How to Restore ASM Based OCR After Complete Loss of the CRS Diskgroup on Linux/Unix Systems (Doc ID 1062983.1)

In this Document

APPLIES TO:

Oracle Database - Enterprise Edition - Version 11.2.0.1.0 and later
Information in this document applies to any platform.

GOAL

It is not possible to directly restore a manual or automatic OCR backup if the OCR is located in an ASM disk group. This is caused by the fact that the command 'ocrconfig -restore' requires ASM to be up & running in order to restore an OCR backup to an ASM disk group. However, for ASM to be available, the CRS stack must have been successfully started. For the restore to succeed, the OCR also must not be in use (r/w), i.e. no CRS daemon must be running while the OCR is being restored.

A description of the general procedure to restore the OCR can be found in the documentation, this document explains how to recover from a complete loss of the ASM disk group that held the OCR and Voting files in a 11gR2 Grid environment.

SOLUTION

When using an ASM disk group for CRS there are typically 3 different types of files located in the disk group that potentially need to be restored/recreated:

- the Oracle Cluster Registry file (OCR)
- the Voting file(s)
- the shared SPFILE for the ASM instances

The following example assumes that the OCR was located in a single disk group used exclusively for CRS. The disk group has just one disk using external redundancy.

Since the CRS disk group has been lost the CRS stack will not be available on any node.

The following settings used in the example would need to be replaced according to the actual configuration:

```
GRID user:                        oragrid
GRID home:                        /u01/app/11.2.0/grid ($CRS_HOME)
ASM disk group name for OCR:      CRS
ASM/ASMLIB disk name:             ASMD40
Linux device name for ASM disk:   /dev/sdh1
Cluster name:                     rac_cluster1
Nodes:                            racnode1, racnode2
```

This document assumes that the name of the OCR diskgroup remains unchanged, however there may be a need to use a different diskgroup name, in which case the name of the OCR diskgroup would have to be modified in /etc/oracle/ocr.loc across all nodes prior to executing the following steps.

1. Locate the latest automatic OCR backup

When using a non-shared CRS home, automatic OCR backups can be located on any node of the cluster, consequently all nodes need to be checked for the most recent backup:

```
$ ls -lrt $CRS_HOME/cdata/rac_cluster1/
-rw------- 1 root root 7331840 Mar 10 18:52 week.ocr
-rw------- 1 root root 7651328 Mar 26 01:33 week_.ocr
-rw------- 1 root root 7651328 Mar 29 01:33 day.ocr
-rw------- 1 root root 7651328 Mar 30 01:33 day_.ocr
-rw------- 1 root root 7651328 Mar 30 01:33 backup02.ocr
-rw------- 1 root root 7651328 Mar 30 05:33 backup01.ocr
-rw------- 1 root root 7651328 Mar 30 09:33 backup00.ocr
```

2. Make sure the Grid Infrastructure is shutdown on all nodes

Given that the OCR diskgroup is missing, the GI stack will not be functional on any node, however there may still be various daemon processes running. On each node shutdown the GI stack using the force (-f) option:

```
# $CRS_HOME/bin/crsctl stop crs -f
```

3. Start the CRS stack in exclusive mode

On the node that has the most recent OCR backup, log on as root and start CRS in exclusive mode, this mode will allow ASM to start & stay up without the presence of a Voting disk and without the CRS daemon process (crsd.bin) running.

11.2.0.1:

```
# $CRS_HOME/bin/crsctl start crs -excl
...
CRS-2672: Attempting to start 'ora.asm' on 'racnode1'
CRS-2676: Start of 'ora.asm' on 'racnode1' succeeded
CRS-2672: Attempting to start 'ora.crsd' on 'racnode1'
CRS-2676: Start of 'ora.crsd' on 'racnode1' succeeded
```

Please note:
This document assumes that the CRS diskgroup was completely lost, in which case the CRS daemon (resource ora.crsd) will terminate again due to the inaccessibility of the OCR - even if above message indicates that the start succeeded.
If this is not the case - i.e. if the CRS diskgroup is still present (but corrupt or incorrect) the CRS daemon needs to be shutdown manually using:

```
# $CRS_HOME/bin/crsctl stop res ora.crsd -init
```

otherwise the subsequent OCR restore will fail.

11.2.0.2 and above:

```
# $CRS_HOME/bin/crsctl start crs -excl -nocrs
CRS-4123: Oracle High Availability Services has been started.
...
CRS-2672: Attempting to start 'ora.cluster_interconnect.haip' on 'auw2k3'
CRS-2672: Attempting to start 'ora.ctssd' on 'racnode1'
CRS-2676: Start of 'ora.drivers.acfs' on 'racnode1' succeeded
CRS-2676: Start of 'ora.ctssd' on 'racnode1' succeeded
CRS-2676: Start of 'ora.cluster_interconnect.haip' on 'racnode1' succeeded
CRS-2672: Attempting to start 'ora.asm' on 'racnode1'
CRS-2676: Start of 'ora.asm' on 'racnode1' succeeded
```

IMPORTANT:
A new option '-**nocrs**' has been introduced with 11.2.0.2, which prevents the start of the ora.crsd resource. It is vital that this option is specified, otherwise the failure to start the ora.crsd resource will tear down ora.cluster_interconnect.haip, which in turn will cause ASM to crash.

4. Label the CRS disk for ASMLIB use

If using ASMLIB the disk to be used for the CRS disk group needs to stamped first, as user root do:

```
# /usr/sbin/oracleasm createdisk ASMD40 /dev/sdh1
Writing disk header: done
Instantiating disk: done
```

5. Create the CRS diskgroup via sqlplus

The disk group can now be (re-)created via sqlplus from the grid user. The *compatible.asm* attribute must be set to 11.2 in order for the disk group to be used by CRS:

```
$ sqlplus / as sysasm
SQL*Plus: Release 11.2.0.1.0 Production on Tue Mar 30 11:47:24 2010
Copyright (c) 1982, 2009, Oracle. All rights reserved.
Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - Production
With the Real Application Clusters and Automatic Storage Management options

SQL> create diskgroup CRS external redundancy disk 'ORCL:ASMD40' attribute
'COMPATIBLE.ASM' = '11.2';

Diskgroup created.
SQL> exit
```

6. Restore the latest OCR backup

Now that the CRS disk group is created & mounted the OCR can be restored - must be done as the root user:

```
# cd $CRS_HOME/cdata/rac_cluster1/
# $CRS_HOME/bin/ocrconfig -restore backup00.ocr
```

7. Start the CRS daemon on the current node (11.2.0.1 only !)

Now that the OCR has been restored the CRS daemon can be started, this is needed to recreate the Voting file. Skip this step for 11.2.0.2.0.

```
# $CRS_HOME/bin/crsctl start res ora.crsd -init
CRS-2672: Attempting to start 'ora.crsd' on 'racnode1'
CRS-2676: Start of 'ora.crsd' on 'racnode1' succeeded
```

8. Recreate the Voting file

The Voting file needs to be initialized in the CRS disk group:

```
# $CRS_HOME/bin/crsctl replace votedisk +CRS
Successful addition of voting disk 00caa5b9c0f54f3abf5bd2a2609f09a9.
Successfully replaced voting disk group with +CRS.
CRS-4266: Voting file(s) successfully replaced
```

9. Recreate the SPFILE for ASM (optional)

Please note:

Starting with 11gR2 ASM can start without a PFILE or SPFILE, so if you are
- not using an SPFILE for ASM
- not using a **shared** SPFILE for ASM
- using a shared SPFILE not stored in ASM (e.g. on cluster file system)
this step possibly should be skipped.

Also use extra care in regards to the **asm_diskstring** parameter as it impacts the discovery of the voting disks.

Please verify the previous settings using the ASM alert log.

Prepare a pfile (e.g. /tmp/asm_pfile.ora) with the ASM startup parameters - these may vary from the example below. If in doubt consult the ASM alert log as the ASM instance startup should list all non-default parameter values. Please note the last startup of ASM (in step 2 via CRS start) will not have used an SPFILE, so a startup prior to the loss of the CRS disk group would need to be located.

```
*.asm_power_limit=1
*.diagnostic_dest='/u01/app/oragrid'
*.instance_type='asm'
*.large_pool_size=12M
*.remote_login_passwordfile='EXCLUSIVE'
```

Now the SPFILE can be created using this PFILE:

```
$ sqlplus / as sysasm
SQL*Plus: Release 11.2.0.1.0 Production on Tue Mar 30 11:52:39 2010
Copyright (c) 1982, 2009, Oracle. All rights reserved.
```

```
Connected to:
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With the Real Application Clusters and Automatic Storage Management options

SQL> create spfile='+CRS' from pfile='/tmp/asm_pfile.ora';

File created.
SQL> exit
```

10. Shutdown CRS

Since CRS is running in exclusive mode, it needs to be shutdown to allow CRS to run on all nodes again. Use of the force (-f) option may be required:

```
# $CRS_HOME/bin/crsctl stop crs -f
...
CRS-2793: Shutdown of Oracle High Availability Services-managed resources on 'auw2k3' has
completed
CRS-4133: Oracle High Availability Services has been stopped.
```

11. Rescan ASM disks

If using ASMLIB rescan all ASM disks on each node as the root user:

```
# /usr/sbin/oracleasm scandisks
Reloading disk partitions: done
Cleaning any stale ASM disks...
Scanning system for ASM disks...
Instantiating disk "ASMD40"
```

12. Start CRS

As the root user submit the CRS startup on all cluster nodes:

```
# $CRS_HOME/bin/crsctl start crs
CRS-4123: Oracle High Availability Services has been started.
```

13. Verify CRS

To verify that CRS is fully functional again:

```
# $CRS_HOME/bin/crsctl check cluster -all
**************************************************************
racnode1:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
**************************************************************
racnode2:
CRS-4537: Cluster Ready Services is online
CRS-4529: Cluster Synchronization Services is online
CRS-4533: Event Manager is online
```

```
**************************************************************

# $CRS_HOME/bin/crsctl status resource -t
...
```

REFERENCES

BUG:10369477 - ASM STORAGE ERRORS ORA-01115 ORA-15081 ORA-15180 FREQUENTLY ON A 4-NODE RAC

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