**RAC System Test Plan**

**19cR3**

# Purpose

Before a new software is deployed in production it is important to test the system thoroughly to validate that it will perform at a satisfactory level, relative to its service level objectives. Testing is also required when introducing major or minor changes to the system. This system test plan can be used to thoroughly test 19c RAC implementation and their associated service level objectives.

# Scope of System Testing

This test plan will be used to validate core component functionality for RAC GI (Grid Infrastructure) configuration. Each new system must be tested thoroughly, in an environment that is a realistic representation of the production environment in terms of configuration, capacity, and workload prior to going live or after implementing significant architectural/system modifications. Without a completed system implementation and functional available end-user applications, only core component functionality and testing is possible to verify cluster, RDBMS and various sub-component behaviors for the Networking, I/O subsystem and miscellaneous database administrative functions.

In addition to the RAC GI configuration testing, this test plan also covers test cases for RMAN, backup and recovery, and Data Guard (for disaster recovery. This Test plan is limited and mainly focused on database administrative functions of 19C GI and its supported components. This test plan will not cover supported applications functionality and load testing.

**Note:** Network related Test cases are out of scope for this virtual RAC testing.

Current architecture, which consist of a VMware hypervisor for virtual deployments and a Cisco hypervisor for physical deployments, have network redundancy built-in. This built-in redundancy alleviates the need to configure NIC bonding/teaming at the OS level. As such, any test in this realm are deemed inconsequential.

# RAC Test Results Summary: TST CLUSTER

|  |  |
| --- | --- |
| **RAC** | TST |
| **SERVERS** |  |
| **TEST DATES** |  |
| **TESTERS** |  |
| **PASS/FAIL** | PASS |
| **OVERALL SUMMARY** |  |

# System Testing Scenarios : Node and Listener Failures

| **#** | **Test** | **Procedure** | **Expected Results** | **Measures** | **Actual Results/Notes** |
| --- | --- | --- | --- | --- | --- |
| 1 | **Planned Node Reboot** | Reboot one of the nodes (“Shutdown -r now”) | All services and components associated with the rebooted node should fail-over to available nodes | Successful failover of all RAC components associated with the rebooted node | Passed  Please see Appendix A (Screenshots for Node and Listener Failures) |
| 2 | **Unplanned Node**  **Failure** | Power off the node | Same as Planned Node Reboot | • Same as Planned Node Reboot | Passed  Please see Appendix A (Screenshots for Node and Listener Failures) |
| 3 | **Restart Failed Node** | Power on the node | * The VIP will migrate back to the restarted node. * Services that had failed over as a result of the node failure will   NOT automatically be relocated.   * Failed resources (asm, listener, instance, etc) will be restarted by the Clusterware. | • Time for all resources to become available again, Check with “crsctl stat res –t” | Passed  Please see Appendix A (Screenshots for Node and Listener Failures) |
| 4 | **Reboot all nodes at the same time** | • Issue a reboot on all nodes at the same time o ‘shutdown –r | * • All nodes, instances and resources are restarted without problems | • Time for all resources to become available again, Check with “crsctl stat res –t”. | Passed  Please see Appendix A (Screenshots for Node and Listener Failures) |
| 5 | **Unplanned Instance Failure** | . Kill -9 <PID of database instance> | * One of the other instances performs instance recovery * Services are moved to available instances, if a preferred instance failed * Client connections are moved / reconnected to surviving instances (Procedure and timings will depend on client types and configuration) * After a short freeze, surviving instances continue processing the workload * Failing instance will be restarted by Oracle Clusterware, unless this feature has been disabled | * Time to detect instance failure * Time to complete instance recovery. Check alert log for recovering instance • Time to restore client activity to same level (assuming remaining nodes have sufficient capacity to run workload)   Duration of database freeze during failover.   * Time before failed instance is restarted automatically by Oracle Clusterware and is accepting new connections | Passed  Please see Appendix A (Screenshots for Node and Listener Failures) |
| 6 | **Planned Instance Termination** | • Issue a ‘shutdown abort’ | * One other instance performs instance recovery * Services are moved to available instances, if a preferred instance failed * Client connections are moved / reconnected to surviving instances (Procedure and timings will depend on client types and configuration) * The instance will NOT be automatically restarted by Oracle Clusterware due to the user invoked shutdown. | * Time to detect instance failure. * Time to complete instance recovery. Check alert log for recovering instance. • Time to restore client activity to same level (assuming remaining nodes have sufficient capacity to run workload). * The instance will NOT be restarted by Oracle Clusterware due to the user induced shutdown. | Passed  Please see Appendix A (Screenshots for Node and Listener Failures) |
| 7 | **Restart Failed Instance** | * Automatic restart by Oracle Clusterware if it is an uncontrolled failure * Manual restart necessary if a “shutdown” command was issued.   Manual restart when the "Auto Start" option for the related instance has been disabled. | * Instance rejoins RAC cluster without any problems (review alert logs etc.) * Client connections and workload will be load balanced across the new instance (Manual procedure might be required to redistribute workload if long running / permanent connections) | • Time before services and workload are rebalanced across all instances (including any manual steps) | Passed  Please see Appendix A (Screenshots for Node and Listener Failures) |
| 8 | **Listener Failure** | Obtain the PID for the listener process:  # ps –ef | grep tnslsnr Kill the listener process:  # kill –9 <listener pid> • | * No impact on connected database sessions. * New connections are redirected to listener on other node * The Listener failure is detected by the ORAAGENT and is automatically restarted. Review the following logs: * $GI\_HOME/log/<nodename>/ crsd/crsd.log * $GI\_HOME/log/<nodename>/ agent/crsd/oraagent\_<GI\_own   er>/oraagent\_<GI\_owner>.log | * Time for the Clusterware to detect failure and restart listener. | Passed  Please see Appendix A (Screenshots for Node and Listener Failures) |
| 9 | **SCAN Listener Failure** | Obtain the PID for the SCAN listener process:  # ps –ef | grep tnslsnr Kill the listener process:  # kill –9 <listener pid> • | * No impact on connected database sessions. * New connections are redirected to listener on other node * The Listener failure is detected by CRSD ORAAGENT and is   automatically restarted. Review the following logs:   * $GI\_HOME/log/<nodename>/cr sd/crsd.log * $GI\_HOME/log/<nodename>/ag ent/crsd/oraagent\_<GI\_owner>/o raagent\_<GI\_owner>.log | * Same as Listener Failure | Passed  Please see Appendix A (Screenshots for Node and Listener Failures) |

# System Testing Scenarios: Clusterware Process Failures

| **#** | **Test** | **Procedure** | **Expected Results** | **Measures** | **Actual Results/Notes** |
| --- | --- | --- | --- | --- | --- |
| 1 | **CRSD Process Failure** | Obtain the PID for the CRSD process:  # ps –ef | grep crsd  Kill the CRSD process:  # kill –9 <crsd pid> | • CRSD process failure is detected by the orarootagent and CRSD is restarted. Review the following logs:  Besides ADR data, Oracle Clusterware collects or uses other data related to problem diagnosis. Starting with Oracle Clusterware 12*c* release 1 (12.1.0.2), this data resides under the same base path used by ADR, but in a separate directory structure with this form: *ORACLE\_BASE*/crsdata/*host\_name*. In this example, *ORACLE\_BASE* is the Oracle base path you specified when you installed the Grid Infrastructure and *host\_name* is the name of the host.  In this directory, on a given host, are several subdirectories. The two subdirectories of greatest interest if a problem occurs are named core and output. The core directory is where Oracle Clusterware daemon core files are written when the normal ADR location used for core files is not available (for example, before ADR services are initialized in a program). The output directory is where Oracle Clusterware daemons redirect their C standard output and standard error files. These files generally use a name structure consisting of the executable name with the characters *OUT* appended to a .trc file extension (like trace files). For example, the redirected standard output from the Cluster Time Synchronization Service daemon is named octssdOUT.trc. Typically, daemons write very little to these files, but in certain failure scenarios important data may be written there. | • Time to restart CRSD process | [root@hrmdc1oel04 ~]# ps -eaf|grep crsd  root 15479 1 0 14:05 ? 00:00:52 /u02/app/19.3.0/grid/bin/crsd.bin reboot  root 37936 37858 0 16:12 pts/0 00:00:00 grep --color=auto crsd  [root@hrmdc1oel04 ~]# kill -9 15479  [root@hrmdc1oel04 ~]# ps -eaf|grep crsd  root 560 38919 0 16:14 pts/1 00:00:00 tail -f crsdOUT.trc  root 648 1 3 16:14 ? 00:00:01 /u02/app/19.3.0/grid/bin/crsd.bin reboot  root 1797 37858 0 16:15 pts/0 00:00:00 grep --color=auto crsd  [root@hrmdc1oel04 ~]#  Initializing Oracle Clusterware CRSD daemon with OS process ID 15479 on host hrmdc1oel04 at local time 2021/08/20-14:05:29.619  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/crsdOUT.trc  Initializing Oracle Clusterware CRSD daemon with OS process ID 648 on host hrmdc1oel04 at local time 2021/08/20-16:14:37.796  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8 |
| 2 | **EVMD Process**  **Failure** | Obtain the PID for the EVMD process:  # ps –ef | grep evmd.bin  Kill the EVMD process:  # kill –9 <evmd pid> | • EVMD process failure is detected by the OHASD orarootagent and CRSD is restarted. Review the following logs:    Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrvltstdb20/output/evmdOUT.trc  Initializing Oracle Clusterware EVMD daemon with OS process ID 23269 on host hrvltstdb20 at local time 2021/05/05-19:51:14.283  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8 | • Time to restart the EVMD process | [root@hrmdc1oel04 ~]# ps -ef | grep evmd.bin  root 7899 37858 0 16:19 pts/0 00:00:00 grep --color=auto evmd.bin  grid 12975 1 0 14:05 ? 00:00:46 /u02/app/19.3.0/grid/bin/evmd.bin  [root@hrmdc1oel04 ~]# kill -9 12975  [root@hrmdc1oel04 ~]# ps -ef | grep evmd.bin  root 8518 37858 0 16:19 pts/0 00:00:00 grep --color=auto evmd.bin  [root@hrmdc1oel04 ~]# ps -ef | grep evmd.bin  grid 8520 1 7 16:19 ? 00:00:00 /u02/app/19.3.0/grid/bin/evmd.bin  root 8715 37858 0 16:19 pts/0 00:00:00 grep --color=auto evmd.bin  [root@hrmdc1oel04 ~]# |
| 3 | **CSSD Process Failure** | Obtain the PID for the CSSD process:  # ps –ef | grep cssd  Kill the CSSD process:  # kill –9 <cssd pid> | * The node will reboot. * Cluster reconfiguration will take place | * Time for the eviction and cluster   reconfiguration on the surviving nodes  Time for the node to come back online and reconfiguration to complete to add the node as an active member of the cluster. | [root@hrmdc1oel04 ~]# ps -eaf|grep -i cssd  root 13766 1 0 14:05 ? 00:00:23 /u02/app/19.3.0/grid/bin/cssdmonitor  grid 13993 1 0 14:05 ? 00:01:13 /u02/app/19.3.0/grid/bin/ocssd.bin  root 15211 1 0 16:21 ? 00:00:00 /u02/app/19.3.0/grid/bin/cssdagent  root 20485 37858 0 16:24 pts/0 00:00:00 grep --color=auto -i cssd  [root@hrmdc1oel04 ~]# kill -9 13993  Node Rebooted  [root@hrmdc1oel05 ~]# crsctl check cluster -all  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  hrmdc1oel05:  CRS-4537: Cluster Ready Services is online  CRS-4529: Cluster Synchronization Services is online  CRS-4533: Event Manager is online  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  hrmdc1oel06:  CRS-4537: Cluster Ready Services is online  CRS-4529: Cluster Synchronization Services is online  CRS-4533: Event Manager is online  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  CRS-4404: The following nodes did not reply within the allotted time:  hrmdc1oel04  [root@hrmdc1oel05 ~]# |
| 4 | **CRSD ORAAGENT**  **RDBMS Process**  **Failure** | Obtain the PID for the CRSD oraagent for the RDBMS software owner:  # cat  $GI\_HOME/log/<nodename>/agent/crsd/oraag ent\_<rdbms\_owner>/oraagent\_<rdbms\_owner>  .pid  # kill –9 <pid for RDBMS oraagent process> | • The ORAAGENT process failure is detected by CRSD and is automatically restarted. Review the following logs:   * /u02/app/grid/crsdata/hrvltstdb20/output   /u02/app/grid/crsdata/hrvltstdb20/output/crsd\_oraagent\_oracleOUT.trc | • Time to restart the   * ORAAGENT process | [root@hrmdc1oel04 ~]# ps -eaf|grep oraagent|grep oracle  oracle 24601 1 0 16:30 ? 00:00:01 /u02/app/19.3.0/grid/bin/oraagent.bin  root 32813 28456 0 16:35 pts/1 00:00:00 tail -f crsd\_oraagent\_oracleOUT.trc  [root@hrmdc1oel04 ~]# kill -9 24601  [root@hrmdc1oel04 output]# tail -f crsd\_oraagent\_oracleOUT.trc  Initializing Oracle Clusterware ORAAGENT daemon with OS process ID 24572 on host hrmdc1oel04 at local time 2021/08/20-16:30:15.680  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8  Agent ncpus:40 threadCount:50  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/crsd\_oraagent\_oracleOUT.trc  Initializing Oracle Clusterware ORAAGENT daemon with OS process ID 24601 on host hrmdc1oel04 at local time 2021/08/20-16:30:17.024  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/crsd\_oraagent\_oracleOUT.trc  Initializing Oracle Clusterware ORAAGENT daemon with OS process ID 34485 on host hrmdc1oel04 at local time 2021/08/20-16:37:11.429  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8 |
| 5 | **CRSD ORAAGENT**  **Grid Infrastructure**  **Process Failure** | Obtain the PID for the CRSD oraagent for the GI software owner:  # cat  $GI\_HOME/log/<nodename>/agent/crsd/oraag ent\_<GI\_owner>/oraagent\_<GI\_owner>.pid  # kill –9 <pid for GI oraagent process> | • The Grid Infrastructure ORAAGENT process failure is detected by CRSD and is automatically restarted. Review the following logs:  /u02/app/grid/crsdata/hrvltstdb20/output/crsd\_oraagent\_gridOUT.trc | • Time to restart the  ORAAGENT process | [root@hrmdc1oel04 ~]# ps -eaf|grep oraagent|grep grid  grid 19500 1 0 16:29 ? 00:00:03 /u02/app/19.3.0/grid/bin/oraagent.bin  grid 22556 1 0 16:29 ? 00:00:06 /u02/app/19.3.0/grid/bin/oraagent.bin  oracle 34485 1 0 16:37 ? 00:00:00 /u02/app/19.3.0/grid/bin/oraagent.bin  root 38000 28456 0 16:39 pts/1 00:00:00 tail -f crsd\_oraagent\_gridOUT.trc  [root@hrmdc1oel04 ~]# kill -9 19500 22556  [root@hrmdc1oel04 ~]# ps -eaf|grep oraagent|grep grid  grid 541 1 4 16:42 ? 00:00:00 /u02/app/19.3.0/grid/bin/oraagent.bin  grid 542 1 11 16:42 ? 00:00:00 /u02/app/19.3.0/grid/bin/oraagent.bin  oracle 34485 1 0 16:37 ? 00:00:01 /u02/app/19.3.0/grid/bin/oraagent.bin  [root@hrmdc1oel04 output]# tail -f crsd\_oraagent\_gridOUT.trc  Initializing Oracle Clusterware ORAAGENT daemon with OS process ID 22254 on host hrmdc1oel04 at local time 2021/08/20-16:29:39.635  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8  Agent ncpus:40 threadCount:50  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/crsd\_oraagent\_gridOUT.trc  Initializing Oracle Clusterware ORAAGENT daemon with OS process ID 22556 on host hrmdc1oel04 at local time 2021/08/20-16:29:51.048  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/crsd\_oraagent\_gridOUT.trc  Initializing Oracle Clusterware ORAAGENT daemon with OS process ID 542 on host hrmdc1oel04 at local time 2021/08/20-16:42:11.935  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8 |
| 6 | **CRSD**  **ORAROOTAGENT**  **Process Failure** | Obtain the PID for the CRSD orarootagent:  # cat  $GI\_HOME/log/<nodename>/agent/crsd/oraro otagent\_root/orarootagent\_root.pid”  # kill –9 <pid for orarootagent process> | • The ORAROOTAGENT process failure is detected by CRSD and is automatically restarted. Review the following logs:  /u02/app/grid/crsdata/hrvltstdb20/output/crsd\_orarootagent\_rootOUT.trc | • Time to restart the  ORAROOTAGENT  process | [root@hrmdc1oel04 ~]# ps -eaf|grep orarootagent  root 4595 28456 0 16:45 pts/1 00:00:00 tail -f crsd\_orarootagent\_rootOUT.trc  root 8035 22351 0 16:47 pts/0 00:00:00 grep --color=auto orarootagent  root 19270 1 0 16:29 ? 00:00:04 /u02/app/19.3.0/grid/bin/orarootagent.bin  root 22264 1 0 16:29 ? 00:00:09 /u02/app/19.3.0/grid/bin/orarootagent.bin  [root@hrmdc1oel04 ~]# kill -9 19270 22264  [root@hrmdc1oel04 ~]# ps -eaf|grep orarootagent  root 4595 28456 0 16:45 pts/1 00:00:00 tail -f crsd\_orarootagent\_rootOUT.trc  root 8161 1 8 16:47 ? 00:00:00 /u02/app/19.3.0/grid/bin/orarootagent.bin  root 8170 1 14 16:47 ? 00:00:00 /u02/app/19.3.0/grid/bin/orarootagent.bin  root 8315 22351 0 16:47 pts/0 00:00:00 grep --color=auto orarootagent  [root@hrmdc1oel04 ~]#  [root@hrmdc1oel04 output]# tail -f crsd\_orarootagent\_rootOUT.trc  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/crsd\_orarootagent\_rootOUT.trc  Initializing Oracle Clusterware ORAROOTAGENT daemon with OS process ID 1006 on host hrmdc1oel04 at local time 2021/08/20-16:14:44.433  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/crsd\_orarootagent\_rootOUT.trc  Initializing Oracle Clusterware ORAROOTAGENT daemon with OS process ID 22264 on host hrmdc1oel04 at local time 2021/08/20-16:29:39.670  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/crsd\_orarootagent\_rootOUT.trc  Initializing Oracle Clusterware ORAROOTAGENT daemon with OS process ID 8161 on host hrmdc1oel04 at local time 2021/08/20-16:47:54.694  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8 |
| 7 | **CSSDAGENT**  **Process Failure** | Obtain the PID for the CSSDAGENT:  # ps –ef | grep cssdagent  # kill –9 <pid for cssdagent process> | • The CSSDAGENT process failure is detected by OHASD and is automatically restarted.  Review the following logs:  root@hrvltstdb20 output]# pwd  /u02/app/grid/crsdata/hrvltstdb20/output  [root@hrvltstdb20 output]# tail -f pwd  tail: cannot open âpwdâ for reading: No such file or directory  tail: no files remaining  [root@hrvltstdb20 output]# tail -f ohasd\_cssdagent\_rootOUT.trc | • Time to restart the CSSDAGENT process | [root@hrmdc1oel04 ~]# ps -ef | grep cssdagent  root 12516 28456 0 16:50 pts/1 00:00:00 tail -f ohasd\_cssdagent\_rootOUT.trc  root 12568 22351 0 16:51 pts/0 00:00:00 grep --color=auto cssdagent  root 26620 1 0 16:31 ? 00:00:03 /u02/app/19.3.0/grid/bin/cssdagent  [root@hrmdc1oel04 ~]# kill -9 26620  [root@hrmdc1oel04 ~]# ps -ef | grep cssdagent  root 12516 28456 0 16:50 pts/1 00:00:00 tail -f ohasd\_cssdagent\_rootOUT.trc  root 13216 1 2 16:51 ? 00:00:00 /u02/app/19.3.0/grid/bin/cssdagent  root 13273 22351 0 16:51 pts/0 00:00:00 grep --color=auto cssdagent  [root@hrmdc1oel04 ~]#  [root@hrmdc1oel04 output]# ls -ltr ohasd\_css\*  -rw-r--r-- 1 root root 14010 Aug 20 16:29 ohasd\_cssdmonitor\_rootOUT.trc  -rw-r--r-- 1 root root 6 Aug 20 16:29 ohasd\_cssdmonitor\_root.pid  -rw-r--r-- 1 root root 15690 Aug 20 16:31 ohasd\_cssdagent\_rootOUT.trc  -rw-r--r-- 1 root root 6 Aug 20 16:31 ohasd\_cssdagent\_root.pid  [root@hrmdc1oel04 output]# tail -f ohasd\_cssdagent\_rootOUT.trc  s0clsncssdSetPriority: scls\_meta\_ctx\_init() success with rv = 0  s0clsncssdSetPriority: lpm initialization successful  s0clsncssdSetPriority: clsugetconf() successful  s0clsncssdSetPriority: slzgetevar() env var CLSSGC\_ENVVAR\_CSS\_PRIORITY not set s0clsncssdSetPriority: priority value read from env is 4 and value to be set is 4  s0clsncssdSetPriority: successfully setting priority to 4  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/ohasd\_cssdagent\_rootOUT.trc  Initializing Oracle Clusterware CSSDAGENT daemon with OS process ID 26620 on host hrmdc1oel04 at local time 2021/08/20-16:31:07.437  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8  main: Entered ...  s0clsncssdSetPriority: Entered  s0clsncssdSetPriority: scls\_meta\_init() success with rv = 0  s0clsncssdSetPriority: scls\_meta\_ctx\_init() success with rv = 0  s0clsncssdSetPriority: lpm initialization successful  s0clsncssdSetPriority: clsugetconf() successful  s0clsncssdSetPriority: slzgetevar() env var CLSSGC\_ENVVAR\_CSS\_PRIORITY not set s0clsncssdSetPriority: priority value read from env is 4 and value to be set is 4  s0clsncssdSetPriority: successfully setting priority to 4  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/ohasd\_cssdagent\_rootOUT.trc  Initializing Oracle Clusterware CSSDAGENT daemon with OS process ID 13216 on host hrmdc1oel04 at local time 2021/08/20-16:51:31.141  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8 |
| 8 | **CSSMONITOR**  **Process Failure** | Obtain the PID for the CSSDMONITOR:  # ps –ef | grep cssdmonitor  # kill –9 <pid for cssdmonitor process> | • The CSSDMONITOR process failure is detected by OHASD and is automatically restarted.  Review the following logs:    [root@hrvltstdb20 output]# pwd  /u02/app/grid/crsdata/hrvltstdb20/output  [root@hrvltstdb20 output]# tail -f ohasd\_cssdmonitor\_rootOUT.trc | • Time to restart the CSSMONITOR process | [root@hrmdc1oel04 ~]# ps -ef | grep cssdmonitor  root 18144 28456 0 16:54 pts/1 00:00:00 tail -f ohasd\_cssdmonitor\_rootOUT.trc  root 18195 22351 0 16:55 pts/0 00:00:00 grep --color=auto cssdmonitor  root 20450 1 0 16:29 ? 00:00:04 /u02/app/19.3.0/grid/bin/cssdmonitor  [root@hrmdc1oel04 ~]# kill -9 20450  [root@hrmdc1oel04 ~]#  [root@hrmdc1oel04 ~]# ps -ef | grep cssdmonitor  root 18144 28456 0 16:54 pts/1 00:00:00 tail -f ohasd\_cssdmonitor\_rootOUT.trc  root 18458 1 4 16:55 ? 00:00:00 /u02/app/19.3.0/grid/bin/cssdmonitor  root 18500 22351 0 16:55 pts/0 00:00:00 grep --color=auto cssdmonitor  [root@hrmdc1oel04 ~]#  [root@hrmdc1oel04 output]# tail -f ohasd\_cssdmonitor\_rootOUT.trc  s0clsncssdSetPriority: scls\_meta\_ctx\_init() success with rv = 0  s0clsncssdSetPriority: lpm initialization successful  s0clsncssdSetPriority: clsugetconf() successful  s0clsncssdSetPriority: slzgetevar() env var CLSSGC\_ENVVAR\_CSS\_PRIORITY not set s0clsncssdSetPriority: priority value read from env is 4 and value to be set is 4  s0clsncssdSetPriority: successfully setting priority to 4  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/ohasd\_cssdmonitor\_rootOUT.trc  Initializing Oracle Clusterware CSSDMONITOR daemon with OS process ID 20450 on host hrmdc1oel04 at local time 2021/08/20-16:29:09.095  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8  main: Entered ...  s0clsncssdSetPriority: Entered  s0clsncssdSetPriority: scls\_meta\_init() success with rv = 0  s0clsncssdSetPriority: scls\_meta\_ctx\_init() success with rv = 0  s0clsncssdSetPriority: lpm initialization successful  s0clsncssdSetPriority: clsugetconf() successful  s0clsncssdSetPriority: slzgetevar() env var CLSSGC\_ENVVAR\_CSS\_PRIORITY not set s0clsncssdSetPriority: priority value read from env is 4 and value to be set is 4  s0clsncssdSetPriority: successfully setting priority to 4  Redirected Oracle Clusterware daemon standard output file /u02/app/grid/crsdata/hrmdc1oel04/output/ohasd\_cssdmonitor\_rootOUT.trc  Initializing Oracle Clusterware CSSDMONITOR daemon with OS process ID 18458 on host hrmdc1oel04 at local time 2021/08/20-16:55:23.508  Oracle Home is: /u02/app/19.3.0/grid  Oracle Base is: /u02/app/grid  NLS\_LANG is: AMERICAN\_AMERICA.AL32UTF8 |

# Component Testing: ASM Functional Tests

| **#** | **Test** | **Procedure** | **Expected Results/Measures** | **Actual Results/Notes** |
| --- | --- | --- | --- | --- |
| 1 | **Verify that candidate disks are available.** | * Add a Disk/LUN to the RAC nodes and configure the Disk/LUN for use by ASM. * Login to ASM via SQL\*Plus and run: “select name, group\_number, path, state, header\_status, mode\_status, label from v$asm\_disk” | • The newly added LUN will appear as a candidate disk within ASM. | [root@hrmdc1oel04 ~]# asmcmd afd\_scan  [root@hrmdc1oel04 ~]# asmcmd afd\_lslbl  --------------------------------------------------------------------------------  Label Duplicate Path  ================================================================================  ASM\_DISK01 /dev/dm-89  ASM\_DISK02 /dev/dm-87  ASM\_DISK03 /dev/dm-86  ASM\_DISK04 /dev/dm-105  ASM\_DISK05 /dev/dm-109  ASM\_DISK06 /dev/dm-107  ASM\_DISK07 /dev/dm-106  ASM\_DISK08 /dev/dm-104  HFCRM\_DATA01 /dev/dm-72  HFCRM\_DATA02 /dev/dm-67  HFCRM\_DATA03 /dev/dm-19  HFCRM\_DATA04 /dev/dm-15  HFCRM\_FRA01 /dev/dm-46  HFCRM\_FRA02 /dev/dm-43  HFCRM\_FRA03 /dev/dm-45  HFCRM\_FRA04 /dev/dm-29  HFCRM\_FRA05 /dev/dm-40  HFCRM\_FRA06 /dev/dm-50  HFPRD\_DATA01 /dev/dm-39  HFPRD\_DATA02 /dev/dm-8  HFPRD\_DATA03 /dev/dm-34  HFPRD\_DATA04 /dev/dm-23  HFPRD\_DATA05 /dev/dm-31  HFPRD\_DATA06 /dev/dm-55  HFPRD\_DATA07 /dev/dm-27  HFPRD\_FRA01 /dev/dm-22  HFPRD\_FRA02 /dev/dm-32  HFPRD\_FRA03 /dev/dm-3  HFPRD\_FRA04 /dev/dm-26  HFPRD\_FRA05 /dev/dm-11  HFPRD\_FRA06 /dev/dm-9  HFPRD\_FRA07 /dev/dm-13  HFPRD\_FRA08 /dev/dm-75  HFPRD\_FRA09 /dev/dm-80  HFPRD\_FRA10 /dev/dm-79  HFPRD\_FRA11 /dev/dm-77  OCR\_VOTE /dev/dm-74  OPSSTBYDATA01 /dev/dm-36  OPSSTBYDATA02 /dev/dm-5  OPSSTBYDATA03 /dev/dm-48  OPSSTBYFRA01 /dev/dm-52  OPSSTBYFRA02 /dev/dm-58  OPSSTBYFRA03 /dev/dm-56  OPSSTBYFRA04 /dev/dm-62  OPSSTBYFRA05 /dev/dm-60  OPSSTBYFRA06 /dev/dm-64  [root@hrmdc1oel04 ~]# |
| 2 | **Create an external redundancy ASM diskgroup using SQL\*Plus** | • Login to ASM via SQL\*Plus and run: “create diskgroup <dg name> external redundancy disk ‘<candidate path>’ ;“ | * A successfully created diskgroup. This diskgroup should also be listed in v$asm\_diskgroup. * The diskgroup will be registered as a Clusterware resource (crsctl stat res –t) | [grid@hrmdc1oel04 ~]$ asmca -silent -creatediskgroup -diskGroupName TEST -disk 'AFD:ASM\_DISK08' -redundancy External  [grid@hrmdc1oel04 ~]$ asmcmd lsdg  State Type Rebal Sector Logical\_Sector Block AU Total\_MB Free\_MB Req\_mir\_free\_MB Usable\_file\_MB Offline\_disks Voting\_files Name  MOUNTED EXTERN N 512 512 4096 1048576 1536000 1531813 0 1531813 0 N HFPRD\_DATA/  MOUNTED EXTERN N 512 512 4096 1048576 512000 508116 0 508116 0 N HFPRD\_FRA/  MOUNTED EXTERN N 512 512 4096 4194304 15360 14956 0 14956 0 Y OCR\_VD\_DG/  MOUNTED EXTERN N 512 512 4096 1048576 512000 511845 0 511845 0 N TEST/  [grid@hrmdc1oel04 ~]$ |
| 3 | **Add a disk to a ASM**  **disk group using**  **SQL\*Plus** | • Login to ASM via SQL\*Plus and run:  “alter diskgroup <dg name> add disk  '<candidate1 path> ;”    **NOTE:** Progress can be monitored by querying v$asm\_operation | • The disk will be added to the diskgroup and the data will be rebalanced evenly across all disks in the diskgroup. | SQL> alter diskgroup test add disk 'AFD:ASM\_DISK09';  Diskgroup altered.  SQL> |
| 4 | **Drop an ASM disk from a diskgroup using**  **SQL\*Plus** | • Login to ASM via SQL\*Plus and run:  “alter diskgroup <dg name> drop disk  <disk name>;”    **NOTE:** Progress can be monitored by querying v$asm\_operation | • The data from the removed disk will be rebalanced across the remaining disks in the diskgroup. Once the rebalance is complete the disk will have a header\_status of “FORMER” (v$asm\_disk) and will be a candidate to be added to another diskgroup. | [grid@hrmdc1oel04 ~]$ asmcmd  ASMCMD> lsdsk -G TEST  Path  AFD:ASM\_DISK08  AFD:ASM\_DISK09  ASMCMD> exit  [grid@hrmdc1oel04 ~]$ sqlplus / as sysasm  SQL\*Plus: Release 19.0.0.0.0 - Production on Fri Aug 20 17:20:12 2021  Version 19.11.0.0.0  Copyright (c) 1982, 2020, Oracle. All rights reserved.  Connected to:  Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production  Version 19.11.0.0.0  SQL> alter diskgroup TEST drop disk 'ASM\_DISK09';  Diskgroup altered.  SQL> select name,path,header\_status from v$asm\_disk where PATH like '%DISK09%';  NAME PATH HEADER\_STATU  ------------------------------ --------------------------------------------- ------------  AFD:ASM\_DISK09 FORMER |
| 5 | **Undrop a ASM disk**  **that is currently being dropped using SQL\*Plus** | * Login to ASM via SQL\*Plus and run:   “alter diskgroup <dg name> drop disk  <disk name>;”   * Before the rebalance completes run the following command via SQL\*Plus:   “alter diskgroup <dg name> undrop disk <disk name>;”    **NOTE:** Progress can be monitored by querying v$asm\_operation | • The undrop operation will rollback the drop operation (assuming it has not completed). The disk entry will remain in v$asm\_disk as a MEMBER. | SQL> alter diskgroup TEST add disk 'AFD:ASM\_DISK09';  Diskgroup altered.  SQL> !asmcmd lsdsk -G TEST  Path  AFD:ASM\_DISK08  AFD:ASM\_DISK09  SQL> alter diskgroup test drop disk 'ASM\_DISK09';  Diskgroup altered.  SQL> !asmcmd lsdsk -G TEST  Path  AFD:ASM\_DISK08  SQL> alter diskgroup test undrop disks;  Diskgroup altered.  SQL> !asmcmd lsdsk -G TEST  Path  AFD:ASM\_DISK08  SQL>ASMCMD> |
| 6 | **Drop a ASM diskgroup using SQL\*Plus** | • Login to ASM via SQL\*Plus and run:  “drop diskgroup <dg name>;” | * The diskgroup will be successfully dropped. * The diskgroup will be unregistered as a Clusterware resource (crsctl stat res –t) | SQL> alter diskgroup TEST mount;  Diskgroup altered.  SQL> select name,state from v$asm\_diskgroup;  NAME STATE  ------------------------------ -----------  HFPRD\_DATA MOUNTED  OCR\_VD\_DG MOUNTED  HFPRD\_FRA MOUNTED  TEST MOUNTED  SQL> drop diskgroup TEST including contents;  Diskgroup dropped.  [grid@hrmdc1oel04 ~]$ crsctl stat res -t |grep TEST  [grid@hrmdc1oel04 ~]$ |
| 7 | **Verify CSS-database communication and ASM files access.** | • Start all the database instances and query the v$asm\_client view in the ASM instances. | • Each database instance should be listed in the v$asm\_client view. | [grid@hrmdc1oel04 ~]$ sqlplus / as sysasm  SQL\*Plus: Release 19.0.0.0.0 - Production on Fri Aug 20 17:43:42 2021  Version 19.11.0.0.0  Copyright (c) 1982, 2020, Oracle. All rights reserved.  Connected to:  Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production  Version 19.11.0.0.0  SQL> select db\_name from v$asm\_client;  DB\_NAME  --------  SAMPLEDB  +ASM  \_OCR  SAMPLEDB  SQL> |
| 8 | **Check the internal consistency of disk group metadata using SQL\*Plus** | • Login to ASM via SQL\*Plus and run:  “alter diskgroup <name> check all” | • If there are no internal inconsistencies, the statement “Diskgroup altered” will be returned (asmcmd will return back to the asmcmd prompt). If inconsistencies are discovered, then appropriate messages are displayed describing the problem. | SQL> alter diskgroup hfprd\_data check all;  Diskgroup altered. |

# Component Testing: ASM Functional Tests –ASMCMD

| **#** | **Test** | **Procedure** | **Expected Results/Measures** | **Actual Results/Notes** |
| --- | --- | --- | --- | --- |
| 1 | **Verify that candidate disks are available.** | * Add a Disk/LUN to the RAC nodes and configure the Disk/LUN for use by ASM. * Login to ASM via ASMCMD and run:   “lsdsk --candidate | • The newly added LUN will appear as a candidate disk within ASM. | [grid@hrmdc1oel04 ~]$ asmcmd  ASMCMD> lsdsk --candidate  Path  AFD:ASM\_DISK08  AFD:ASM\_DISK09  AFD:HFCRM\_DATA01  AFD:HFCRM\_DATA02  AFD:HFCRM\_DATA03  AFD:HFCRM\_DATA04  AFD:HFCRM\_FRA01  AFD:HFCRM\_FRA02  AFD:HFCRM\_FRA03  AFD:HFCRM\_FRA04  AFD:HFCRM\_FRA05  AFD:HFCRM\_FRA06  AFD:HFPRD\_DATA01  AFD:HFPRD\_DATA02  AFD:HFPRD\_DATA03  AFD:HFPRD\_DATA04  AFD:HFPRD\_DATA05  AFD:HFPRD\_DATA06  AFD:HFPRD\_DATA07  AFD:HFPRD\_FRA01  AFD:HFPRD\_FRA02  AFD:HFPRD\_FRA03  AFD:HFPRD\_FRA04  AFD:HFPRD\_FRA05  AFD:HFPRD\_FRA06  AFD:HFPRD\_FRA07  AFD:HFPRD\_FRA08  AFD:HFPRD\_FRA09  AFD:HFPRD\_FRA10  AFD:HFPRD\_FRA11  AFD:OCR\_VOTE  AFD:OPSSTBYDATA01  AFD:OPSSTBYDATA02  AFD:OPSSTBYDATA03  AFD:OPSSTBYFRA01  AFD:OPSSTBYFRA02  AFD:OPSSTBYFRA03  AFD:OPSSTBYFRA04  AFD:OPSSTBYFRA05  AFD:OPSSTBYFRA06  ASMCMD> |
| 2 | **Create an external redundancy ASM**  **diskgroup using**  **ASMCMD** | * Identify the candidate disks for the diskgroup by running:   “lsdsk –candidate”     * Create a XML config file to define the diskgroup e.g.   <dg name="<dg name>" redundancy="external">  <dsk string="<disk path>" />  <a name="compatible.asm" value="11.1"/>  <a name="compatible.rdbms" value="11.1"/>  </dg>   * Login to ASM via ASMCMD and run:   “mkdg <config file>.xml” | * A successfully created diskgroup. This diskgroup can be viewed using the “lsdg” ASMCMD command. * The diskgroup will be registered as a Clusterware resource (crsctl stat res –t) | [grid@hrmdc1oel04 ~]$ asmcmd  ASMCMD> lsdsk --candidate  Path  AFD:ASM\_DISK08  AFD:ASM\_DISK09  AFD:HFCRM\_DATA01  AFD:HFCRM\_DATA02  AFD:HFCRM\_DATA03  AFD:HFCRM\_DATA04  AFD:HFCRM\_FRA01  AFD:HFCRM\_FRA02  AFD:HFCRM\_FRA03  AFD:HFCRM\_FRA04  AFD:HFCRM\_FRA05  AFD:HFCRM\_FRA06  AFD:HFPRD\_DATA01  AFD:HFPRD\_DATA02  AFD:HFPRD\_DATA03  AFD:HFPRD\_DATA04  AFD:HFPRD\_DATA05  AFD:HFPRD\_DATA06  AFD:HFPRD\_DATA07  AFD:HFPRD\_FRA01  AFD:HFPRD\_FRA02  AFD:HFPRD\_FRA03  AFD:HFPRD\_FRA04  AFD:HFPRD\_FRA05  AFD:HFPRD\_FRA06  AFD:HFPRD\_FRA07  AFD:HFPRD\_FRA08  AFD:HFPRD\_FRA09  AFD:HFPRD\_FRA10  AFD:HFPRD\_FRA11  AFD:OCR\_VOTE  AFD:OPSSTBYDATA01  AFD:OPSSTBYDATA02  AFD:OPSSTBYDATA03  AFD:OPSSTBYFRA01  AFD:OPSSTBYFRA02  AFD:OPSSTBYFRA03  AFD:OPSSTBYFRA04  AFD:OPSSTBYFRA05  AFD:OPSSTBYFRA06  ASMCMD>  cat dg.xml  <dg name="TESTDG" redundancy="external">  <dsk string="AFD:ASM\_DISK08" />  <a name="compatible.asm" value="19.3"/>  <a name="compatible.rdbms" value="19.3"/>  </dg>  [grid@hrmdc1oel04 ~]$ asmcmd  ASMCMD> mkdg dg.xml  [grid@hrmdc1oel04 ~]$ crsctl stat res -t | grep TESTDG  ora.TESTDG.dg(ora.asmgroup)  [grid@hrmdc1oel04 ~]$ |
| 3 | **Add a disk to a ASM**  **disk group using**  **ASMCMD** | * Identify the candidate disk to be added by running: “lsdsk –candidate” * Create a XML config file to define the diskgroup change e.g.   <chdg name="<dg name>">  <add>  <dsk string="<disk path>"/>  </add>  </chdg>   * Login to ASM via ASMCMD and run:   “chdg <config file>.xml”    **NOTE:** Progress can be monitored by  running “lsop” | • The disk will be added to the diskgroup and the data will be rebalanced evenly across all disks in the diskgroup. Progress of the rebalance can be monitored by running the “lsop” ASMCMD command. | [grid@hrmdc1oel04 ~]$ cat chdg.xml  <chdg name="TESTDG">  <add>  <dsk string="AFD:ASM\_DISK09" />  </add>  </chdg>  [grid@hrmdc1oel04 ~]$ asmcmd chdg chdg.xml  Diskgroup altered.  [grid@hrmdc1oel04 ~]$ asmcmd lsop  Group\_Name Pass State Power EST\_WORK EST\_RATE EST\_TIME  [grid@hrmdc1oel04 ~]$ asmcmd lsdsk -G TESTDG  Path  AFD:ASM\_DISK08  AFD:ASM\_DISK09 |
| 4 | **Drop an ASM disk from a diskgroup using ASMCMD** | * Identify the ASM name for the disk to be dropped from the given diskgroup:   “lsdsk -G <dg name> -k   * Create a XML config file to define the diskgroup change e.g.   <chdg name="<dg name>">  <drop>  <dsk name="<disk name>"/>  </drop>  </chdg>   * Login to ASM via ASMCMD and run:   “chdg <config file>.xml”    **NOTE:** Progress can be monitored by  running “lsop” | * The data from the removed disk will be rebalanced across the remaining disks in the diskgroup. Once the rebalance is complete the disk will be listed as a candidate (lsdsk – candidate) to be added to another diskgroup. Progress can be monitored by running “lsop”   The diskgroup will be unregistered as a Clusterware resource (crsctl stat res –t) | [grid@hrmdc1oel04 ~]$ asmcmd lsdsk -G TESTDG  Path  AFD:ASM\_DISK08  AFD:ASM\_DISK09  [grid@hrmdc1oel04 ~]$ vi chdg\_disk.xml  <chdg name="TESTDG">  <drop>  <dsk name="ASM\_DISK08" />  </drop>  </chdg>  [grid@hrmdc1oel04 ~]$ asmcmd  ASMCMD> chdg chdg\_disk.xml  Diskgroup altered.  ASMCMD> lsdsk -G TESTDG  Path  AFD:ASM\_DISK09  ASMCMD> |
| 5 | **Modify rebalance power of an active**  **operation using**  **ASMCMD** | * Add a disk to a diskgroup (as shown above). * Identify the rebalance operation by running “lsop” via ASMCMD. * Before the rebalance completes run the following command via ASMCMD:   “rebal –power <1-11> <dg name>.    **NOTE:** Progress can be monitored by   * running “lsop” | • The rebalance power of the current operation will be increased to the specified value. This is visible with the lsop command. | ASMCMD> rebal --power 5 TESTDG  Rebal on progress.  ASMCMD> lsop  Group\_Name Pass State Power EST\_WORK EST\_RATE EST\_TIME  ASMCMD> |
| 6 | **Drop a ASM diskgroup using**  **ASMCMD** | • Login to ASM via ASMCMD and run:  “dropdg <dg name>;” | * The diskgroup will be successfully dropped.   The diskgroup will be unregistered as a Clusterware resource (crsctl stat res –t) | ASMCMD> lsdg  State Type Rebal Sector Logical\_Sector Block AU Total\_MB Free\_MB Req\_mir\_free\_MB Usable\_file\_MB Offline\_disks Voting\_files Name  MOUNTED EXTERN N 512 512 4096 1048576 1536000 1531803 0 1531803 0 N HFPRD\_DATA/  MOUNTED EXTERN N 512 512 4096 1048576 512000 508116 0 508116 0 N HFPRD\_FRA/  MOUNTED EXTERN N 512 512 4096 4194304 15360 14956 0 14956 0 Y OCR\_VD\_DG/  MOUNTED EXTERN N 512 512 4096 1048576 512000 511932 0 511932 0 N TESTDG/  ASMCMD> exit  [grid@hrmdc1oel04 ~]$ crsctl stat res -t |grep dg  ora.HFPRD\_DATA.dg(ora.asmgroup)  ora.HFPRD\_FRA.dg(ora.asmgroup)  ora.OCR\_VD\_DG.dg(ora.asmgroup)  ora.TESTDG.dg(ora.asmgroup)  [grid@hrmdc1oel04 ~]$ asmcmd dropdg TESTDG  [grid@hrmdc1oel04 ~]$ crsctl stat res -t |grep dg  ora.HFPRD\_DATA.dg(ora.asmgroup)  ora.HFPRD\_FRA.dg(ora.asmgroup)  ora.OCR\_VD\_DG.dg(ora.asmgroup)  [grid@hrmdc1oel04 ~]$ asmcmd lsdg  State Type Rebal Sector Logical\_Sector Block AU Total\_MB Free\_MB Req\_mir\_free\_MB Usable\_file\_MB Offline\_disks Voting\_files Name  MOUNTED EXTERN N 512 512 4096 1048576 1536000 1531803 0 1531803 0 N HFPRD\_DATA/  MOUNTED EXTERN N 512 512 4096 1048576 512000 508116 0 508116 0 N HFPRD\_FRA/  MOUNTED EXTERN N 512 512 4096 4194304 15360 14956 0 14956 0 Y OCR\_VD\_DG/  [grid@hrmdc1oel04 ~]$ |

# Component Testing: ASM Objects Functional Tests

| **#** | **Test** | **Procedure** | **Expected Results/Measures** | **Actual Results/Notes** |
| --- | --- | --- | --- | --- |
| 1 | **Create an ASM template** | • Login to ASM via SQL\*Plus and run: “alter diskgroup <dg name> add template unreliable  attributes(unprotected fine);” | • The ASM template will be successfully created and visible within the c view. | [grid@hrmdc1oel04 ~]$ asmca -createDiskGroup -diskGroupName TESTDG -disk 'AFD:ASM\_DISK08' -redundancy EXTERNAL -silent  [grid@hrmdc1oel04 ~]$ crsctl stat res -t | grep TESTDG  ora.TESTDG.dg(ora.asmgroup)  [grid@hrmdc1oel04 ~]$ sqlplus / as sysasm  SQL\*Plus: Release 19.0.0.0.0 - Production on Fri Aug 20 18:29:59 2021  Version 19.11.0.0.0  Copyright (c) 1982, 2020, Oracle. All rights reserved.  Connected to:  Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production  Version 19.11.0.0.0  SQL> ALTER DISKGROUP TESTDG ADD TEMPLATE my\_template ATTRIBUTES (UNPROTECTED FINE);  Diskgroup altered.  SQL> select \* from v$asm\_template where name='MY\_TEMPLATE';  GROUP\_NUMBER ENTRY\_NUMBER REDUND STRIPE S NAME PRIM  ------------ ------------ ------ ------ - ------------------------------ ----  MIRR CON\_ID  ---- ----------  4 466 UNPROT FINE N MY\_TEMPLATE COLD  COLD 0  SQL> |
| 2 | **Apply an ASM template** | * Use the template above and apply it to a new tablespace to be created on the database * Login to ASM via SQL\*Plus and run: “create tablespace test datafile '+<dg   name>/my\_files(unreliable)' size  10M;” | • The datafile is created using the attributes of the ASM template | SQL> create tablespace test datafile '+TESTDG' size 10M;  Tablespace created.  SQL> |
| 3 | **Drop an ASM template** | • Login to ASM via SQL\*Plus and run: “alter diskgroup <dg name> drop  template unreliable;” | • This template should be removed from v$asm\_template. | SQL> alter diskgroup testdg drop template my\_template;  Diskgroup altered.  SQL>  SQL>  SQL> select \* from v$asm\_template where name='MY\_TEMPLATE';  no rows selected |
| 4 | **Create an ASM directory** | • Login to ASM via SQL\*Plus and run: “alter diskgroup <dg name> add directory '+<dg name>/my\_files';” | * You can use the asmcmd tool to check that the new directory name was created in the desired diskgroup.      * The created directory will have an entry in v$asm\_directory | SQL> alter diskgroup testdg add directory '+TESTDG/testdirectory';  Diskgroup altered.  SQL> !asmcmd ls +TESTDG  SAMPLEDB/  testdirectory/ |
| 5 | **Create an ASM alias** | • Login to ASM via SQL\*Plus and run:  “alter diskgroup DATA add alias  '+DATA/my\_files/datafile\_alias' for  '+<dg name>/  <db name>/DATAFILE/<file name>';” | • Verify that the alias exists in v$asm\_alias | SQL> alter diskgroup data add alias '+DATA/spfile.ora' for '+data/sampledb/parameterfile/spfile.268.1070547143';  Diskgroup altered.  SQL> select \* from v$asm\_alias where name = 'spfile.ora';  NAME  ----------------------------------------------------------------------  GROUP\_NUMBER FILE\_NUMBER FILE\_INCARNATION ALIAS\_INDEX ALIAS\_INCARNATION  ------------ ----------- ---------------- ----------- -----------------  PARENT\_INDEX REFERENCE\_INDEX A S CON\_ID  ------------ --------------- - - ----------  spfile.ora  2 268 1070547143 1 3  33554432 50331647 N N 0  SQL> |
| 6 | **Drop an ASM alias** | • Login to ASM via SQL\*Plus and run:  “alter diskgroup DATA drop alias  '+<dg name>/my\_files/ datafile\_alias';” | • Verify that the alias does not exist in v$asm\_alias. | SQL> alter diskgroup data drop alias '+DATA/spfile.ora';  Diskgroup altered.  SQL> select \* from v$asm\_alias where name = 'spfile.ora';  no rows selected  SQL> |
| 7 | **Drop an active database file within ASM** | * Identify a data file from a running database. * Login to ASM via SQL\*Plus and run:   “alter diskgroup data drop file '+<dg name>/<db name>/DATAFILE/<file name>';” | • This will fail with the following message: ERROR at line 1:  ORA-15032: not all alterations performed  ORA-15028: ASM file  '+DATA/V102/DATAFILE/TEST.269.654602409' not dropped; currently being accessed | SQL> select name from v$datafile;  NAME  --------------------------------------------------------------------------------  +HFPRD\_DATA/SAMPLEDB/DATAFILE/system.257.1080948957  +HFPRD\_DATA/SAMPLEDB/DATAFILE/undotbs3.266.1080949209  +HFPRD\_DATA/SAMPLEDB/DATAFILE/sysaux.258.1080948991  +HFPRD\_DATA/SAMPLEDB/DATAFILE/undotbs1.259.1080949007  +HFPRD\_DATA/SAMPLEDB/DATAFILE/undotbs2.265.1080949209  +HFPRD\_DATA/SAMPLEDB/DATAFILE/users.260.1080949007  +TESTDG/SAMPLEDB/DATAFILE/test.256.1081103743  7 rows selected.  SQL> exit  Disconnected from Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production  Version 19.10.0.0.0 |
| 8 | **Drop an inactive**  **database file within**  **ASM** | * Identify a datafile that is no longer used by a database * Login to ASM via SQL\*Plus and run:   “alter diskgroup data drop file '+<dg name>/<db name>/DATAFILE/<file name>';” | • Observe that file number in v$asm\_file is now removed. | [grid@hrvltstdb20 ~]$ asmcmd cp +DATA/SAMPLEDB/DATAFILE/users.260.1070546571 +DATA/SAMPLEDB/DATAFILE/notused  copying +DATA/SAMPLEDB/DATAFILE/users.260.1070546571 -> +DATA/SAMPLEDB/DATAFILE/notused  [grid@hrvltstdb20 ~]$ asmcmd rm +DATA/SAMPLEDB/DATAFILE/notused  [grid@hrvltstdb20 ~]$ |

# 

# Component Testing: ASM ACFS Functional Tests

| **#** | **Test** | **Procedure** | **Expected Results/Measures** | **Actual Results/Notes** |
| --- | --- | --- | --- | --- |
| 1 | **Create an ASM Dynamic Volume** | * Create an ASM diskgroup to house the ASM Logical Volume.   ASMCMD or SQL\*Plus may be used  to achieve this task. The diskgroup compatibility attributes  COMPATIBLE.ASM and  COMPATIBLE.ADVM must be set to 11.2 or higher.   * Login to ASM via ASMCMD and   create the logical volume to house the ACFS filesystem:  “volcreate –G <dg name> -s <size>  <vol name>” | • The volume will be created with the specified attributes. The volume can be viewed in ASMCMD by running “volinfo –a”. | [grid@hrmdc1oel04 ~]$ asmca -createDiskGroup -diskGroupName ACFSDG -disk 'AFD:ASM\_DISK10' -redundancy EXTERNAL -silent  [grid@hrmdc1oel04 ~]$ asmcmd lsdg  State Type Rebal Sector Logical\_Sector Block AU Total\_MB Free\_MB Req\_mir\_free\_MB Usable\_file\_MB Offline\_disks Voting\_files Name  MOUNTED EXTERN N 512 512 4096 1048576 512000 511845 0 511845 0 N ACFSDG/  MOUNTED EXTERN N 512 512 4096 1048576 1536000 1531513 0 1531513 0 N HFPRD\_DATA/  MOUNTED EXTERN N 512 512 4096 1048576 512000 507444 0 507444 0 N HFPRD\_FRA/  MOUNTED EXTERN N 512 512 4096 4194304 15360 14956 0 14956 0 Y OCR\_VD\_DG/  MOUNTED EXTERN N 512 512 4096 1048576 512000 511833 0 511833 0 N TESTDG/  [grid@hrmdc1oel04 ~]$  [grid@hrmdc1oel04 ~]$ asmcmd volcreate -G ACFSDG -s 50G ACFSVOL  [grid@hrmdc1oel04 ~]$ asmcmd -p  ASMCMD [+] > volinfo --all  Diskgroup Name: ACFSDG  Volume Name: ACFSVOL  Volume Device: /dev/asm/acfsvol-146  State: ENABLED  Size (MB): 51200  Resize Unit (MB): 64  Redundancy: UNPROT  Stripe Columns: 8  Stripe Width (K): 1024  Usage:  Mountpath:  ASMCMD [+] > |
| 2 | **Create an ACFS filesystem** | * Within ASMCMD issue the “volinfo –a” command and take note of the Volume Device path. * As the root user create an ACFS filesystem on the ASM Volume as follows: * “/sbin/mkfs –t acfs <volume device path>” | • The filesystem will be successfully created. The filesystem attributes can be viewed by running “/sbin/acfsutil info fs” | [grid@hrmdc1oel04 ~]$ asmcmd -p  ASMCMD [+] > volinfo --all  Diskgroup Name: ACFSDG  Volume Name: ACFSVOL  Volume Device: /dev/asm/acfsvol-146  State: ENABLED  Size (MB): 51200  Resize Unit (MB): 64  Redundancy: UNPROT  Stripe Columns: 8  Stripe Width (K): 1024  Usage:  Mountpath:  ASMCMD [+] > exit  ASMCMD [+] >  [root@hrmdc1oel04 ~]# /sbin/mkfs –t acfs /dev/asm/acfsvol-146  mke2fs 1.42.9 (28-Dec-2013)  mkfs.ext2: invalid blocks 'acfs' on device '–t'  [root@hrmdc1oel04 ~]# /sbin/mkfs -t acfs "/dev/asm/acfsvol-146"  mkfs.acfs: version = 19.0.0.0.0  mkfs.acfs: on-disk version = 46.0  mkfs.acfs: volume = /dev/asm/acfsvol-146  mkfs.acfs: volume size = 53687091200 ( 50.00 GB )  mkfs.acfs: Format complete.  [root@hrmdc1oel04 ~]# |
| 3 | **Mount the ACFS filesystem** | • As the root user execute the following to mount the ACFS filesystem:  “/sbin/mount –t acfs <volume device path> <mount point>     * **NOTE:** If acfsutil was not used to register the file system, the dynamic volume must be enabled on the remote nodes before mounting (within ASMCMD run volenable). | • The filesystem will successfully be mounted and will be visible. | [root@hrmdc1oel04 ~]# mkdir /acfsshare  [root@hrmdc1oel04 ~]# chown oracle:oinstall /acfsshare  [root@hrmdc1oel05 ~]# mkdir /acfsshare  [root@hrmdc1oel05 ~]# chown oracle:oinstall /acfsshare  [root@hrmdc1oel06 ~]# mkdir /acfsshare  [root@hrmdc1oel06 ~]# chown oracle:oinstall /acfsshare  [root@hrmdc1oel04 ~]# /sbin/mkfs -t acfs "/dev/asm/acfsvol-146"  mkfs.acfs: version = 19.0.0.0.0  mkfs.acfs: on-disk version = 46.0  mkfs.acfs: volume = /dev/asm/acfsvol-146  mkfs.acfs: volume size = 53687091200 ( 50.00 GB )  mkfs.acfs: Format complete.  [root@hrmdc1oel04 ~]#  [root@hrmdc1oel04 ~]# **srvctl add filesystem -d /dev/asm/acfsvol-146 -m /acfsshare -u oracle -fstype ACFS -autostart ALWAYS**  [root@hrmdc1oel04 ~]# df -h |grep acfs  /dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare  [root@hrmdc1oel04 ~]# **srvctl start filesystem -d /dev/asm/acfsvol-146**  **/dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare**  **[oracle@hrmdc1oel04 temp]$ ssh -q hrmdc1oel05 df -h |grep /acfs**  **/dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare**  **[oracle@hrmdc1oel04 temp]$ ssh -q hrmdc1oel05 df -h |grep /acfs**  **/dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare**  **[oracle@hrmdc1oel04 temp]$** | |
| 4 | **Add an ACFS filesystem to the ACFS mount**  **registry** | • Use acfsutil to register the ACFS filesystem:  “/sbin/acfsutil registry –a <volume device path> <mount point> | * The filesystem will be registered with the ACFS registry. This can be validated by running   “/sbin/acfsutil registry –l”  The filesystem will be automounted on all nodes in the cluster on reboot | [root@hrmdc1oel04 ~]# mkdir /acfsshare  [root@hrmdc1oel04 ~]# chown oracle:oinstall /acfsshare  [root@hrmdc1oel05 ~]# mkdir /acfsshare  [root@hrmdc1oel05 ~]# chown oracle:oinstall /acfsshare  [root@hrmdc1oel06 ~]# mkdir /acfsshare  [root@hrmdc1oel06 ~]# chown oracle:oinstall /acfsshare  [root@hrmdc1oel04 ~]# /sbin/mkfs -t acfs "/dev/asm/acfsvol-146"  mkfs.acfs: version = 19.0.0.0.0  mkfs.acfs: on-disk version = 46.0  mkfs.acfs: volume = /dev/asm/acfsvol-146  mkfs.acfs: volume size = 53687091200 ( 50.00 GB )  mkfs.acfs: Format complete.  [root@hrmdc1oel04 ~]#  [root@hrmdc1oel04 ~]# **srvctl add filesystem -d /dev/asm/acfsvol-146 -m /acfsshare -u oracle -fstype ACFS -autostart ALWAYS**  [root@hrmdc1oel04 ~]# df -h |grep acfs  /dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare  [root@hrmdc1oel04 ~]# **srvctl start filesystem -d /dev/asm/acfsvol-146**  **/dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare**  **[oracle@hrmdc1oel04 temp]$ ssh -q hrmdc1oel05 df -h |grep /acfs**  **/dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare**  **[oracle@hrmdc1oel04 temp]$ ssh -q hrmdc1oel05 df -h |grep /acfs**  **/dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare**  **[oracle@hrmdc1oel04 temp]$** | |
| 5 | **Create a file on the ACFS filesystem** | * Perform the following:   “echo “Testing ACFS” > <mount point>/testfile   * Perform a “cat” command on the file on all nodes in the cluster. | • The file will exist on all nodes with the specified contents. | [oracle@hrmdc1oel04 temp]$ pwd  /acfsshare/temp  [oracle@hrmdc1oel04 temp]$ cat db\_links\_only.par  userid="/ as sysdba"  directory=exports  dumpfile=dblinks.dmp  logfile=dblinks.log  full=y  INCLUDE=DB\_LINK:"IN(SELECT db\_link FROM dba\_db\_links)" |
| 6 | **Remove an ACFS**  **filesystem from the ACFS mount registry** | • Use acfsutil to register the ACFS filesystem:  “/sbin/acfsutil registry –d <volume device path> | * The filesystem will be unregistered with the ACFS registry. This can be validated by running   “/sbin/acfsutil registry –l”  The filesystem will NOT be automounted on all nodes in the cluster on reboot | [root@hrmdc1oel04 ~]# /sbin/acfsutil registry -d /dev/asm/acfsvol-146  acfsutil registry: successfully removed ACFS volume /dev/asm/acfsvol-146 from Oracle Registry  [root@hrmdc1oel04 ~]# /sbin/acfsutil registry -l /dev/asm/acfsvol-146 /acfsshare  acfsutil registry: ACFS-03136: unable to locate volume /dev/asm/acfsvol-146 in Cluster Ready Services  [root@hrmdc1oel04 ~]# /sbin/acfsutil registry -a /dev/asm/acfsvol-146 /acfsshare  acfsutil registry: mount point /acfsshare successfully added to Oracle Registry  [root@hrmdc1oel04 ~]# /sbin/acfsutil registry -l /dev/asm/acfsvol-146 /acfsshare  Device : /dev/asm/acfsvol-146 : Mount Point : /acfsshare : Options : none : Nodes : all : Disk Group: ACFSDG : Primary Volume : ACFSVOL : Accelerator Volumes :  Device : /dev/asm/acfsvol-146 : Mount Point : /acfsshare : Options : none : Nodes : all : Disk Group: ACFSDG : Primary Volume : ACFSVOL : Accelerator Volumes :  [root@hrmdc1oel04 ~]# srvctl start filesystem -d /dev/asm/acfsvol-146  PRCR-1120 : Resources are already running.  CRS-5702: Resource 'ora.acfsdg.acfsvol.acfs' is already running on 'hrmdc1oel04'  [root@hrmdc1oel04 ~]#  [root@hrmdc1oel04 ~]# /infshare/oracle/scripts/dba/rac-status.sh -all  Cluster hfmdc-ew-cluster  Type | Name | hrmdc1oel04 | hrmdc1oel05 | hrmdc1oel06 |  ---------------------------------------------------------------------------------------  acfs | acfsdg.acfsvol | Online | Online | Online | mounted on /acfsshare  advm | ACFSDG.ACFSVOL | Online | Online | Online | |
| 7 | **Add an ACFS filesystem as a Clusterware resource**    **NOTE:** This is required when using ACFS for a shared RDBMS Home. When ACFS is registered as a CRS resource it should NOT be registered in the ACFS mount registry. | * Execute the following command as root to add a ACFS filesystem as a Clusterware resource:   “svrctl add filesystem –d < volume device path> -v <volume name> -g <dg name> -m <mount point> -u root”   * Start the ACFS filesystem resource:   “svrctl start filesystem –d <volume device path>” | * The filesystem will be registered as a resource within the Clusterware. This can be validated by running “crsctl stat res –t” * The filesystem will be automounted on all nodes in the cluster on reboot | [root@hrmdc1oel04 ~]# mkdir /acfsshare  [root@hrmdc1oel04 ~]# chown oracle:oinstall /acfsshare  [root@hrmdc1oel05 ~]# mkdir /acfsshare  [root@hrmdc1oel05 ~]# chown oracle:oinstall /acfsshare  [root@hrmdc1oel06 ~]# mkdir /acfsshare  [root@hrmdc1oel06 ~]# chown oracle:oinstall /acfsshare  [root@hrmdc1oel04 ~]# /sbin/mkfs -t acfs "/dev/asm/acfsvol-146"  mkfs.acfs: version = 19.0.0.0.0  mkfs.acfs: on-disk version = 46.0  mkfs.acfs: volume = /dev/asm/acfsvol-146  mkfs.acfs: volume size = 53687091200 ( 50.00 GB )  mkfs.acfs: Format complete.  [root@hrmdc1oel04 ~]#  [root@hrmdc1oel04 ~]# **srvctl add filesystem -d /dev/asm/acfsvol-146 -m /acfsshare -u oracle -fstype ACFS -autostart ALWAYS**  [root@hrmdc1oel04 ~]# df -h |grep acfs  /dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare  [root@hrmdc1oel04 ~]# **srvctl start filesystem -d /dev/asm/acfsvol-146**  **/dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare**  **[oracle@hrmdc1oel04 temp]$ ssh -q hrmdc1oel05 df -h |grep /acfs**  **/dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare**  **[oracle@hrmdc1oel04 temp]$ ssh -q hrmdc1oel05 df -h |grep /acfs**  **/dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare**  **[oracle@hrmdc1oel04 temp]$**  [root@hrmdc1oel04 ~]# /infshare/oracle/scripts/dba/rac-status.sh -all  Cluster hfmdc-ew-cluster  Type | Name | hrmdc1oel04 | hrmdc1oel05 | hrmdc1oel06 |  ---------------------------------------------------------------------------------------  acfs | acfsdg.acfsvol | Online | Online | Online | mounted on /acfsshare  advm | ACFSDG.ACFSVOL | Online | Online | Online || |
| 8 | **Increase the size of a ACFS filesystem** | * Add a disk to the diskgroup housing the ACFS filesystem (if necessary) * Use acfsutil as the root user to resize the ACFS filesystem:   “acfsutil size <size><K|M|G> <mount point>” | • The dynamic volume and filesystem will be resized without an outage of the filesystem provided enough free space exists in the diskgroup. Validate with “df – h”. | [root@hrmdc1oel04 ~]# df -h |grep /ac  /dev/asm/acfsvol-146 50G 891M 50G 2% /acfsshare  [root@hrmdc1oel04 ~]# acfsutil size 65G /acfsshare/  acfsutil size: new file system size: 69793218560 (66560MB)  [root@hrmdc1oel04 ~]# df -h |grep /ac  /dev/asm/acfsvol-146 65G 921M 65G 2% /acfsshare  [root@hrmdc1oel04 ~]# |
| 10 | **Create a snapshot of a ACFS filesystem** | • Use acfsutil to create a snapshot of an ACFS filesystem:  “/sbin/acfsutil snap create <name> <ACFS mount point>” | • A snapshot of the ACFS file system will be created under <ACFS mount point>/.ACFS/snaps. | FAILED  [root@hrmdc1oel04 ~]# /sbin/acfsutil snap create acfssnap /acfsshare  acfsutil snap create: Snapshot operation is complete.  [root@hrmdc1oel04 ~]# ls -ltr /acfsshare  total 172  drwx------ 2 root root 65536 Aug 22 11:21 lost+found  -rw-r--r-- 1 root root 32 Aug 22 11:22 abc.lst  drwxr-xr-x 2 root root 20480 Aug 22 11:22 tesp  drwxr-xr-x 2 oracle oinstall 20480 Aug 22 11:24 temp  [root@hrmdc1oel04 ~]#  SNAPS are not getting created under /.ACFS/snaps |
| 11 | **Delete a snapshot of a ACFS filesystem** | • Use acfsutil to delete a previously created snapshot of an ACFS filesystem:  “/sbin/acfsutil snap delete <name>  <ACFS mount point>” | • The specified snapshot will be deleted and will no longer appear under <ACFS mount point>/.ACFS/snaps. | FAILED |
| 12 | **Perform a FSCK of a ACFS filesystem** | • Dismount the ACFS filesystem to be checked on ALL nodes:   * If the filesystem is registered as a Clusterware resource issue “srvctl stop filesystem –d <device path>” to dismount the filesystem on all nodes * If the filesystem is only in the ACFS mount registry or is not registered with Clusterware in any way dismount the filesystem using “umount <mount point>”.   • Execute fsck on the ACFS filesystem as follows:  “sbin/fsck -a -v -y -t acfs <device path>”  This command will automatically fix any errors (-a), answer yes to any prompts (-y) and provide verbose output (-v). | • FSCK will check the specified ACFS filesystem for errors, automatically fix any errors (-a), answer yes to any prompts (-y) and provide verbose output (-v). | [root@hrvltstdb20 ~]# /sbin/fsck -a -v -y -t acfs /dev/asm/acfsvol-325  fsck from util-linux 2.23.2  version = 19.0.0.0.0  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  \*\*\*\*\*\*\*\*\*\* Pass: 1 \*\*\*\*\*\*\*\*\*\*  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  Oracle ASM Cluster File System (ACFS) On-Disk Structure Version: 49.0  ACFS file system created at: Tue May 05 15:00:57 2021  checking primary file system  Files checked in primary file system: 100%  checking snapshot: acfssnap (identifier: 1), 1 of 2 snapshots  Files checked in snapshot acfssnap: 100%  snap name: acfssnap snap id: 1 current snap: 1 snaps to check: 2 snapAUsCount: 96 (0x60)  checking snapshot: firstsnap (identifier: 2), 2 of 2 snapshots  Files checked in snapshot firstsnap: 100%  snap name: firstsnap snap id: 2 current snap: 2 snaps to check: 2 snapAUsCount: 96 (0x60)  Checking if any files are orphaned...  0 orphans found  Checker completed with no errors. |
| 13 | **Delete an ACFS filesystem** | • Dismount the ACFS filesystem to be deleted on ALL nodes:   * If the filesystem is registered as a Clusterware resource issue “srvctl stop filesystem –d <device path>” to dismount the filesystem on all nodes * If the filesystem is only in the ACFS mount registry or is not registered with CRS in any way dismount the filesystem using “umount <mount point>”. * If the filesystem is registered with the ACFS mount registry deregister the mount point using acfsutil as follows:   “/sbin/acfsutil registry –d <device path>”   * Remove the filesystem from the Dynamic Volume using acfsutil:   “/sbin/acfsutil rmfs <device path>” | • The ACFS filesystem will be removed from the ASM Dynamic Volume. Attempts to mount the filesystem should now fail. | [root@hrvltstdb20 ~]# df -h | grep acfs  /dev/asm/acfsvol-325 60G 735M 60G 2% /acfsshare  [root@hrvltstdb20 ~]# /u02/app/19.3.0/grid/bin/srvctl stop filesystem -d /dev/asm/acfsvol-325  [root@hrvltstdb20 ~]# df -h | grep acfs  [root@hrvltstdb20 ~]#  [root@hrvltstdb20 ~]# /sbin/acfsutil registry -d /dev/asm/acfsvol-325  acfsutil registry: successfully removed ACFS volume /dev/asm/acfsvol-325 from Oracle Registry  [root@hrvltstdb20 ~]# /sbin/acfsutil rmfs /dev/asm/acfsvol-325  [root@hrvltstdb20 ~]# |
| 14 | **Remove an ASM Dynamic Volume** | • Use ASMCMD to delete a ASM Dynamic Volume:  “voldelete –G <dg name> <vol name>” | * The removed Dynamic Volume will no longer be listed in the output of “volinfo –a”.   The disk space utilized by the Dynamic Volume will be returned to the diskgroup. | [grid@hrvltstdb20 ~]$ . oraenv  ORACLE\_SID = [grid] ? +ASM1  The Oracle base has been set to /u02/app/grid  [grid@hrvltstdb20 ~]$ asmcmd  ASMCMD> volinfo --all  Diskgroup Name: ACFSDG  Volume Name: ACFSVOL  Volume Device: /dev/asm/acfsvol-325  State: ENABLED  Size (MB): 61440  Resize Unit (MB): 64  Redundancy: UNPROT  Stripe Columns: 8  Stripe Width (K): 1024  Usage:  Mountpath:  ASMCMD> voldelete -G ACFSDG ACFSVOL  ASMCMD> volinfo --all  no volumes found  ASMCMD> |

# Component Testing: ASM Tools & Utilities

| **#** | **Test** | **Procedure** | **Expected Results/Measures** | **Actual Results/Notes** |
| --- | --- | --- | --- | --- |
| 1 | **Run dbverify on the database files.** | • Specify each file individually using the dbv utility:  dbv  userid=s<user>/<password>file='<A SM filename>' blocksize=<blocksize> | • The output should be similar to the following, with no errors present:    DBVERIFY - Verification complete    Total Pages Examined : 640  Total Pages Processed (Data) : 45  Total Pages Failing (Data) : 0  Total Pages Processed (Index): 2  Total Pages Failing (Index): 0  Total Pages Processed (Other): 31  Total Pages Processed (Seg) : 0  Total Pages Failing (Seg) : 0  Total Pages Empty : 562  Total Pages Marked Corrupt : 0  Total Pages Influx : 0  Highest block SCN : 0 (0.0) | [oracle@hrmdc1oel04 ~]$ dbv USERID=sys/Testing123# FILE=+HFPRD\_DATA/SAMPLEDB/DATAFILE/users.260.1080949007  DBVERIFY: Release 19.0.0.0.0 - Production on Sun Aug 22 10:23:17 2021  Copyright (c) 1982, 2019, Oracle and/or its affiliates. All rights reserved.  DBVERIFY - Verification starting : FILE = +HFPRD\_DATA/SAMPLEDB/DATAFILE/users.260.1080949007  DBVERIFY - Verification complete  Total Pages Examined : 640  Total Pages Processed (Data) : 60  Total Pages Failing (Data) : 0  Total Pages Processed (Index): 15  Total Pages Failing (Index): 0  Total Pages Processed (Other): 464  Total Pages Processed (Seg) : 0  Total Pages Failing (Seg) : 0  Total Pages Empty : 101  Total Pages Marked Corrupt : 0  Total Pages Influx : 0  Total Pages Encrypted : 0  Highest block SCN : 1252497 (0.1252497)  [oracle@hrmdc1oel04 ~]$ |
| 2 | **Use**  **dbms\_file\_transfer to copy files from ASM to filesystem** | • Use dbms\_file\_transfer.put\_file and get\_file functions to copy database files (datafiles, archives, etc) into and out of ASM.    **NOTE**: This requires that a database directory be pre-created and available for the source and destination directories. See PL/SQL Guide for dbms\_file\_transfer details | • The put\_file and get file functions will copy files successfully to/from filesystem. This provides an alternate option for migrating to ASM, or to simply copy files out of ASM. | SQL> !hostname  hrmdc1oel04.washdc.state.sbu  SQL> create public database link testdblink connect to testuser identified by "Testing123#" using 'SAMPLEDB';  Database link created.  SQL> select \* from global\_name@testdblink;  GLOBAL\_NAME  --------------------------------------------------------------------------------  SAMPLEDB.WASHDC.STATE.SBU  SQL> create directory source as '+TESTDG/SAMPLEDB/DATAFILE';  Directory created.  SQL> create directory dest as '/tmp';  Directory created.  SQL> BEGIN  SYS.DBMS\_FILE\_TRANSFER.PUT\_FILE ( 'SOURCE' , 'test.256.1081103743' , 'DEST' , 'test.256.1081103743','TESTDBLINK' ) ;  END ;  / 2 3 4  PL/SQL procedure successfully completed.  SQL> !ls -ltr /tmp/user\*  ls: cannot access /tmp/user\*: No such file or directory  SQL> |

# Linux Specific Tests

| **#** | **Test** | **Procedure** | **Expected Results/Measures** | **Actual Results/Notes** |
| --- | --- | --- | --- | --- |
| 1 | **Create an OCFS2 filesystem** | * Add a Disk/LUN to the RAC nodes and configure the Disk/LUN for use by OCFS2. * Create the appropriate partition table on the disk and use “partprobe” to rescan the partition tables. * Create the OCFS2 filesystem by running:   “/sbin/mkfs –t ocfs2 <device path>”   * Add the filesystem to /etc/fstab on all nodes * Mount the filesystem on all nodes | * The OCFS2 filesystem will be created. * The OCFS2 filesystem will be mounted on all nodes | [oracle@hrmdc1oel04 ~]$ cat /etc/fstab  #  # /etc/fstab  # Created by anaconda on Wed Mar 3 20:34:07 2021  #  # Accessible filesystems, by reference, are maintained under '/dev/disk'  # See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info  #  /dev/mapper/ol-root / xfs defaults 0 0  UUID=a302ac9a-546d-436d-a580-1b63f97f6b60 /boot xfs defaults 0 0  /dev/mapper/ol-home /home xfs defaults 0 0  /dev/mapper/ol-tmp /tmp xfs defaults 0 0  /dev/mapper/ol-usr /usr xfs defaults 0 0  /dev/mapper/ol-var /var xfs defaults 0 0  /dev/mapper/ol-var\_log /var/log xfs defaults 0 0  /dev/mapper/ol-var\_log\_audit /var/log/audit xfs defaults 0 0  /dev/mapper/ol-swap swap swap defaults 0 0  UUID="1eebcf47-df39-4443-9ef2-3da9941f579b" /u02 xfs defaults 0 0  UUID="9fc9de7e-eb49-463c-840b-e90d716f954e" /u01 xfs defaults 0 0  UUID="6f2d80b9-a57c-40cd-8f5f-995c4f624318" /infshare ocfs2 defaults 0 0  [oracle@hrmdc1oel04 ~]$ |
| 2 | **Create a file on the OCFS filesystem** | * Perform the following:   “echo “Testing OCFS2” > <mount point>/testfile   * Perform a “cat” command on the file on all nodes in the cluster. | • The file will exist on all nodes with the specified contents. | [oracle@hrmdc1oel04 dba]$ echo "Testing OCFS2" > /infshare/oracle/scripts/dba/testfile  [oracle@hrmdc1oel04 dba]$ cat /infshare/oracle/scripts/dba/testfile  Testing OCFS2  [oracle@hrmdc1oel04 dba]$ ssh oracle@hrmdc1oel05 cat /infshare/oracle/scripts/dba/testfile  ######################################################################################  ######################################################################################  ## ##  ## You are accessing a U.S. Government information system, includes any of: ##  ## (1) this computer ##  ## (2) this computer network ##  ## (3) all computers connected to this network ##  ## (4) all devices and storage media attached to this network or, ##  ## to a computer on this network. ##  ## ##  ## This information system is provided for U.S. Government-authorized use only. ##  ## Unauthorized or improper use of this system may result in disciplinary action, ##  ## as well as civil and criminal penalties. ##  ## ##  ## By using this information system, you understand and consent to the following: ##  ## 1.You have no reasonable expectation of privacy regarding any communications ##  ## or data transiting or stored on this information system. ##  ## 2.At any time, and for any lawful government purpose, the government may ##  ## monitor, intercept, and search and seize any communication or data ##  ## transiting, or stored on this information system. ##  ## 3.Any communications or data transiting or stored on this information system ##  ## may be disclosed or used for any lawful government purpose. ##  ## 4.Nothing herein consents to the search or seizure of a privately-owned ##  ## computer or other privately owned communications device, or the contents ##  ## thereof, that is in the system user's home. ##  ## ##  ######################################################################################  ######################################################################################  Testing OCFS2  [oracle@hrmdc1oel04 dba]$ ssh oracle@hrmdc1oel06 cat /infshare/oracle/scripts/dba/testfile  ######################################################################################  ######################################################################################  ## ##  ## You are accessing a U.S. Government information system, includes any of: ##  ## (1) this computer ##  ## (2) this computer network ##  ## (3) all computers connected to this network ##  ## (4) all devices and storage media attached to this network or, ##  ## to a computer on this network. ##  ## ##  ## This information system is provided for U.S. Government-authorized use only. ##  ## Unauthorized or improper use of this system may result in disciplinary action, ##  ## as well as civil and criminal penalties. ##  ## ##  ## By using this information system, you understand and consent to the following: ##  ## 1.You have no reasonable expectation of privacy regarding any communications ##  ## or data transiting or stored on this information system. ##  ## 2.At any time, and for any lawful government purpose, the government may ##  ## monitor, intercept, and search and seize any communication or data ##  ## transiting, or stored on this information system. ##  ## 3.Any communications or data transiting or stored on this information system ##  ## may be disclosed or used for any lawful government purpose. ##  ## 4.Nothing herein consents to the search or seizure of a privately-owned ##  ## computer or other privately owned communications device, or the contents ##  ## thereof, that is in the system user's home. ##  ## ##  ######################################################################################  ######################################################################################  Testing OCFS2  [oracle@hrmdc1oel04 dba]$ |
| 3 | **Verify that the OCFS2 filesystem is available after a system reboot** | • Issue a “shutdown –r now” | • The OCFS2 filesystem will automatically mount and be accessible to all nodes after a reboot. | Passed. |
| 4 | **Enable database**  **archive logs to**  **OCFS2**    **NOTE:** If using the  OCFS2 filesystem for database files it must be mounted with the following options:  rw,datavolume,nointr | • Modify the database archive log settings to utilize OCFS2 | • Archivelog files are created, and available to all nodes on the specified OCFS2 filesystem. | SQL> select name,open\_mode from v$database;  NAME OPEN\_MODE  --------- --------------------  SAMPLEDB READ WRITE  SQL> show parameters db\_recovery\_file\_dest  NAME TYPE VALUE  ------------------------------------ ----------- ------------------------------  db\_recovery\_file\_dest string +HFPRD\_FRA  db\_recovery\_file\_dest\_size big integer 18266M  SQL> !pwd  /infshare/oracle/scripts/dba  SQL> !ls -ltr  total 77  -rwxr-xr-x 1 oracle oinstall 75935 Aug 18 19:44 rac-status.sh  -rw-r--r-- 1 oracle oinstall 14 Aug 22 10:39 testfile  SQL> !mkdir logs  SQL> !ls -ltr  total 81  -rwxr-xr-x 1 oracle oinstall 75935 Aug 18 19:44 rac-status.sh  -rw-r--r-- 1 oracle oinstall 14 Aug 22 10:39 testfile  drwxr-xr-x 2 oracle oinstall 3896 Aug 22 10:44 logs  SQL> alter system set db\_recovery\_file\_dest='/infshare/oracle/scripts/dba/logs/' scope=both sid='\*';  System altered.  SQL> alter system switch logfile;  System altered.  SQL> !ls -altrh /infshare/oracle/scripts/dba/logs/  total 12K  drwxr-xr-x 3 oracle oinstall 3.9K Aug 22 10:44 ..  drwxr-xr-x 3 oracle oinstall 3.9K Aug 22 10:45 .  drwxr-x--- 3 oracle oinstall 3.9K Aug 22 10:45 SAMPLEDB  SQL> !ls -altrh /infshare/oracle/scripts/dba/logs/SAMPLEDB/  total 12K  drwxr-xr-x 3 oracle oinstall 3.9K Aug 22 10:45 ..  drwxr-x--- 3 oracle oinstall 3.9K Aug 22 10:45 .  drwxr-x--- 3 oracle oinstall 3.9K Aug 22 10:45 archivelog  SQL> !ls -altrh /infshare/oracle/scripts/dba/logs/SAMPLEDB/archivelog/  total 12K  drwxr-x--- 3 oracle oinstall 3.9K Aug 22 10:45 ..  drwxr-x--- 3 oracle oinstall 3.9K Aug 22 10:45 .  drwxr-x--- 2 oracle oinstall 3.9K Aug 22 10:45 2021\_08\_22  SQL> !ls -altrh /infshare/oracle/scripts/dba/logs/SAMPLEDB/archivelog/2021\_08\_22/  total 139M  drwxr-x--- 3 oracle oinstall 3.9K Aug 22 10:45 ..  drwxr-x--- 2 oracle oinstall 3.9K Aug 22 10:45 .  -rw-r----- 1 oracle oinstall 139M Aug 22 10:45 o1\_mf\_1\_22\_jl4rrnsz\_.arc  SQL> alter system switch logfile;  System altered.  SQL> !ls -altrh /infshare/oracle/scripts/dba/logs/SAMPLEDB/archivelog/2021\_08\_22/  total 268M  drwxr-x--- 3 oracle oinstall 3.9K Aug 22 10:45 ..  -rw-r----- 1 oracle oinstall 139M Aug 22 10:45 o1\_mf\_1\_22\_jl4rrnsz\_.arc  -rw-r----- 1 oracle oinstall 5.0K Aug 22 10:47 o1\_mf\_1\_23\_jl4rw99q\_.arc  -rw-r----- 1 oracle oinstall 66M Aug 22 10:47 o1\_mf\_3\_16\_jl4rw9cl\_.arc  drwxr-x--- 2 oracle oinstall 3.9K Aug 22 10:47 .  -rw-r----- 1 oracle oinstall 64M Aug 22 10:47 o1\_mf\_2\_11\_jl4rwc7k\_.arc  SQL> |
| 5 | **Create an RMAN on**  **a OCFS2 filesystem**    **NOTE:** If using the  OCFS2 filesystem for database files it must be mounted with the following options:  rw,datavolume,nointr | * Back up ASM based datafiles to OCFS2 filesystem. * Execute baseline recovery scenarios (full, point-in-time, datafile). | * RMAN backupsets are created, and available to all nodes on the specified OCFS2 filesystem.   Recovery scenarios completed with no errors. | [oracle@hrmdc1oel04 dba]$ rman target /  Recovery Manager: Release 19.0.0.0.0 - Production on Sun Aug 22 10:49:21 2021  Version 19.11.0.0.0  Copyright (c) 1982, 2019, Oracle and/or its affiliates. All rights reserved.  PL/SQL package SYS.DBMS\_BACKUP\_RESTORE version 19.03.00.00 in TARGET database is not current  PL/SQL package SYS.DBMS\_RCVMAN version 19.03.00.00 in TARGET database is not current  connected to target database: SAMPLEDB (DBID=3774943188)  RMAN> backup current controlfile format '/infshare/oracle/scripts/dba/logs/%d\_C\_%T\_%u\_CTL';  Starting backup at 22-AUG-21  using target database control file instead of recovery catalog  allocated channel: ORA\_DISK\_1  channel ORA\_DISK\_1: SID=3272 instance=SAMPLEDB1 device type=DISK  channel ORA\_DISK\_1: starting full datafile backup set  channel ORA\_DISK\_1: specifying datafile(s) in backup set  including current control file in backup set  channel ORA\_DISK\_1: starting piece 1 at 22-AUG-21  channel ORA\_DISK\_1: finished piece 1 at 22-AUG-21  piece handle=/infshare/oracle/scripts/dba/logs/SAMPLEDB\_C\_20210822\_030752qq\_CTL tag=TAG20210822T105002 comment=NONE  channel ORA\_DISK\_1: backup set complete, elapsed time: 00:00:01  Finished backup at 22-AUG-21  Starting Control File and SPFILE Autobackup at 22-AUG-21  piece handle=/infshare/oracle/scripts/dba/logs/SAMPLEDB/autobackup/2021\_08\_22/o1\_mf\_s\_1081248604\_jl4s0wbm\_.bkp comment=NONE  Finished Control File and SPFILE Autobackup at 22-AUG-21  RMAN> |
| 6 | **Create a datapump export on a OCFS2 filesystem** | • Using datapump, take an export of the database to an OCFS2 filesystem. | • A full system export should be created without errors or warnings. | [oracle@hrmdc1oel04 ss]$ cat db\_links\_only.par  userid="/ as sysdba"  directory=exports  dumpfile=dblinks.dmp  logfile=dblinks.log  full=y  INCLUDE=DB\_LINK:"IN(SELECT db\_link FROM dba\_db\_links)"  [oracle@hrmdc1oel04 ss]$ sqlplus / as sysdba  SQL\*Plus: Release 19.0.0.0.0 - Production on Sun Aug 22 10:53:11 2021  Version 19.11.0.0.0  Copyright (c) 1982, 2020, Oracle. All rights reserved.  Connected to:  Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production  Version 19.11.0.0.0  SQL> select name,open\_mode from v$database;  NAME OPEN\_MODE  --------- --------------------  SAMPLEDB READ WRITE  SQL> create directory exports as '/infshare/oracle/scripts/dba/logs';  Directory created.  SQL> exit  Disconnected from Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production  Version 19.11.0.0.0  [oracle@hrmdc1oel04 ss]$ expdp parfile=db\_links\_only.par  Export: Release 19.0.0.0.0 - Production on Sun Aug 22 10:54:01 2021  Version 19.11.0.0.0  Copyright (c) 1982, 2019, Oracle and/or its affiliates. All rights reserved.  Connected to: Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production  Starting "SYS"."SYS\_EXPORT\_FULL\_01": /\*\*\*\*\*\*\*\* AS SYSDBA parfile=db\_links\_only.par  Processing object type DATABASE\_EXPORT/SCHEMA/DB\_LINK  Master table "SYS"."SYS\_EXPORT\_FULL\_01" successfully loaded/unloaded  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  Dump file set for SYS.SYS\_EXPORT\_FULL\_01 is:  /infshare/oracle/scripts/dba/logs/dblinks.dmp  Job "SYS"."SYS\_EXPORT\_FULL\_01" successfully completed at Sun Aug 22 10:54:14 2021 elapsed 0 00:00:08  [oracle@hrmdc1oel04 ss]$ ls -altrh /infshare/oracle/scripts/dba/logs/\*.dmp  -rw-r----- 1 oracle oinstall 472K Aug 22 10:54 /infshare/oracle/scripts/dba/logs/dblinks.dmp  [oracle@hrmdc1oel04 ss]$ |
| 7 | **Validate OCFS2 functionality during node failures.** | • Issue a “shutdown –r now” from a single node in the cluster | • OCFS2 filesystem should remain available to surviving nodes. | Passed. OCFS2 file system remain mounted on survived node |
| 8 | **Perform a FSCK of a OCFS2 filesystem** | * Dismount the OCFS2 filesystem to be checked on ALL nodes * Execute fsck on the OCFS2 filesystem as follows:   “sbin/fsck -v -y -t ocfs2 <device path>”  This command will automatically, answer yes to any prompts (-y) and provide verbose output (-v). | • FSCK will check the specified OCFS2 filesystem for errors, answer yes to any prompts (-y) and provide verbose output (-v). | [root@hrmdc1oel06 ~]# fsck -v -y -t ocfs2 /infshare/  fsck from util-linux 2.23.2  fsck.ocfs2 1.8.6  Checking OCFS2 filesystem in /dev/mapper/3624a9370888b2143fb9c4c08001e2fda:  Label: <NONE>  UUID: 6F2D80B9A57C40CD8F5F995C4F624318  Number of blocks: 805306368  Block size: 4096  Number of clusters: 805306368  Cluster size: 4096  Number of slots: 16  o2fsck\_init\_cache:378 | Want 1048576 blocks for the I/O cache  o2fsck\_init\_cache:402 | Asking for 1048576 blocks of I/O cache  o2fsck\_init\_cache:419 | Got 1048576 blocks  o2fsck\_should\_replay\_journals:565 | slot 0 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 1 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 2 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 3 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 4 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 5 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 6 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 7 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 8 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 9 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 10 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 11 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 12 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 13 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 14 JOURNAL\_DIRTY\_FL: 0  o2fsck\_should\_replay\_journals:565 | slot 15 JOURNAL\_DIRTY\_FL: 0  o2fsck\_init\_cache:378 | Want 805306368 blocks for the I/O cache  o2fsck\_init\_cache:402 | Asking for 1610612736 blocks of I/O cache  o2fsck\_init\_cache:419 | Got 67642248 blocks  o2fsck\_init\_cache:431 | Leaving room for other allocations  o2fsck\_init\_cache:402 | Asking for 33821124 blocks of I/O cache  o2fsck\_init\_cache:419 | Got 33821124 blocks  /dev/mapper/3624a9370888b2143fb9c4c08001e2fda is clean. It will be checked after 20 additional mounts.  [root@hrmdc1oel06 ~]# |
| 9 | **Check the OCFS2**  **cluster status** | • Check the OCFS2 cluster status on all nodes by issuing “/etc/init.d/o2cb status”. | • The output of the command will be similar to:  Module "configfs": Loaded  Filesystem "configfs": Mounted  Module "ocfs2\_nodemanager": Loaded Module "ocfs2\_dlm": Loaded  Module "ocfs2\_dlmfs": Loaded  Filesystem "ocfs2\_dlmfs": Mounted  Checking O2CB cluster ocfs2: Online Checking O2CB heartbeat: Active | [root@hrvltstdb20 ~]# o2cb cluster-status  Cluster 'ewocfsdev' is online  [root@hrvltstdb21 ~]# o2cb list-cluster ewocfsdev  node:  number = 0  name = hrvltstdb20  ip\_address = 192.168.155.237  ip\_port = 7777  cluster = ewocfsdev  node:  number = 1  name = hrvltstdb21  ip\_address = 192.168.155.238  ip\_port = 7777  cluster = ewocfsdev  cluster:  node\_count = 2  heartbeat\_mode = local  name = ewocfsdev  [root@hrvltstdb21 ~]# o2cb cluster-status  Cluster 'ewocfsdev' is online  [root@hrvltstdb21 ~]# |
|  | **Orachk** | Orachk – Execute as user “oracle” | **Orachk as oracle** | [oracle@hrmdc1oel04 ~]$ orachk  Clusterware stack is running from /u02/app/19.3.0/grid. Is this the correct Clusterware Home?[y/n][y] y  Checking ssh user equivalency settings on all nodes in cluster for oracle  Node hrmdc1oel05 is configured for ssh user equivalency for oracle user  Node hrmdc1oel06 is configured for ssh user equivalency for oracle user  .  Make sure that '/u01/ahf\_data\_dir/oracle.ahf/data/hrmdc1oel05/orachk/user\_oracle/work' exists and has right permissions on hrmdc1oel05 or point to some other directory(for eg: /tmp) by using either '-tmpdir' or 'RAT\_TMPDIR'! |
|  | **Orachk** | Orachk – execute as user “root” |  | See APENDEX B for the output. |

# 

# Network Specific Tests

| **#** | **Test** | **Procedure** | **Expected Results** | **Measures** | **Actual Results/Notes** |
| --- | --- | --- | --- | --- | --- |
| 1 | **Public Network Failure** | • Unplug all network cables for the public network    **NOTE:** Configurations using NIS must also have implemented NSCD for this test to succeed with the expected results.    **NOTE:** It is recommended NOT to use ifconfig to down the interface, this may lead to the address still being plumbed to the interface resulting in unexpected results. | • Check with “crsctl stat res –t” o The ora.\*.network and listener resources will go offline for the node.  o SCAN VIPs and SCAN LISTENERs running on the node will fail over to a surviving node. o The VIP for the node will fail over to a surviving node.   * The database instance will remain up but will be unregistered with the remote listeners. * Database services will fail over to one of the other available nodes. * If TAF is configured, clients should fail over to an available instance. | • Time to detect the network failure and relocate resources. |  |
| 2 | **Public NIC Failure** | * Assuming dual NICs are configured public interface for redundancy (e.g. bonding, teaming, etc). * Unplug the network cable from 1 of the NICs.     **NOTE:** It is recommended NOT to use ifconfig to down the interface, this may lead to the address still being plumbed to the interface resulting in unexpected results. | • Network traffic should fail over to other NIC without impacting any of the cluster resources. | • Time to fail over to other NIC card. With bonding /teaming configured this should be less than 100ms. |  |
| 3 | **Interconnect Network Failure** | • Unplug all network cables for the interconnect network | • CSSD will detect split-brain situation and perform one of the following: o In a two-node cluster the node with the lowest node number will survive. o In a multiple node cluster the largest sub-cluster will survive.   * On the node(s) that is being evicted, a graceful shutdown of Oracle Clusterware will be attempted. o All I/O capable client processes will be terminated and all resources will be cleaned up. If process termination and/or resource cleanup does not complete successfully the node will be rebooted. o Assuming that the above has completed successfully, OHASD will attempt to restart the stack. In this case the stack will be restarted once the network connectivity of the private interconnect network has been restored. * Review the following logs: * $GI\_HOME/log/<nodename>/ alert<nodename>.log * $GI\_HOME/log/<nodename>/ cssd/ocssd.log | • Oracle Clusterware will gracefully shutdown, should graceful shutdown fail (due to I/O processes not being terminated or resource cleanup) the node will be rebooted. • Assuming that the graceful shutdown of Oracle Clusterware succeeded, OHASD will restart the stack once network connectivity for the private interconnect has been restored. |  |
| 4 | **Interconnect NIC**  **Failure (OS or 3rd**  **Party NIC**  **Redundancy)** | * Assuming dual NICs are configured for the private interface for redundancy (e.g. bonding, teaming, etc). * Unplug the network cable from 1 of the NICs. | • Network traffic should fail over to other NIC without impacting any of the cluster resources. | • Time to fail over to other NIC card. With bonding / teaming configured this should be less than 100ms. |  |
| 5 | **Interconnect NIC** | * Assuming 2 or more NICs configured for Oracle Redundant Interconnect and HAIP. * Unplug the network cable from 1 of the NICs | * The HAIP running on the NIC in which the cable was pulled will failover to one of the surviving NICs in the configuration. * Clusterware and/or RAC communication will not be impacted. * Review the following logs: * $GI\_HOME/log/<nodename>/ cssd/ocssd.log * $GI\_HOME/log/<nodename>/ gipcd/gipcd.log   • Upon reconnecting the cable, the HAIP that failed over will relocate back to its original interface. | • Failover (and fail back) will be seamless (no disruption in service from any node in the cluster). |  |
| 6 | **Interconnect Switch**  **Failure (Redundant**  **Switch**  **Configuration)** | • In a redundant network switch configuration, power off one switch | • Network traffic should fail over to other switch without any impact on interconnect traffic or instances. | • Time to fail over to other NIC card. With bonding /teaming/11.2 Redundant Interconnect configured this should be less than 100ms. |  |
| 7 | **Node Loses Access to**  **Disks with CSS**  **Voting Device** | • Unplug external storage cable connection (SCSI, FC or LAN cable) from one node to disks containing the CSS Voting Device(s).    **NOTE:** To perform this test it may be necessary to isolate the CSS Voting Device(s) to an isolated ASM diskgroup or CFS. | * $GI\_HOME/log/<nodename>/ alert<nodename>.log ***For 11.2.0.2 and above:*** * CSS will detect this and evict the node as follows: o All I/O capable client processes will be terminated and all resources will be cleaned up. If process termination and/or resource cleanup does not complete successfully the node will be rebooted. o Assuming that the above has completed successfully, OHASD will attempt to restart the stack. In this case the stack will be restarted once the network connectivity of the private interconnect network has been restored. * Review the following logs: * $GI\_HOME/log/<nodename>/ alert<nodename>.log * $GI\_HOME/log/<nodename>/ cssd/ocssd.log | • Oracle Clusterware will gracefully shutdown, should graceful shutdown fail (due to I/O processes not being terminated or resource cleanup) the node will be rebooted. • Assuming that the graceful shutdown of Oracle Clusterware succeeded, OHASD will restart the stack once network connectivity for the private interconnect has been restored. |  |
| 8 | **Node Loses Access to**  **Disks with OCR Device(s)** | • Unplug external storage cable connection (SCSI, FC or LAN cable) from one node to disks containing the OCR Device(s).    **NOTE:** To perform this test it may be necessary to isolate the OCR Device(s) to an isolated ASM diskgroup or CFS. | * CRSD will detect the failure of the OCR device and abort. OHASD will attempt to restart CRSD 10 times after which manual intervention will be required. * The database instance, ASM instance and listeners will not be impacted. * Review the following logs: * $GI\_HOME/log/<nodename>/ cssd/crsd.log * $GI\_HOME/log/<nodename>/ alert<nodename>.log * $GI\_HOME/log/<nodename>/ ohasd/ohasd.log | • Monitor database status under load to ensure no service interruption occurs. |  |
| 9 | **Node Loses Access to**  **Single Path of Disk**  **Subsystem (OCR,**  **Voting Device,**  **Database files)** | • Unplug external storage cable connection (SCSI, FC or LAN cable) from node to disk subsystem. | * If multi-pathing is enabled, the multi-pathing configuration should provide failure transparency   No impact to database instances. | * Monitor database status under load to ensure no service interruption occurs.   Path failover should be visible in the OS logfiles. |  |

# Disaster Recovery Tests

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Test** | **Procedure** | **Expected Results/Measures** | **Actual Results/Notes** |
| 1 | Make sure VMs are replicated to DR site | * Try bringing up VMs at DR site | * Should be able to VM without any issues | Should be able to VM without any issues |

# Appendix A (Screenshots for Node and Listener Failures)

Text

Description automatically generated

Graphical user interface

Description automatically generated

(HRMDC1oel04)node DOWN and two Nodes (HRMDC1oel05 and HRMDC1oel06) are UP

Text

Description automatically generated

A picture containing text, monitor, screenshot, silver

Description automatically generated

[root@hrmdc1oel05 dba]# crsctl stat res -t

--------------------------------------------------------------------------------

Name Target State Server State details

--------------------------------------------------------------------------------

Local Resources

--------------------------------------------------------------------------------

ora.LISTENER.lsnr

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.chad

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.net1.network

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.ons

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.proxy\_advm

OFFLINE OFFLINE hrmdc1oel05 STABLE

OFFLINE OFFLINE hrmdc1oel06 STABLE

--------------------------------------------------------------------------------

Cluster Resources

--------------------------------------------------------------------------------

ora.ASMNET1LSNR\_ASM.lsnr(ora.asmgroup)

1 ONLINE OFFLINE STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.HFPRD\_DATA.dg(ora.asmgroup)

1 ONLINE OFFLINE STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.HFPRD\_FRA.dg(ora.asmgroup)

1 ONLINE OFFLINE STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.LISTENER\_SCAN1.lsnr

1 ONLINE ONLINE hrmdc1oel05 STABLE

ora.LISTENER\_SCAN2.lsnr

1 ONLINE ONLINE hrmdc1oel06 STABLE

ora.LISTENER\_SCAN3.lsnr

1 ONLINE ONLINE hrmdc1oel05 STABLE

ora.OCR\_VD\_DG.dg(ora.asmgroup)

1 ONLINE OFFLINE STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.asm(ora.asmgroup)

1 ONLINE OFFLINE STABLE

2 ONLINE ONLINE hrmdc1oel05 Started,STABLE

3 ONLINE ONLINE hrmdc1oel06 Started,STABLE

ora.asmnet1.asmnetwork(ora.asmgroup)

1 ONLINE OFFLINE STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.cvu

1 ONLINE ONLINE hrmdc1oel06 STABLE

ora.hrmdc1oel04.vip

1 ONLINE INTERMEDIATE hrmdc1oel06 FAILED OVER,STABLE

ora.hrmdc1oel05.vip

1 ONLINE ONLINE hrmdc1oel05 STABLE

ora.hrmdc1oel06.vip

1 ONLINE ONLINE hrmdc1oel06 STABLE

ora.qosmserver

1 ONLINE ONLINE hrmdc1oel05 STABLE

ora.sampledb.db

1 ONLINE OFFLINE Instance Shutdown,ST

ABLE

2 ONLINE ONLINE hrmdc1oel05 Open,HOME=/u02/app/o

racle/product/19.3.0

/db\_1,STABLE

3 ONLINE ONLINE hrmdc1oel06 Open,HOME=/u02/app/o

racle/product/19.3.0

/db\_1,STABLE

ora.scan1.vip

1 ONLINE ONLINE hrmdc1oel05 STABLE

ora.scan2.vip

1 ONLINE ONLINE hrmdc1oel06 STABLE

ora.scan3.vip

1 ONLINE ONLINE hrmdc1oel05 STABLE

--------------------------------------------------------------------------------

[root@hrmdc1oel05 dba]#

All Nodes Back UP Agin.

Graphical user interface

Description automatically generated

[root@hrmdc1oel04 dba]# crsctl stat res -t

--------------------------------------------------------------------------------

Name Target State Server State details

--------------------------------------------------------------------------------

Local Resources

--------------------------------------------------------------------------------

ora.LISTENER.lsnr

ONLINE ONLINE hrmdc1oel04 STABLE

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.chad

ONLINE ONLINE hrmdc1oel04 STABLE

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.net1.network

ONLINE ONLINE hrmdc1oel04 STABLE

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.ons

ONLINE ONLINE hrmdc1oel04 STABLE

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.proxy\_advm

OFFLINE OFFLINE hrmdc1oel04 STABLE

OFFLINE OFFLINE hrmdc1oel05 STABLE

OFFLINE OFFLINE hrmdc1oel06 STABLE

--------------------------------------------------------------------------------

Cluster Resources

--------------------------------------------------------------------------------

ora.ASMNET1LSNR\_ASM.lsnr(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.HFPRD\_DATA.dg(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.HFPRD\_FRA.dg(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.LISTENER\_SCAN1.lsnr

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.LISTENER\_SCAN2.lsnr

1 ONLINE ONLINE hrmdc1oel06 STABLE

ora.LISTENER\_SCAN3.lsnr

1 ONLINE ONLINE hrmdc1oel05 STABLE

ora.OCR\_VD\_DG.dg(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.asm(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 Started,STABLE

2 ONLINE ONLINE hrmdc1oel05 Started,STABLE

3 ONLINE ONLINE hrmdc1oel06 Started,STABLE

ora.asmnet1.asmnetwork(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.cvu

1 ONLINE ONLINE hrmdc1oel06 STABLE

ora.hrmdc1oel04.vip

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.hrmdc1oel05.vip

1 ONLINE ONLINE hrmdc1oel05 STABLE

ora.hrmdc1oel06.vip

1 ONLINE ONLINE hrmdc1oel06 STABLE

ora.qosmserver

1 ONLINE ONLINE hrmdc1oel05 STABLE

ora.sampledb.db

1 ONLINE ONLINE hrmdc1oel04 Open,HOME=/u02/app/o

racle/product/19.3.0

/db\_1,STABLE

2 ONLINE ONLINE hrmdc1oel05 Open,HOME=/u02/app/o

racle/product/19.3.0

/db\_1,STABLE

3 ONLINE ONLINE hrmdc1oel06 Open,HOME=/u02/app/o

racle/product/19.3.0

/db\_1,STABLE

ora.scan1.vip

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.scan2.vip

1 ONLINE ONLINE hrmdc1oel06 STABLE

ora.scan3.vip

1 ONLINE ONLINE hrmdc1oel05 STABLE

--------------------------------------------------------------------------------

[root@hrmdc1oel04 dba]#

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1 (HRMDC1oel04)node UP and two Nodes (HRMDC1oel05 and HRMDC1oel06) are DOWN

Text

Description automatically generated

Text

Description automatically generated

[root@hrmdc1oel04 dba]# crsctl stat res -t

--------------------------------------------------------------------------------

Name Target State Server State details

--------------------------------------------------------------------------------

Local Resources

--------------------------------------------------------------------------------

ora.LISTENER.lsnr

ONLINE ONLINE hrmdc1oel04 STABLE

ora.chad

ONLINE ONLINE hrmdc1oel04 STABLE

ora.net1.network

ONLINE ONLINE hrmdc1oel04 STABLE

ora.ons

ONLINE ONLINE hrmdc1oel04 STABLE

ora.proxy\_advm

OFFLINE OFFLINE hrmdc1oel04 STABLE

--------------------------------------------------------------------------------

Cluster Resources

--------------------------------------------------------------------------------

ora.ASMNET1LSNR\_ASM.lsnr(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE OFFLINE STABLE

3 ONLINE OFFLINE STABLE

ora.HFPRD\_DATA.dg(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE OFFLINE STABLE

3 ONLINE OFFLINE STABLE

ora.HFPRD\_FRA.dg(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE OFFLINE STABLE

3 ONLINE OFFLINE STABLE

ora.LISTENER\_SCAN1.lsnr

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.LISTENER\_SCAN2.lsnr

1 ONLINE OFFLINE STABLE

ora.LISTENER\_SCAN3.lsnr

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.OCR\_VD\_DG.dg(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE OFFLINE STABLE

3 ONLINE OFFLINE STABLE

ora.asm(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 Started,STABLE

2 ONLINE OFFLINE STABLE

3 ONLINE OFFLINE STABLE

ora.asmnet1.asmnetwork(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE OFFLINE STABLE

3 ONLINE OFFLINE STABLE

ora.cvu

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.hrmdc1oel04.vip

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.hrmdc1oel05.vip

1 ONLINE INTERMEDIATE hrmdc1oel04 FAILED OVER,STABLE

ora.hrmdc1oel06.vip

1 ONLINE OFFLINE STABLE

ora.qosmserver

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.sampledb.db

1 ONLINE ONLINE hrmdc1oel04 Open,HOME=/u02/app/o

racle/product/19.3.0

/db\_1,STABLE

2 ONLINE OFFLINE STABLE

3 ONLINE OFFLINE STABLE

ora.scan1.vip

1 ONLINE ONLINE hrmdc1oel04 STABLE

**ora.scan2.vip**

**1 ONLINE OFFLINE STABLE**

ora.scan3.vip

1 ONLINE ONLINE hrmdc1oel04 STABLE

--------------------------------------------------------------------------------

[root@hrmdc1oel04 dba]#

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ALL 3 nodes (HRMDC1oel04, HRMDC1oel05 and HRMDC1oel06) are UP again.

Text

Description automatically generated

Graphical user interface

Description automatically generated

[root@hrmdc1oel04 ~]# crsctl stat res -t

--------------------------------------------------------------------------------

Name Target State Server State details

--------------------------------------------------------------------------------

Local Resources

--------------------------------------------------------------------------------

ora.LISTENER.lsnr

ONLINE ONLINE hrmdc1oel04 STABLE

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.chad

ONLINE ONLINE hrmdc1oel04 STABLE

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.net1.network

ONLINE ONLINE hrmdc1oel04 STABLE

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.ons

ONLINE ONLINE hrmdc1oel04 STABLE

ONLINE ONLINE hrmdc1oel05 STABLE

ONLINE ONLINE hrmdc1oel06 STABLE

ora.proxy\_advm

OFFLINE OFFLINE hrmdc1oel04 STABLE

OFFLINE OFFLINE hrmdc1oel05 STABLE

OFFLINE OFFLINE hrmdc1oel06 STABLE

--------------------------------------------------------------------------------

Cluster Resources

--------------------------------------------------------------------------------

ora.ASMNET1LSNR\_ASM.lsnr(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.HFPRD\_DATA.dg(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.HFPRD\_FRA.dg(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.LISTENER\_SCAN1.lsnr

1 ONLINE ONLINE hrmdc1oel06 STABLE

ora.LISTENER\_SCAN2.lsnr

1 ONLINE ONLINE hrmdc1oel05 STABLE

ora.LISTENER\_SCAN3.lsnr

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.OCR\_VD\_DG.dg(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.asm(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 Started,STABLE

2 ONLINE ONLINE hrmdc1oel05 Started,STABLE

3 ONLINE ONLINE hrmdc1oel06 Started,STABLE

ora.asmnet1.asmnetwork(ora.asmgroup)

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE ONLINE hrmdc1oel05 STABLE

3 ONLINE ONLINE hrmdc1oel06 STABLE

ora.cvu

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.hrmdc1oel04.vip

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.hrmdc1oel05.vip

1 ONLINE ONLINE hrmdc1oel05 STABLE

ora.hrmdc1oel06.vip

1 ONLINE ONLINE hrmdc1oel06 STABLE

ora.qosmserver

1 ONLINE ONLINE hrmdc1oel04 STABLE

ora.sampledb.db

1 ONLINE ONLINE hrmdc1oel04 Open,HOME=/u02/app/o

racle/product/19.3.0

/db\_1,STABLE

2 ONLINE ONLINE hrmdc1oel05 Open,HOME=/u02/app/o

racle/product/19.3.0

/db\_1,STABLE

3 ONLINE ONLINE hrmdc1oel06 Open,HOME=/u02/app/o

racle/product/19.3.0

/db\_1,STABLE

ora.sampledb.taf\_service.svc

1 ONLINE ONLINE hrmdc1oel04 STABLE

2 ONLINE ONLINE hrmdc1oel06 STABLE

ora.scan1.vip

1 ONLINE ONLINE hrmdc1oel06 STABLE

ora.scan2.vip

1 ONLINE ONLINE hrmdc1oel05 STABLE

ora.scan3.vip

1 ONLINE ONLINE hrmdc1oel04 STABLE

--------------------------------------------------------------------------------

[root@hrmdc1oel04 ~]#

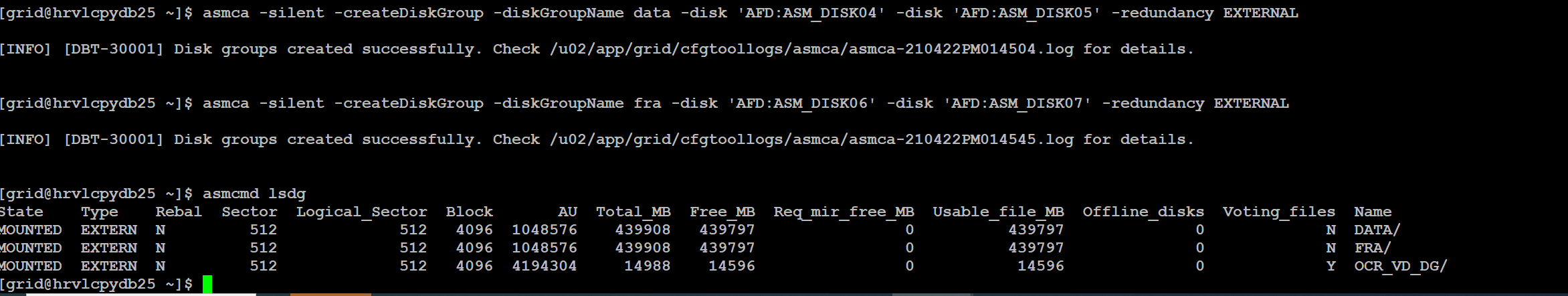
ADD service to Database:-

Text

Description automatically generated

Text

Description automatically generated



clea

**APENDEX B**

**ORACHK as user “root”**

[root@hrmdc1oel06 ~]# orachk

Clusterware stack is running from /u02/app/19.3.0/grid. Is this the correct Clusterware Home?[y/n][y] y

Checking ssh user equivalency settings on all nodes in cluster for root

Node hrmdc1oel04 is not configured for ssh user equivalency and the orachk uses ssh to execute checks on remote nodes.

Without passwordless ssh orachk can not run audit checks on the remote nodes.

If necessary due to security policies the orachk can be run on each node using -localonly option.

Do you want to configure SSH for user root on hrmdc1oel04 [y/n][y] n

We can configure ssh only for this run and reverse the changes back. Do you want to continue?[y/n][y] n

Without ssh user equivalency, no audit checks will be executed on hrmdc1oel04

Node hrmdc1oel05 is not configured for ssh user equivalency and the orachk uses ssh to execute checks on remote nodes.

Without passwordless ssh orachk can not run audit checks on the remote nodes.

If necessary due to security policies the orachk can be run on each node using -localonly option.

Do you want to configure SSH for user root on hrmdc1oel05 [y/n][y] n

We can configure ssh only for this run and reverse the changes back. Do you want to continue?[y/n][y] n

Without ssh user equivalency, no audit checks will be executed on hrmdc1oel05

Searching for running databases . . . . .

. .

List of running databases registered in OCR

1. SAMPLEDB

2. None of above

Select databases from list for checking best practices. For multiple databases, select 1 for All or comma separated number like 1,2 etc [1-2][1]. 1

. . . .

. .

Checking Status of Oracle Software Stack - Clusterware, ASM, RDBMS

. . . . . .

. . . . . . . . . . . . .

-------------------------------------------------------------------------------------------------------

Oracle Stack Status

-------------------------------------------------------------------------------------------------------

Host Name CRS Installed RDBMS Installed CRS UP ASM UP RDBMS UP DB Instance Name

-------------------------------------------------------------------------------------------------------

hrmdc1oel06 Yes Yes Yes Yes Yes SAMPLEDB3

-------------------------------------------------------------------------------------------------------

Copying plug-ins

. .

. . . . . .

Either Cluster Verification Utility pack (cvupack) does not exist at /opt/oracle.ahf/common/cvu or it is an old or invalid cvupack

Checking Cluster Verification Utility (CVU) version at CRS Home - /u02/app/19.3.0/grid

\*\*\* Checking Best Practice Recommendations ( Pass / Warning / Fail ) \*\*\*

.

Collections and audit checks log file is

/u02/app/grid/oracle.ahf/data/hrmdc1oel06/orachk/user\_root/output/orachk\_hrmdc1oel06\_SAMPLEDB\_082221\_121347/log/orachk.log

============================================================

Node name - hrmdc1oel06

============================================================

. . . . . .

Collecting - ASM Disk Groups

Collecting - ASM Disk I/O stats

Collecting - ASM Diskgroup Attributes

Collecting - ASM disk partnership imbalance

Collecting - ASM diskgroup attributes

Collecting - ASM diskgroup usable free space

Collecting - ASM initialization parameters

Collecting - Active sessions load balance for SAMPLEDB database

Collecting - Archived Destination Status for SAMPLEDB database

Collecting - Cluster Interconnect Config for SAMPLEDB database

Collecting - Database Archive Destinations for SAMPLEDB database

Collecting - Database Files for SAMPLEDB database

Collecting - Database Instance Settings for SAMPLEDB database

Collecting - Database Parameters for SAMPLEDB database

Collecting - Database Properties for SAMPLEDB database

Collecting - Database Registry for SAMPLEDB database

Collecting - Database Sequences for SAMPLEDB database

Collecting - Database Undocumented Parameters for SAMPLEDB database

Collecting - Database Undocumented Parameters for SAMPLEDB database

Collecting - Database Workload Services for SAMPLEDB database

Collecting - Dataguard Status for SAMPLEDB database

Collecting - Files not opened by ASM

Collecting - List of active logon and logoff triggers for SAMPLEDB database

Collecting - Log Sequence Numbers for SAMPLEDB database

Collecting - Percentage of asm disk Imbalance

Collecting - Process for shipping Redo to standby for SAMPLEDB database

Collecting - Redo Log information for SAMPLEDB database

Collecting - Standby redo log creation status before switchover for SAMPLEDB database

Collecting - /proc/cmdline

Collecting - /proc/modules

Collecting - CPU Information

Collecting - CRS active version

Collecting - CRS oifcfg

Collecting - CRS software version

Collecting - CSS Reboot time

Collecting - Cluster interconnect (clusterware)

Collecting - Clusterware OCR healthcheck

Collecting - Clusterware Resource Status

Collecting - Disk I/O Scheduler on Linux

Collecting - DiskFree Information

Collecting - DiskMount Information

Collecting - Huge pages configuration

Collecting - Interconnect network card speed

Collecting - Kernel parameters

Collecting - Linux module config.

Collecting - Maximum number of semaphore sets on system

Collecting - Maximum number of semaphores on system

Collecting - Maximum number of semaphores per semaphore set

Collecting - Memory Information

Collecting - NUMA Configuration

Collecting - Network Interface Configuration

Collecting - Network Performance

Collecting - Network Service Switch

Collecting - OS Packages

Collecting - OS version

Collecting - Operating system release information and kernel version

Collecting - Oracle executable attributes

Collecting - Patches for Grid Infrastructure

Collecting - Patches for RDBMS Home

Collecting - Shared memory segments

Collecting - Table of file system defaults

Collecting - Voting disks (clusterware)

Collecting - number of semaphore operations per semop system call

Collecting - CRS Opatch version

Collecting - CRS user time zone check

Collecting - Custom rc init scripts (rc.local)

Collecting - Disk Information

Collecting - Grid Infastructure user shell limits configuration

Collecting - Interconnect interface config

Collecting - Network interface stats

Collecting - ORAchk Daemon/Scheduler configuration

Collecting - Root user limits

Collecting - Verify ACFS volume size

Collecting - Verify TCP Selective Acknowledgement is enabled

Collecting - Verify no database server kernel out of memory errors

Collecting - Verify the vm.min\_free\_kbytes configuration

Collecting - root time zone check

Collecting - slabinfo

Collecting - umask setting for GI owner

Data collections completed. Checking best practices on hrmdc1oel06.

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INFO => Important Automatic Storage Management (ASM) Notes and Technical White Papers

INFO => Oracle Data Pump Best practices.

WARNING => Linux swap configuration does not meet recommendation

INFO => Hidden database initialization parameters should not be set per best practice recommendations for SAMPLEDB

INFO => Most recent ADR incidents for /u02/app/oracle/product/19.3.0/db\_1

INFO => Oracle GoldenGate failure prevention best practices

CRITICAL => The vm.min\_free\_kbytes configuration is not set as recommended

CRITICAL => The RMAN snapshot control file location is not shared on all database nodes in the cluster for SAMPLEDB

WARNING => OCR is not being backed up daily

WARNING => ORA-00600 errors found in alert log for SAMPLEDB

WARNING => Some user sessions lack proper failover mode (BASIC) and method (SELECT) for SAMPLEDB

WARNING => Package compat-libstdc++-33-3.2.3-61-x86\_64 is recommended but not installed

INFO => Some data or temp files are not autoextensible for SAMPLEDB

WARNING => Primary database is not protected with Data Guard (standby database) for real-time data protection and availability for SAMPLEDB

WARNING => Flashback on PRIMARY is not configured for SAMPLEDB

INFO => Important Storage Minimum Requirements for Grid & Database Homes

CRITICAL => Operating system hugepages count does not satisfy total SGA requirements

WARNING => NIC bonding is not configured for interconnect

WARNING => NIC bonding is NOT configured for public network (VIP)

WARNING => Cluster health analyzer (CHA) is not configured as recommended

WARNING => NTP is not running with correct setting

WARNING => All disk groups should have compatible.rdbms attribute set to recommended values

FAIL => One or more log archive destination and alternate log archive destination settings are not as recommended for SAMPLEDB

FAIL => Database parameter DB\_LOST\_WRITE\_PROTECT is not set to recommended value on SAMPLEDB3 instance

INFO => The Optimizer Fix 28345522 is disabled by default for SAMPLEDB

WARNING => Database parameter DB\_BLOCK\_CHECKING on primary is not set to the recommended value. for SAMPLEDB

INFO => The Optimizer Fix 22149010 is disabled by default for SAMPLEDB

INFO => The Optimizer Fix 25167306 is disabled by default for SAMPLEDB

WARNING => Consider setting the value of the parameter \_cursor\_obsolete\_threshold to 1024 for Non-Multitenant environment which is the appropriate recommended value for SAMPLEDB

INFO => The Optimizer Fix 28965084 is disabled by default for SAMPLEDB

INFO => The Optimizer Fix 28776811 is disabled by default for SAMPLEDB

INFO => The Optimizer Fix 29132869 is disabled by default for SAMPLEDB

INFO => The Optimizer Fix 28498976 is disabled by default for SAMPLEDB

INFO => The Optimizer Fix 29687220 is disabled by default for SAMPLEDB

INFO => The Optimizer Fix 30232638 is disabled by default for SAMPLEDB

INFO => The Optimizer Fix 29930457 is disabled by default for SAMPLEDB

INFO => The Optimizer Fix 29304314 is disabled by default for SAMPLEDB

INFO => The Optimizer Fix 28776431 is disabled by default for SAMPLEDB

INFO => Operational Best Practices

INFO => Database Consolidation Best Practices

INFO => Computer failure prevention best practices

INFO => Data corruption prevention best practices

INFO => Logical corruption prevention best practices

INFO => Database/Cluster/Site failure prevention best practices

INFO => Client failover operational best practices

WARNING => fast\_start\_mttr\_target should be greater than or equal to 300 on SAMPLEDB3 instance

WARNING => Oracle patch 26749785 is not applied on RDBMS\_HOME /u02/app/oracle/product/19.3.0/db\_1

WARNING => Oracle patch 29259068 is not applied on RDBMS\_HOME /u02/app/oracle/product/19.3.0/db\_1

INFO => The Optimizer Fix 30347410 is disabled by default for SAMPLEDB

INFO => The Optimizer Fix 27261477 is disabled by default for SAMPLEDB

FAIL => CSS disktimeout is not set to the default value of 400

INFO => Information about hanganalyze and systemstate dump

FAIL => Database control files are not configured as recommended for SAMPLEDB

WARNING => Redo log files should be appropriately sized for SAMPLEDB

FAIL => Table AUD$[FGA\_LOG$] should use Automatic Segment Space Management for SAMPLEDB

INFO => Database failure prevention best practices

FAIL => The bundle patch version installed does not match the bundle patch version registered in the database for SAMPLEDB

INFO => Parallel Execution Health-Checks and Diagnostics Reports for SAMPLEDB

INFO => Oracle recovery manager(rman) best practices

INFO => Database feature usage statistics for SAMPLEDB

WARNING => Consider investigating changes to the schema objects such as DDLs or new object creation for SAMPLEDB

WARNING => Consider increasing the value of the session\_cached\_cursors database parameter for SAMPLEDB

Best Practice checking completed. Checking recommended patches on hrmdc1oel06

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Collecting patch inventory on CRS\_HOME /u02/app/19.3.0/grid

Collecting patch inventory on ASM\_HOME /u02/app/19.3.0/grid

Collecting patch inventory on ORACLE\_HOME /u02/app/oracle/product/19.3.0/db\_1

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1 Recommended CRS patches for 190000 from /u02/app/19.3.0/grid on hrmdc1oel06

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Patch# CRS ASM RDBMS RDBMS\_HOME Patch-Description

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32576499yes yes yes /u02/app/oracle/product/19.3.0/db\_1

32576499yes yes yes /u02/app/oracle/product/19.3.0/db\_1

32576499yes yes yes /u02/app/oracle/product/19.3.0/db\_1

32576499yes yes yes /u02/app/oracle/product/19.3.0/db\_1

32576499yes yes yes /u02/app/oracle/product/19.3.0/db\_1

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1 Recommended RDBMS patches for 190000 from /u02/app/oracle/product/19.3.0/db\_1 on hrmdc1oel06

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Patch# RDBMS ASM type Patch-Description

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32576499yes yes merge

32576499yes yes merge

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Clusterware patches summary report

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Total patches Applied on CRS Applied on RDBMS Applied on ASM

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1 1 1 1

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RDBMS homes patches summary report

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Total patches Applied on RDBMS Applied on ASM ORACLE\_HOME

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1 1 1 /u02/app/oracle/product/19.3.0/db\_1

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CLUSTERWIDE CHECKS

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Detailed report (html) - /u02/app/grid/oracle.ahf/data/hrmdc1oel06/orachk/user\_root/output/orachk\_hrmdc1oel06\_SAMPLEDB\_082221\_121347/orachk\_hrmdc1oel06\_SAMPLEDB\_082221\_121347.html

UPLOAD [if required] - /u02/app/grid/oracle.ahf/data/hrmdc1oel06/orachk/user\_root/output/orachk\_hrmdc1oel06\_SAMPLEDB\_082221\_121347.zip

[root@hrmdc1oel06 ~]#