICE_NAME = IGAPRODSB)
(UR=A)
))
```

Add similar entries on all other primary nodes.

On Standby sites. Add/Modify tnsnames.ora

On standby node **ODEVX3DB01**
update /u01/app/oracle/product/11.2.0.3/dbhome_1/network/admin/tnsnames.ora
with following entry.

```
IGAPROD=
(DESCRIPTION=
(SEND_BUFF_SIZE=240000)
(RECV_BUFF_SIZE=240000)
(ADDRESS=(PROTOCOL=tcp)(HOST= odevx2-scan)(PORT=1523))
 (CONNECT_DATA=
(SID=IGAPROD)
))

IGAPRODSB=
(DESCRIPTION=
(SEND_BUFF_SIZE=240000)
(RECV_BUFF_SIZE=240000)
(ADDRESS=(PROTOCOL=tcp)(HOST= odevx3-scan)(PORT=1523))
(CONNECT_DATA=
 (SERVER = DEDICATED)
 (SERVICE_NAME = IGAPRODSB)
(UR=A)
))

#RMAN catalog DB entry (Connecting to catalog optional)
```

On standby node ODEVX3DB02
update /u01/app/oracle/product/11.2.0.3/dbhome_1/network/admin/tnsnames.ora
with following entry.

```
IGAPROD=
(DESCRIPTION=
(SEND_BUFF_SIZE=240000)
(RECV_BUFF_SIZE=240000)
(ADDRESS=(PROTOCOL=tcp)(HOST= odevx2-scan)(PORT=1523))
 (CONNECT_DATA=
(SID=IGAPROD)
))

IGAPRODSB=
(DESCRIPTION=
(SEND_BUFF_SIZE=240000)
(RECV_BUFF_SIZE=240000)
(ADDRESS=(PROTOCOL=tcp)(HOST= odevx3-scan)(PORT=1523))
(CONNECT_DATA=
 (SERVER = DEDICATED)
```

```
 (SERVICE_NAME = IGAPRODSB)
(UR=A)
))

#RMAN catalog DB entry (Connecting to catalog optional)
```

4.3.5

4.4 On the Primary Database Node – ODEVX2DB01 (Node1 if it's a RAC)

    4.4.1   Copy password file from Primary to Standby site(s)

```
cd $ORACLE_HOME/dbs
scp orapwIGAPROD
oracle@ODEVX3DB01:/u01/app/oracle/product/11.2.0.3/dbhome_1/dbs/orap
wIGAPRODSB
scp orapwIGAPROD
oracle@ODEVX3DB02:/u01/app/oracle/product/11.2.0.3/dbhome_1/dbs/orap
wIGAPRODSB
```

4.5 On the Standby Database

    4.5.1   Setup a dummy pfile

    4.5.2   Name the file as "initIGAPRODSB.ora"

    4.5.3   You will later create initIGAPRODSB1.ora and initIGAPRODSB2.ora for 2 node RAC database instances.

Standby Init file:

initIGAPRODSB.ora
~~~~~~~~~~~~~~

```
IGAPROD2.__db_cache_size=721420288
IGAPROD1.__db_cache_size=754974720
IGAPROD2.__java_pool_size=16777216
IGAPROD1.__java_pool_size=16777216
IGAPROD2.__large_pool_size=16777216
IGAPROD1.__large_pool_size=16777216
IGAPROD1.__oracle_base='/u01/app/oracle'#ORACLE_BASE set from environment
IGAPROD2.__oracle_base='/u01/app/oracle'#ORACLE_BASE set from environment
IGAPROD2.__pga_aggregate_target=1677721600
IGAPROD1.__pga_aggregate_target=1677721600
IGAPROD2.__sga_target=2147483648
IGAPROD1.__sga_target=2147483648
IGAPROD2.__shared_io_pool_size=0
IGAPROD1.__shared_io_pool_size=0
IGAPROD2.__shared_pool_size=1241513984
IGAPROD1.__shared_pool_size=1207959552
IGAPROD2.__streams_pool_size=0
IGAPROD1.__streams_pool_size=0
*.audit_file_dest='/u01/app/oracle/admin/IGAPROD/adump'
```

```
*.audit_trail='none'
*.cluster_database=FALSE
IGAPROD1.cluster_interconnects='192.168.10.1'
IGAPROD2.cluster_interconnects='192.168.10.2'
*.compatible='11.2.0.2.0'
*.db_block_checksum='FULL'
*.db_block_size=8192
*.fast_start_mttr_target=300
IGAPROD1.instance_number=1
IGAPROD2.instance_number=2
*.job_queue_processes=10
*.listener_networks='((NAME=network2)
(LOCAL_LISTENER=LISTENER_IBLOCAL)(REMOTE_LISTENER=LISTENER_IBREMO
TE))','((NAME=network1)(LOCAL_LISTENER=LISTENER_IPLOCAL)(REMOTE_LISTE
NER=LISTENER_IPREMOTE))'
*.log_buffer=134217728
*.open_cursors=1000
*.parallel_adaptive_multi_user=FALSE
*.parallel_force_local=TRUE
*.parallel_max_servers=44
*.parallel_threads_per_cpu=1
*.pga_aggregate_target=1677721600
*.processes=5000
*.remote_listener='odevx2-scan:1523'
*.remote_login_passwordfile='exclusive'
*.sec_case_sensitive_logon=FALSE
*.session_cached_cursors=200
*.sga_max_size=2147483648
*.sga_target=2147483648
IGAPROD2.thread=2
IGAPROD1.thread=1
IGAPROD1.undo_tablespace='UNDOTBS1'
IGAPROD2.undo_tablespace='UNDOTBS2'
*.use_large_pages='ONLY'

#Standby Configuration
*.fal_server='IGAPROD'
*.fal_client='IGAPRODSB'
*.standby_file_management='AUTO'
*.log_file_name_convert='+RECO_ODEVX2/IGAPROD','+RECO_ODEVX3/IGAPRODS
B'
*.log_archive_config='dg_config=(IGAPRODSB,IGAPROD)'
*.log_archive_dest_1='location=+RECO_ODEVX3','valid_for=(ALL_LOGFILES,
ALL_ROLES) DB_UNIQUE_NAME=IGAPRODSB'
*.log_archive_format='%t_%s_%r.dbf'
*.log_archive_max_processes=10
*.log_archive_min_succeed_dest=1
*.remote_login_passwordfile='exclusive'
*.db_create_file_dest='+DATA_ODEVX3'
*.db_file_name_convert='+DATA_ODEVX2/IGAPROD','+DATA_ODEVX3/IGAPRODS
B'
*.db_recovery_file_dest='+RECO_ODEVX3'
*.db_recovery_file_dest_size=10737418240
```

```
*.db_unique_name='IGAPRODSB'
*.db_create_online_log_dest_1='+DATA_ODEVX3'
*.db_create_online_log_dest_2='+RECO_ODEVX3'
*.db_domain=''
*.db_files=1024
*.db_name='IGAPROD'
*.db_recovery_file_dest_size=107374182400
*.db_recovery_file_dest='+RECO_ODEVX3'
*.diagnostic_dest='/u01/app/oracle'
*.control_files='+DATA_ODEVX3/IGAPRODSB/controlfile/control01.ctl','+RECO_ODE
VX3/IGAPRODSB/controlfile/control02.ctl'
```

Copy the file initIGAPRODSB.ora to $ORACLE_HOME/dbs on standby if not already exist in dbs directory.

4.6 **On the Standby Database**

    4.6.1   Using the dummy parameter file start up the instance

        SQL> startup nomount /u01/app/oracle/product/11.2.0.3/dbhome_1/dbs/ initIGAPRODSB.ora

    4.6.2   Repeat on node 2 and start the instance 2. - Optional

4.7 **Test Connections**

    4.7.1   **On both primary and Standby Sites test sql*net connections.**

        Sqlplus "sys/<pwd>@ IGAPRODSB as sysdba"

        Sqlplus "sys/<pwd>@IGAPROD as sysdba"

    4.7.2   **You should be able to connect to database using tnsnames and with SYS user with password on both primary and standby databases.**

4.8 **On the Standby Database**

    4.8.1   **Perform RMAN duplicate**

        4.8.1.1 **Duplicate from active database.**

            4.8.1.1.1   **Adjust and Use the following sample code.**

```
mkdir –p
/u01/app/oracle/diag/rdbms/IGAPRODSB/IGAPRODSB/adump

duplicate target database for standby from active database
spfile
parameter_value_convert 'IGAPROD','IGAPRODSB'
set db_unique_name='IGAPRODSB'
set
db_file_name_convert='+DATA_ODEVX2/IGAPROD','+DATA_ODEVX3/IGAPRO
DSB/'
set
log_file_name_convert='+DATA_ODEVX2/IGAPROD','+DATA_ODEVX3/IGAPRO
DSB/'

set
control_files='+DATA_ODEVX3/IGAPRODSB/controlfile/control01.ctl','+RECO_O
DEVX3/IGAPRODSB/controlfile/control01.ctl'
set standby_file_management='AUTO'
set db_recovery_file_dest='+RECO_ODEVX3'
```

```
set
audit_file_dest='/u01/app/oracle/diag/rdbms/IGAPRODSB/IGAPRODSB/adump
'
```

4.8.1.2 Using RMAN backup to build data guard.

4.8.1.2.1 Take a full backup of primary + archivelogs to NFS mount visible o both Primary and Standby Databases.

```
For example:
run{
allocate channel oem_backup_disk1 type disk format
'/orabackup/odevx2db01/rman/IGAPROD_db/20140716/level_0/IGAPR
OD_level_0_%U';
allocate channel oem_backup_disk2 type disk format
'/orabackup/odevx2db01/rman/IGAPROD_db/20140716/level_0/IGAPR
OD_level_0_%U';
allocate channel oem_backup_disk3 type disk format
'/orabackup/odevx2db01/rman/IGAPROD_db/20140716/level_0/IGAPR
OD_level_0_%U';
BACKUP DATABASE INCLUDE CURRENT CONTROLFILE FOR
STANDBY PLUS ARCHIVELOG;
SQL "ALTER SYSTEM ARCHIVE LOG CURRENT";
}

OR use existing level 0 back script, switch logfile and create standby
controlfile.

Run {
BACKUP DATABASE PLUS ARCHIVELOG;
SQL "ALTER SYSTEM ARCHIVE LOG CURRENT";
BACKUP CURRENT CONTROLFILE FOR STANDBY format
'/localorabkp/odevx2db01/rman/IGAPROD_db/20140717/level_0/stby_c
ontrol_file_071914.ctl';
}
```

#Note sometime RMAN does not recognize old backup with "backup current controlfile for standby ... command" user below command to fix that issue.

```
SQL> ALTER DATABASE CREATE STANDBY CONTROLFILE AS
'/localorabkp/odevx2db01/rman/IGAPROD_db/20140717/level_0/
stby_control_file_071914.ctl';
```

4.8.1.2.2 Once backup is complete. Standby DB restore can be started.

```
export ORACLE_HOME=IGAPRODSB
Create rman script rman_dup.rcv.
```

```
CATALOG CONTROLFILECOPY
'/orabackup/odevx2db01/rman/IGAPROD/20140820/level_0/stby_control_fil
e.ctl';

run{
allocate channel oem_backup_disk1 type disk format
'/orabackup/odevx2db01/rman/IGAPROD/20140820/level_0/IGAPROD_leve
l_0_%U';
allocate channel oem_backup_disk2 type disk format
'/orabackup/odevx2db01/rman/IGAPROD/20140820/level_0/IGAPROD_leve
l_0_%U';
allocate channel oem_backup_disk3 type disk format
'/orabackup/odevx2db01/rman/IGAPROD/20140820/level_0/IGAPROD_leve
l_0_%U';
allocate channel oem_backup_disk4 type disk format
'/orabackup/odevx2db01/rman/IGAPROD/20140820/level_0/IGAPROD_leve
l_0_%U';
allocate channel oem_backup_disk5 type disk format
'/orabackup/odevx2db01/rman/IGAPROD/20140820/level_0/IGAPROD_leve
l_0_%U';
allocate channel oem_backup_disk6 type disk format
'/orabackup/odevx2db01/rman/IGAPROD/20140820/level_0/IGAPROD_leve
l_0_%U';
allocate auxiliary channel stby1 type disk;
set newname for datafile 1 to '+DATA_ODEVX3';
set newname for datafile 2 to '+DATA_ODEVX3';
set newname for datafile 3 to '+DATA_ODEVX3';
set newname for datafile 4 to '+DATA_ODEVX3';
set newname for datafile 5 to '+DATA_ODEVX3';
set newname for datafile 6 to '+DATA_ODEVX3';
set newname for datafile 7 to '+DATA_ODEVX3';
set newname for datafile 8 to '+DATA_ODEVX3';
set newname for datafile 9 to '+DATA_ODEVX3';
set newname for datafile 10 to '+DATA_ODEVX3';
set newname for datafile 11 to '+DATA_ODEVX3';
set newname for datafile 12 to '+DATA_ODEVX3';
set newname for datafile 13 to '+DATA_ODEVX3';
set newname for tempfile 1 to '+DATA_ODEVX3';
duplicate target database for standby nofilenamecheck dorecover;
release channel oem_backup_disk1;
release channel oem_backup_disk2;
release channel oem_backup_disk3;
release channel oem_backup_disk4;
release channel oem_backup_disk5;
release channel oem_backup_disk6;
release channel stby1;
}
```

```
#Run in back ground.

nohup rman target sys/password@IGAPROD auxiliary
sys/password@IGAPRODSB  catalog rman/password@oemr1
cmdfile='/home/oracle/rman_dup.rcv'
log='/home/oracle/rman_dup_082014.log' &
```

Monitor the progress of the restore. Check files are being copied into ASM disk groups.

4.9 On the Standby Database
4.9.1   Validate the Database Role on standby instance IGAPRODSB
SQL> select name, database_role from v$database;

4.10   On the Primary and Standby Database
4.10.1 Configure Log Transport Method to be used.
4.10.2 Enable REDO Transport and REDO Apply.
    4.10.2.1On the standby site use following command to place standby database into managed recovery.

```
export ORACLE_SID=IGAPROD
sqlplus / as sysdba
SQL> alter database recover managed standby database disconnect;
Use Real Time Apply when SRLs are configured.
SQL> alter database recover managed standby database using current logfile
disconnect;
```

4.11   On the Standby Database
4.11.1 Once standby is created check if they have been mounted.
SQL> select instance_number, instance_name from gv$instance;

4.12   Add Standby Redo Logs on Standby Site.
5   On each database instance log in as sysdba and do following.

```
For Standby Site: ODEVX3DB01
export ORACLE_SID= IGAPROD
sqlplus / as sysdba
SELECT STATUS from V$INSTANCE;
SELECT GROUP#,THREAD#,SEQUENCE#,ARCHIVED,STATUS
FROM V$STANDBY_LOG;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX3' size
4096M;
```

```
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 1 '+RECO_ODEVX3' size
4096M;

For Standby Site: ODEVX3DB02 , add standby redo logs

ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX3' size
4096M;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '+RECO_ODEVX3' size
4096M;

SELECT GROUP#,THREAD#,SEQUENCE#,ARCHIVED,STATUS
FROM V$STANDBY_LOG;
```

5.2 Check for any heartbeat issues and errors on primary and standby alert log.

```
On Primary this was experienced.
SQL> select severity,error_code,message,timestamp from v$dataguard_status where dest_id=2
SQL> col severity for a20
SQL> col message for a60

#Archiver error

SEVERITY             ERROR_CODE MESSAGE
TIMESTAMP
-------------------- ---------- --------------------------------------------------------------
---------------------- -------------------
Error                     16058 PING[ARC2]: Heartbeat failed to connect to standby
'IGAPRODSB'. Error is 16058.    17-JUL-14
Error                     16058 FAL[server, ARC3]: Error 16058 creating remote archivelog
file 'IGAPRODSB'       17-JUL-14
Error                     16058 PING[ARC2]: Heartbeat failed to connect to standby
'IGAPRODSB'. Error is 16058.    17-JUL-14
Error                     16058 PING[ARC2]: Heartbeat failed to connect to standby
'IGAPRODSB'. Error is 16058.    17-JUL-14
Error                     16058 PING[ARC2]: Heartbeat failed to connect to standby
'IGAPRODSB'. Error is 16058.    17-JUL-14
Error                     16058 PING[ARC2]: Heartbeat failed to connect to standby
'IGAPRODSB'. Error is 16058.    17-JUL-14
Error                     16058 PING[ARC2]: Heartbeat failed to connect to standby
'IGAPRODSB'. Error is 16058.    17-JUL-14
Error                     16058 PING[ARC2]: Heartbeat failed to connect to standby
'IGAPRODSB'. Error is 16058.    17-JUL-14
Error                     16058 PING[ARC2]: Heartbeat failed to connect to standby
'IGAPRODSB'. Error is 16058.    17-JUL-14
Error                     16058 PING[ARC2]: Heartbeat failed to connect to standby
'IGAPRODSB'. Error is 16058.    17-JUL-14
```

```
Error                     16058 PING[ARC2]: Heartbeat failed to connect to standby
'IGAPRODSB'. Error is 16058.   17-JUL-14
```

5.3 Monitoring both Primary and Standby Sites for log shipping & log Apply.

On primary

```
SQL> set lines 180
SQL> col instance_name for a30
SQL> col host_name for a30
SQL> select instance_name,host_name from v$instance;

INSTANCE_NAME              HOST_NAME
----------------------------- ------------------------------
IGAPROD                    odevx2db01

SQL> archive log list
Database log mode            Archive Mode
Automatic archival        Enabled
Archive destination        +RECO_ODEVX2
Oldest online log sequence    219
Next log sequence to archive   222
Current log sequence        222
SQL> col CURRENT_SCN for 999999999999999
SQL> select
DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT_SCN from
v$database;

DATABASE_ROLE   PROTECTION_MODE   SWITCHOVER_STATUS      CURRENT_SCN
---------------- -------------------- -------------------- ----------------
PRIMARY      MAXIMUM PERFORMANCE  FAILED DESTINATION   6112663458179


SQL> SELECT STATUS,PROCESS FROM V$MANAGED_STANDBY;

STATUS      PROCESS
----------- ---------
OPENING    ARCH
CLOSING    ARCH
CONNECTED   ARCH
OPENING    ARCH
CLOSING    ARCH
OPENING    ARCH
CLOSING    ARCH
OPENING    ARCH
CLOSING    ARCH
OPENING    ARCH
OPENING    LNS

11 rows selected.


#On Standby
```

```
SQL> set lines 180
SQL> col instance_name for a30
SQL> col host_name for a30
SQL> select instance_name,host_name from v$instance;

INSTANCE_NAME                   HOST_NAME
------------------------------ ------------------------------
IGAPRODSB                       ODEVX3DB01

SQL> archive log list
Database log mode              Archive Mode
Automatic archival             Enabled
Archive destination            +RECO_ODEVX3
Oldest online log sequence     0
Next log sequence to archive   221
Current log sequence           221
SQL> col CURRENT_SCN for 999999999999999
SQL> select
DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT_SCN from
v$database;

DATABASE_ROLE   PROTECTION_MODE     SWITCHOVER_STATUS      CURRENT_SCN
--------------- ------------------- ------------------- ----------------
PHYSICAL STANDBY MAXIMUM PERFORMANCE  NOT ALLOWED         6112662810240



SQL> SELECT STATUS,PROCESS FROM V$MANAGED_STANDBY;

STATUS      PROCESS
------------ ---------
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
APPLYING_LOG MRP0

11 rows selected.
```

5.4 Heartbeat errors on Primary

5.4.1 Correct any connection errors and cancel recover or make log shipping to defer state if necessary.

Add any issues here.

5.5 Create SPFILE Standby Database

  5.5.1 Create spfile from pfile.

  5.5.2 SQL> CREATE SPFILE='
      +DATA_ODEVX3/IGAPRODSB/PARAMETERFILE/spfileIGAPRODSB.ora'
      from
      pfile='/u01/app/oracle/product/11.2.0.3/dbhome_1/dbs/initIGAPRODSB.ora
      ';

  5.5.3 Check spfile is create in ASM disk group.

  5.5.4 On standby node1 ODEVX3DB01:
      cd $ORACLE_HOME/dbs
      mv initIGAPRODSB1.ora.old
      echo "spfile=' +DATA_ODEVX3/IGAPRODSB/spfileIGAPRODSB.ora'" >
      initIGAPRODSB1.ora
      scp initIGAPRODSB1.ora ODEVX3DB02:$ORACLE_HOME/dbs/
      initIGAPRODSB2.ora

5.6 Converting to RAC database.

  5.6.1 If you started standby in managed recover with standby and assuming you are using spfile. The following steps should be updated in spfile.

```
SQL> alter system set local_listener='(DESCRIPTION =
(ADDRESS=(PROTOCOL=TCP)(HOST=odevx3db01-vip)(PORT=1544))
(ADDRESS=(PROTOCOL=TCP)(HOST=10.10.127.12)(PORT=1544))
(CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME =
IGAPRODSB) (UR=A)))' sid='IGAPRODSB1' scope=both;

SQL> alter system set local_listener='(DESCRIPTION =
(ADDRESS=(PROTOCOL=TCP)(HOST=odevx3db02-vip)(PORT=1544))
(ADDRESS=(PROTOCOL=TCP)(HOST=10.10.127.13)(PORT=1544))
(CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME =
IGAPRODSB) (UR=A)))' sid='IGAPRODSB2' scope=both;

SQL> alter system set cluster_database=TRUE sid='*' scope=spfile;

SQL> alter system set instance_number=1 sid='IGAPRODSB1' scope=spfile;

SQL> alter system set instance_number=2 sid='IGAPRODSB2' scope=spfile;

SQL> ALTER SYSTEM SET undo_tablespace='APPS_UNDOTS1'
SID='IGAPRODSB1' SCOPE=SPFILE;

 SQL> create undo tablespace APPS_UNDOTS2 datafile '+DATA_ODEVX2' size
2048M autoextend on;
 --This step should be carried out after standby become primary and opened

SQL> ALTER SYSTEM SET undo_tablespace='APPS_UNDOTS2'
SID='IGAPRODSB2' SCOPE=SPFILE;
--This step may be carried out after standby become primary and opened and
```

APPS_UNDOTS2 is created.

SQL> alter system set thread=1 sid='IGAPRODSB1' scope=spfile;

SQL> alter system set thread=2 sid='IGAPRODSB2' scope=spfile;

SQL> alter system set diagnostic_dest='/u01/app/oracle' sid='*' scope=both;

SQL> alter system set LOG_ARCHIVE_DEST_2='SERVICE=IGAPROD LGWR
ASYNC VALID_FOR=(ONLINE_LOGFILES,PRIMARY_ROLE)
DB_UNIQUE_NAME=IGAPROD NOAFFIRM NET_TIMEOUT=30 REOPEN=30
max_failure=0 max_connections=1' sid ='*' scope=both;

SQL> alter system set LOG_ARCHIVE_DEST_STATE_1=ENABLE sid ='*'
scope=both;
SQL> alter system set LOG_ARCHIVE_DEST_STATE_2=ENABLE sid ='*'
scope=both;

SQL> alter system set fal_client='IGAPRODSB' sid ='*' scope=both;
SQL> alter system set fal_server='IGAPROD' sid ='*' scope=both;

Add the entry in /etc/oratab.

[oracle@ODEVX3DB01 dbs]$ grep IGAPRODSB1 /etc/oratab
IGAPRODSB1:/u01/app/oracle/product/11.2.0.3/dbhome_1:N   # line
added by Agent
[oracle@ODEVX3DB02 ~]$ grep IGAPRODSB2 /etc/oratab
IGAPRODSB2:/u01/app/oracle/product/11.2.0.3/dbhome_1:N   # line
added by Agent

Create a pfile under dbs pointing to SPFILE on ASM disk group.
[oracle@ODEVX3DB01 dbs]$ pwd
/u01/app/oracle/product/11.2.0.3/dbhome_1/dbs
[oracle@ODEVX3DB01 dbs]$ cp initIGAPRODSB.ora initIGAPRODSB1.ora

[oracle@ODEVX3DB01 dbs]$ cat initIGAPRODSB1.ora
SPFILE='+DATA_ODEVX3/IGAPRODSB/PARAMETERFILE/spfileIGAPRODS
B.ora'   # line added by Agent

[oracle@ODEVX3DB01 dbs]$ scp initIGAPRODSB1.ora
ODEVX3DB02:/u01/app/oracle/product/11.2.0.3/dbhome_1/dbs/initIGAPRO
DSB2.ora
initIGAPRODSB1.ora

Cancel Recovery process:
SQL> ALTER DATABASE RECOVER MANAGED STANDBY DATABASE
CANCEL;

```
Database altered.
SQL> shutdown immediate
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL>
```

5.7 Bring up both instances using spfile.

```
shutdown immediate -- and startup instances on both nodes to check.

[oracle@ODEVX3DB01 dbs]$ . oraenv
ORACLE_SID = [IGAPRODSB1] ?
The Oracle base remains unchanged with value /u01/app/oracle
[oracle@ODEVX3DB01 dbs]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Mon Jul 21 15:17:05 2014

Copyright (c) 1982, 2013, Oracle.  All rights reserved.

Connected to an idle instance.

SQL> startup mount

[oracle@ODEVX3DB02 ~]$ . oraenv
ORACLE_SID = [oracle] ? IGAPRODSB2
SQL> startup mount
ORACLE instance started.


SQL> select
INSTANCE_NUMBER,INSTANCE_NAME,HOST_NAME,THREAD#,STATUS from
gv$instance;

INSTANCE_NUMBER INSTANCE_NAME    HOST_NAME
THREAD# STATUS
--------------- ---------------- ------------------------------------------------------------- ---------- ----------
--
  1 IGAPRODSB1      ODEVX3DB01                                1 MOUNT
  2 IGAPRODSB2      ODEVX3DB02                                2 MOUNT
```

5.8 Register Standby Database Resources with Clusterware
5.8.1 Add standby database & instances to cluster registry

```
On Primary:
alter system set log_archive_dest_state_2='defer' scope=both;

shutdown standby instances and add standby to cluster registry.
```

```
[oracle@ODEVX3DB01 trace]$ srvctl add database -d IGAPRODSB -o
/u01/app/oracle/product/11.2.0.3/dbhome_1 -p
'+DATA_ODEVX3/IGAPRODSB/PARAMETERFILE/spfileIGAPRODSB.ora' -r
PHYSICAL_STANDBY –n IGAPROD
[oracle@ODEVX3DB01 trace]$ srvctl modify database -d IGAPRODSB -a
"DATA_ODEVX3,RECO_ODEVX3"
[oracle@ODEVX3DB01 trace]$ srvctl modify database -d IGAPRODSB -s
MOUNT
[oracle@ODEVX3DB01 trace]$  srvctl add instance -d IGAPRODSB -i
IGAPRODSB1 -n ODEVX3DB01
[oracle@ODEVX3DB01 trace]$ srvctl add instance -d IGAPRODSB -i
IGAPRODSB2 -n ODEVX3DB02
[oracle@ODEVX3DB01 dbs]$ srvctl status database -d IGAPRODSB
Instance IGAPRODSB1 is not running on node ODEVX3DB01
Instance IGAPRODSB2 is not running on node ODEVX3DB02

[oracle@ODEVX3DB01 dbs]$ srvctl config database -d IGAPRODSB

Database unique name: IGAPRODSB
Database name:
Oracle home: /u01/app/oracle/product/11.2.0.3/dbhome_1
Oracle user: oracle
Spfile:
+DATA_ODEVX3/IGAPRODSB/PARAMETERFILE/spfileIGAPRODSB.ora
Domain:
Start options: mount
Stop options: immediate
Database role: PHYSICAL_STANDBY
Management policy: AUTOMATIC
Server pools: IGAPRODSB
Database instances: IGAPRODSB1,IGAPRODSB2
Disk Groups: DATA_ODEVX3,RECO_ODEVX3
Mount point paths:
Services:
Type: RAC
Database is administrator managed

[oracle@ODEVX3DB01 dbs]$ srvctl start database -d IGAPRODSB
[oracle@ODEVX3DB01 dbs]$ srvctl status database -d IGAPRODSB
Instance IGAPRODSB1 is running on node ODEVX3DB01
Instance IGAPRODSB2 is running on node ODEVX3DB02
[oracle@ODEVX3DB01 dbs]$

SQL> select
DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT
_SCN from gv$database;
```

```
DATABASE_ROLE    PROTECTION_MODE    SWITCHOVER_STATUS
CURRENT_SCN
---------------- -------------------- -------------------- -----------
PHYSICAL STANDBY MAXIMUM PERFORMANCE  NOT ALLOWED
6.1127E+12
PHYSICAL STANDBY MAXIMUM PERFORMANCE  NOT ALLOWED
6.1127E+12


SQL>  alter database recover managed standby database using current logfile
disconnect;


On Primary:
SQL> alter system set log_archive_dest_state_2='enable' scope=both;


System altered.


Check Redo shipping and apply status on Primary & Standby:

```

5.9 Setup Active Data Guard.
    5.9.1   On primary:
           SQL>select status,instance_name,database_role from v$instance,v$database;
    5.9.2   On Standby:
           SQL>select status,instance_name,database_role from v$database,v$instance;
    5.9.3   Check if the Managed Recovery Process (MRP) is active on the physcial standby
           database.
           SQL>select process,status,sequence# from v$managed_standby;
    5.9.4   Cancel the MRP on the physical standby database and open the standby
           database. The standby database would be opened in the READ-ONLY Mode to
           make it Active DataGuard.
           SQL> alter database recover managed standby database cancel;
           SQL> **ALTER DATABASE OPEN READ ONLY;**
           SQL> select status,instance_name,database_role,open_mode from
           v$database,v$instance;
    5.9.5   Now start the MRP on the physical standby database.
           SQL> alter database recover managed standby database disconnect from session;
           OR
           SQL> alter database recover managed standby database using current logfile
           disconnect; (FOR REAL TIME APPLY)
  5.10   Monitor Standby REDO APPLY.
    5.10.1 **On primary**
           SQL>select
           DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT
           _SCN from v$database;
           SQL>SELECT SEQUENCE#, FIRST_TIME, NEXT_TIME FROM
           V$ARCHIVED_LOG ORDER BY SEQUENCE#;
           SQL>SELECT STATUS,PROCESS FROM V$MANAGED_STANDBY;

SQL>SELECT SEQUENCE#,APPLIED FROM V$ARCHIVED_LOG ORDER BY SEQUENCE#;
SQL>archive log list
SQL>select timestamp, message from v$dataguard_status;

5.10.2 on Standby
SQL> select DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT_SCN from v$database;
SQL> SELECT SEQUENCE#, FIRST_TIME, NEXT_TIME FROM V$ARCHIVED_LOG ORDER BY SEQUENCE#;
SQL> SELECT STATUS,PROCESS FROM V$MANAGED_STANDBY;
SQL> archive log list
SQL> select timestamp, message from v$dataguard_status;

5.11 Verify Standby Database
5.11.1 On Primary
SQL> ALTER SYSTEM ARCHIVE LOG CURRENT;
5.11.2 On Standby
SQL> SELECT sequence#, first_time, next_time, applied FROM v$archived_log ORDER BY sequence#;

5.11.3 Add redo log groups and drop old log groups. This step is only necessary if you need to adjust redo log size, redo log group numbers for any standards.

--Add logfile groups for each thread and drop old groups. - may have to do some of log switches to drop old groups.

ALTER DATABASE ADD LOGFILE THREAD 1 GROUP 11
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 1 GROUP 12
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 1 GROUP 13
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 1 GROUP 14
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;

ALTER DATABASE ADD LOGFILE THREAD 2 GROUP 21
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 2 GROUP 22
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 2 GROUP 23
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 2 GROUP 24
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;

5.12 Enable Data Guard Broker (Optional)
5.12.1 Enable Data Guard Broker
5.12.2 On the primary and standby issue following command
Alter system set dg_broker_start=true scope=both sid='*';

5.12.3 On Primary Node

```
SQL>alter system set
dg_broker_config_file1='/u01/app/oracle/product/11.2.0.3/dbhome_1/dr1IG
APROD.dat' scope=BOTH;
SQL> alter system set
dg_broker_config_file2='/u01/app/oracle/product/11.2.0.3/dbhome_1/
dr2IGAPROD.dat' scope=BOTH;

On Standby Node
SQL> alter system set dg_broker_config_file1='+DATA_ODEVX3/
IGAPRODSB/BROKER/dr1IGAPRODSB.dat' scope=BOTH;
SQL> alter system set dg_broker_config_file2='+DATA_ODEVX3/
IGAPRODSB/BROKER/dr2IGAPRODSB.dat' scope=BOTH;
```

5.12.4   On Primary Node

5.12.4.1Create Data Guard Configuration

```
$ export ORACLE_HOME=IGAPROD
$ which dgmgrl
$ dgmgrl sys/<pwd>
 DGMGRL> create configuration 'IGAPROD_DG' as primary database is
'IGAPROD' connect identifier is IGAPROD;

DGMGRL> ADD DATABASE 'IGAPRODSB' AS CONNECT IDENTIFIER IS
IGAPRODSB MAINTAINED AS PHYSICAL;

DGMGRL> ENABLE CONFIGURATION;

DGMGRL> SHOW CONFIGURATION;

DGMGRL> SHOW DATABASE IGAPROD_DG VERBOSE;

DGMGRL> SHOW DATABASE IGAPRODSB VERBOSE;
```

5.12.4.2 Editing DG Broker Configuration

```
DGMGRL> EDIT DATABASE 'IGAPRODSB' SET PROPERTY
'DGConnectIdentifier'='IGAPRODSB_DG';
```

5.12.4.3

5.13   Test Switch Over

Switchover is a planned event in which data guard reverses the roles of the
primary and a standby database. Switch over is particularly useful for
minimizing downtime during planned events, for example during migration,
upgrades and patching.

```
On Primary:
SQL> select
DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT
_SCN from gv$database;
```

on StandBy:

SQL> SQL> select
DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT
_SCN from gv$database;

########## Switch Over ###############

1. Prepare for switch over:

On Primary:
SQL> SELECT UNIQUE THREAD# AS THREAD, MAX(SEQUENCE#) OVER
(PARTITION BY thread#) AS LAST from GV$ARCHIVED_LOG;

On Standby:

SQL> SELECT UNIQUE THREAD# AS THREAD, MAX(SEQUENCE#) OVER
(PARTITION BY thread#) AS LAST from GV$ARCHIVED_LOG;

On Primary: Switch log file.

SQL> ALTER SYSTEM SWITCH LOGFILE;
-- This is last archivelog switch after apps are down or stopped transactions.

On StandBy Stop Apply:

SQL> ALTER DATABASE RECOVER MANAGED STANDBY DATABASE
CANCEL;

On Standby Finish applying all received redo data:

SQL> ALTER DATABASE RECOVER MANAGED STANDBY DATABASE
FINISH;

6. **Monitor Log Shipping & Apply**
   a.

#######After Restore completed##################

Monitor Media Recovery

SQL> alter session set nls_date_format='DD-MON-YYYY HH24:MI:SS';

Session altered.

#on Primary:

```
SQL> select DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT_SCN from
v$database;

DATABASE_ROLE   PROTECTION_MODE     SWITCHOVER_STATUS   CURRENT_SCN
---------------- -------------------- -------------------- -----------
PHYSICAL STANDBY MAXIMUM PERFORMANCE  RECOVERY NEEDED      6.1127E+12

#On Standby:


SQL> alter session set nls_date_format='DD-MON-YYYY HH24:MI:SS';

Session altered.

SQL> select DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT_SCN from
v$database;

DATABASE_ROLE   PROTECTION_MODE     SWITCHOVER_STATUS   CURRENT_SCN
---------------- -------------------- -------------------- -----------
PHYSICAL STANDBY MAXIMUM PERFORMANCE  RECOVERY NEEDED      6.1127E+12


#Standby Alert log:


Media Recovery Log
+RECO_ODEVX3/IGAPRODSB/archivelog/2014_07_20/thread_1_seq_235.587.853399383
Sun Jul 20 07:36:58 2014
Media Recovery Waiting for thread 1 sequence 236 (in transit)
Sun Jul 20 07:39:13 2014
Archived Log entry 22 added for thread 1 sequence 236 rlc 852377577 ID 0xcc9a9adf dest 2:
RFS[8]: Opened log for thread 1 sequence 245 dbid -862314785 branch 852377577
Sun Jul 20 07:39:18 2014
Media Recovery Log
+RECO_ODEVX3/IGAPRODSB/archivelog/2014_07_20/thread_1_seq_236.588.853399565
Sun Jul 20 07:39:30 2014
Media Recovery Waiting for thread 1 sequence 237 (in transit)
Sun Jul 20 07:39:37 2014
Archived Log entry 23 added for thread 1 sequence 245 rlc 852377577 ID 0xcc9a9adf dest 2:
RFS[8]: Opened log for thread 1 sequence 246 dbid -862314785 branch 852377577
Archived Log entry 24 added for thread 1 sequence 246 rlc 852377577 ID 0xcc9a9adf dest 2:
RFS[8]: Opened log for thread 1 sequence 247 dbid -862314785 branch 852377577
Archived Log entry 25 added for thread 1 sequence 247 rlc 852377577 ID 0xcc9a9adf dest 2:
RFS[8]: Opened log for thread 1 sequence 248 dbid -862314785 branch 852377577
Archived Log entry 26 added for thread 1 sequence 248 rlc 852377577 ID 0xcc9a9adf dest 2:
Sun Jul 20 07:41:31 2014
Archived Log entry 27 added for thread 1 sequence 237 rlc 852377577 ID 0xcc9a9adf dest 2:
Sun Jul 20 07:41:35 2014
Media Recovery Log
+RECO_ODEVX3/IGAPRODSB/archivelog/2014_07_20/thread_1_seq_237.589.853399707
Sun Jul 20 07:41:48 2014
Media Recovery Waiting for thread 1 sequence 238 (in transit)

#Recovery is still under way - should complete log 251

#on Primary

SQL>  select DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT_SCN from
v$database;

DATABASE_ROLE   PROTECTION_MODE     SWITCHOVER_STATUS        CURRENT_SCN
---------------- -------------------- -------------------- --------------------
PRIMARY          MAXIMUM PERFORMANCE  TO STANDBY              6112663653233


#on Standby
```

```
SQL> select DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT_SCN from
v$database;


DATABASE_ROLE   PROTECTION_MODE    SWITCHOVER_STATUS       CURRENT_SCN
---------------- -------------------- -------------------- --------------------
PHYSICAL STANDBY MAXIMUM PERFORMANCE  NOT ALLOWED           6112663639383

#Check logs are applied on standby

SQL> SQL> SELECT SEQUENCE#,APPLIED FROM V$ARCHIVED_LOG ORDER BY SEQUENCE#;

 SEQUENCE# APPLIED
---------- ---------
    218 YES
    ………..
    ………..
    246 YES
    247 YES
    248 YES
    249 YES
    250 YES
    251 YES

34 rows selected.

SQL>


#On Primary:

SQL> SELECT STATUS,PROCESS FROM V$MANAGED_STANDBY;

STATUS     PROCESS
------------ ---------
CLOSING    ARCH
CLOSING    ARCH
CLOSING    ARCH
CLOSING    ARCH
CLOSING    ARCH
CLOSING    ARCH
CLOSING    ARCH
CLOSING    ARCH
CLOSING    ARCH
CLOSING    ARCH
WRITING    LNS

11 rows selected.

#On Standby

SQL> SELECT STATUS,PROCESS FROM V$MANAGED_STANDBY;

STATUS     PROCESS
------------ ---------
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
CONNECTED   ARCH
IDLE       RFS
```

```
STATUS      PROCESS
----------- ---------
IDLE        RFS
IDLE        RFS
IDLE        RFS
IDLE        RFS
WAIT_FOR_LOG MRP0
IDLE        RFS
IDLE        RFS
IDLE        RFS
IDLE        RFS
IDLE        RFS

21 rows selected.


#On Primary
SQL> alter system switch logfile;

System altered.


#On Standby Alert Log

Archived Log entry 35 added for thread 1 sequence 252 rlc 852377577 ID 0xcc9a9adf dest 2:
RFS[3]: No standby redo logfiles created
RFS[3]: Opened log for thread 1 sequence 253 dbid -862314785 branch 852377577

Media Recovery Log
+RECO_ODEVX3/IGAPRODSB/archivelog/2014_07_20/thread_1_seq_252.571.853388135
Media Recovery Waiting for thread 1 sequence 253 (in transit)


#On Stanby
SQL>  SELECT SEQUENCE#,APPLIED FROM V$ARCHIVED_LOG where sequence#=252;

 SEQUENCE# APPLIED
---------- ---------
      252 YES

#On Primary

SQL>  SELECT MAX(SEQUENCE#) FROM V$ARCHIVED_LOG WHERE APPLIED='YES';

MAX(SEQUENCE#)
--------------
         252

#On Standby
SQL> SELECT MAX(SEQUENCE#) FROM V$ARCHIVED_LOG WHERE APPLIED='YES';

MAX(SEQUENCE#)
--------------
         252

#Switch Log Again

#On Primary

SQL>  alter system switch logfile;



#On Standby Alert log
Archived Log entry 36 added for thread 1 sequence 253 rlc 852377577 ID 0xcc9a9adf dest 2:
RFS[3]: No standby redo logfiles created
RFS[3]: Opened log for thread 1 sequence 254 dbid -862314785 branch 852377577
```

```
Media Recovery Log
+RECO_ODEVX3/IGAPRODSB/archivelog/2014_07_20/thread_1_seq_253.601.853401339
Media Recovery Waiting for thread 1 sequence 254 (in transit)

#On Standby

SQL> SELECT MAX(SEQUENCE#) FROM V$ARCHIVED_LOG WHERE APPLIED='YES';

MAX(SEQUENCE#)
--------------
       253


#On Primary

SQL> SELECT MAX(SEQUENCE#) FROM V$ARCHIVED_LOG WHERE APPLIED='YES';

MAX(SEQUENCE#)
--------------
       253

#On Primary
SQL>  select DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT_SCN from
v$database;

DATABASE_ROLE   PROTECTION_MODE     SWITCHOVER_STATUS       CURRENT_SCN
---------------- -------------------- ------------------- -------------------
PRIMARY      MAXIMUM PERFORMANCE  TO STANDBY        6112663662319


#On Standby

SQL>  select DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT_SCN from
v$database;
```

7. Init file configuration (Primary & Standy) –
8. **Some Issues may be encountered during standby setup/sync/RMAN duplicate**
   a. Make sure copy password from primary to standby for oracle user. scp pwdfile oracle@dest:<DBS DIR PATH ON DEST>
   b. Make sure use large large_pool for rman restore
   c. Make sure set read permissions or all backup files, archivelog files required for rman restore/recover. And also permission on /ora/IGAPROD/arch
   d. Add IGAPRODSB to Cluster registry on standby if RMAN is stuck accessing disk group to create data files and archive log files.
   e. Check password is senstive on source and target
           SQL> show parameter sec_case_sensitive_logon;
           SQL> alter system set sec_case_sensitive_logon = false;
      --whatever you have on source (true/false)
   f. SQLNET.ORA setting to match on source and target.
9. **After Converting standby to RAC**
   After standby is converted to RAC database. Both instances are opened read only however "REDO APPLY" will be active on only on of the standby nodes.

```
#On Primary
```

```
SQL> SELECT MAX(SEQUENCE#) FROM V$ARCHIVED_LOG WHERE APPLIED='YES';

MAX(SEQUENCE#)
--------------
         298

#On Stadby
SQL> SELECT INST_ID,MAX(SEQUENCE#) FROM GV$ARCHIVED_LOG WHERE APPLIED='YES' GROUP BY
INST_ID;

   INST_ID MAX(SEQUENCE#)
---------- --------------
       1        298
       2        298

#on Standby

#On node 1
SQL> alter database open read only;
SQL> alter database recover managed standby database using current logfile disconnect;

#On Node2
SQL> alter database open read only;

Database altered.

SQL> select inst_id,open_mode from gv$database;

   INST_ID OPEN_MODE
---------- --------------------
       2 READ ONLY WITH APPLY
       1 READ ONLY WITH APPLY

SQL> select DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT_SCN from v$database;

DATABASE_ROLE    PROTECTION_MODE    SWITCHOVER_STATUS   CURRENT_SCN
---------------- -------------------- -------------------- -----------
PRIMARY        MAXIMUM PERFORMANCE  SESSIONS ACTIVE     6.1127E+12


SQL> select DATABASE_ROLE,PROTECTION_MODE,SWITCHOVER_STATUS,CURRENT_SCN from GV$DATABASE;

DATABASE_ROLE    PROTECTION_MODE    SWITCHOVER_STATUS   CURRENT_SCN
---------------- -------------------- -------------------- -----------
PHYSICAL STANDBY MAXIMUM PERFORMANCE  NOT ALLOWED        6.1127E+12
PHYSICAL STANDBY MAXIMUM PERFORMANCE  NOT ALLOWED        6.1127E+12


#On Primary add SRLs for thread 2(instance 2) - This is not required if Primary is single instance

ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '/ora/IGAPROD/redo/stbylog16.dbf' size 1024M reuse;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '/ora/IGAPROD/redo/stbylog11.dbf' size 1024M reuse;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '/ora/IGAPROD/redo/stbylog18.dbf' size 1024M reuse;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '/ora/IGAPROD/redo/stbylog19.dbf' size 1024M reuse;
ALTER DATABASE ADD STANDBY LOGFILE THREAD 2 '/ora/IGAPROD/redo/stbylog20.dbf' size 1024M reuse;

SQL> SELECT INST_ID,GROUP#,THREAD#,SEQUENCE#,ARCHIVED,STATUS FROM GV$STANDBY_LOG;

   INST_ID   GROUP#   THREAD# SEQUENCE# ARC STATUS
---------- ---------- ---------- ---------- --- ----------
       2      1      1      300 YES ACTIVE
       2      2      1        0 NO  UNASSIGNED
       2      7      1        0 YES UNASSIGNED
       2      8      1        0 YES UNASSIGNED
       2      9      1        0 YES UNASSIGNED
       1      1      1      300 YES ACTIVE
       1      2      1        0 NO  UNASSIGNED
```

```
     1    7    1       0 YES UNASSIGNED
     1    8    1       0 YES UNASSIGNED
     1    9    1       0 YES UNASSIGNED

10 rows selected.


SQL> SELECT STATUS,PROCESS FROM V$MANAGED_STANDBY;

STATUS      PROCESS
----------- ---------
CLOSING     ARCH
CONNECTED   ARCH
CLOSING     ARCH
CLOSING     ARCH
CLOSING     ARCH
OPENING     ARCH
CLOSING     ARCH
CLOSING     ARCH
CLOSING     ARCH
CLOSING     ARCH
WRITING     LNS

11 rows selected.

SQL>

SQL> SELECT INST_ID,STATUS,PROCESS FROM GV$MANAGED_STANDBY ORDER BY 1;

  INST_ID STATUS      PROCESS
---------- ----------- ---------
     1 CLOSING     ARCH
     1 IDLE        RFS
     1 IDLE        RFS
     1 IDLE        RFS
     1 IDLE        RFS
     1 APPLYING_LOG MRP0
     1 CONNECTED   ARCH
     1 CONNECTED   ARCH
     1 CLOSING     ARCH
     1 CONNECTED   ARCH
     1 CONNECTED   ARCH
     1 CONNECTED   ARCH
     1 IDLE        RFS
     1 CONNECTED   ARCH
     1 CLOSING     ARCH
     1 CLOSING     ARCH
     2 CONNECTED   ARCH
     2 CONNECTED   ARCH
     2 CONNECTED   ARCH
     2 CONNECTED   ARCH
     2 CONNECTED   ARCH
     2 CONNECTED   ARCH
     2 CONNECTED   ARCH
     2 CONNECTED   ARCH
     2 CONNECTED   ARCH
     2 CONNECTED   ARCH

26 rows selected.

SQL>
```

SQL> create undo tablespace APPS_UNDOTS2 datafile '+DATA_ODEVX3' size 2048M autoextend on;

SQL> ALTER SYSTEM SET undo_tablespace='APPS_UNDOTS2' SID='ESLPERF2' SCOPE=SPFILE;

System altered.

##This step is needed to enable node2 if you have not already done when converting.

```
SQL> ALTER DATABASE ADD LOGFILE THREAD 1 GROUP 11
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 1 GROUP 12
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 1 GROUP 13
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 1 GROUP 14
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 2 GROUP 21
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 2 GROUP 22
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 2 GROUP 23
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
ALTER DATABASE ADD LOGFILE THREAD 2 GROUP 24
('+DATA_ODEVX3','+RECO_ODEVX3') size 10240M;
```

```
SQL>  alter database enable thread 2;
```

Database altered.

--drop old logfiles after several switch

drop old database from registry and add new database in cluster registry.

```
srvctl remove instance  –d OAGPRODSB –i OAGPRODSB1
srvctl remove instance  –d OAGPRODSB –i OAGPRODSB2
srvctl remove database –d OAGPRODSB
```

Add new database to registry.

```
[oracle@ODEVX3DB01 trace]$ srvctl add database -d ESLPERF -o
/u01/app/oracle/product/11.2.0.3/dbhome_1 -p
'+DATA_ODEVX3/ESLPERF/PARAMETERFILE/spfileESLPERF.ora' -r PHYSICAL_STANDBY –
n IGAPROD
[oracle@ODEVX3DB01 trace]$ srvctl modify database -d ESLPERF -a
"DATA_ODEVX2,RECO_ODEVX2"
[oracle@ODEVX3DB01 trace]$ srvctl modify database -d ESLPERF -s MOUNT
[oracle@ODEVX3DB01 trace]$  srvctl add instance -d ESLPERF -i ESLPERF1 -n ODEVX3DB01
[oracle@ODEVX3DB01 trace]$ srvctl add instance -d ESLPERF -i ESLPERF2 -n ODEVX3DB02
[oracle@ODEVX3DB01 dbs]$ srvctl status database -d ESLPERF
Instance ESLPERF1 is not running on node ODEVX3DB01
Instance ESLPERF2 is not running on node ODEVX3DB02
```