

Oracle[®] Tutor[™]



Section 8 网格基础架构和 ASM (Grid Infrastructure and ASM)

1. Install Oracle Grid Infrastructure

配一下：`ORA_CRS_HOME=/u01/app/11.2.0/grid`

注意该包：`oracleasm-lib-2.0.4-1.el5.i386.rpm`，如果有 `oracleasm-discover` 这个命令就有该包。有了该包就可以配路径“`ORCL:VOL*`”。

```
oracleasm-discover
```

```
service oracleasm restart
```

在执行 `root.sh` 前，两个节点都务必要配置 `/etc/sysconfig/network-scripts/ifcfg-eth0:*` 都要 `ifup eth*`,VIP 的，但是不能启动 SCAN 的！！，最好 `echo "ifup eth0:1">> /etc/rc.d/rc.local`

如果装错：`/u01/app/11.2.0/grid/crs/install/rootcrs.pl -deconfig`

安装 grid infrastructure 最后一步检查在虚拟机和某些系统上 `ntp` 会莫名其妙报错，不用管它，这是个 bug 参见：ID 1384298.1。

ASM created and started successfully.

Disk Group DATA created successfully.

```

clscfg: -install mode specified
Successfully accumulated necessary OCR keys.
Creating OCR keys for user 'root', privgrp 'root'..
Operation successful.
CRS-4256: Updating the profile
Successful addition of voting disk a24cd043478b4fdbbfa4380016e445c0.
Successfully replaced voting disk group with +DATA.
CRS-4256: Updating the profile
CRS-4266: Voting file(s) successfully replaced
## STATE   File Universal Id               File Name Disk group
--  -----  -
1. ONLINE  a24cd043478b4fdbbfa4380016e445c0 (ORCL:VOL1) [DATA]
Located 1 voting disk(s).
CRS-2672: Attempting to start 'ora.asm' on 'station31'
CRS-2676: Start of 'ora.asm' on 'station31' succeeded
CRS-2672: Attempting to start 'ora.DATA.dg' on 'station31'
CRS-2676: Start of 'ora.DATA.dg' on 'station31' succeeded
PRCR-1079 : Failed to start resource ora.scan2.vip
CRS-5017: The resource action "ora.scan2.vip start" encountered the following error:
CRS-5005: IP Address: 192.168.0.132 is already in use in the network
. For details refer to "(:CLSN00107:)" in
"/u01/app/11.2.0/grid/log/station31/agent/crsd/orarootagent_root/orarootagent_root.lo
g".

CRS-2674: Start of 'ora.scan2.vip' on 'station31' failed
CRS-2632: There are no more servers to try to place resource 'ora.scan2.vip' on that would
satisfy its placement policy

start scan ... failed
FirstNode configuration failed at /u01/app/11.2.0/grid/crs/install/crsconfig_lib.pm line
9196.
/u01/app/11.2.0/grid/perl/bin/perl -I/u01/app/11.2.0/grid/perl/lib
-I/u01/app/11.2.0/grid/crs/install /u01/app/11.2.0/grid/crs/install/rootcrs.pl execution
failed
[root@station31 CVU_11.2.0.3.0_grid]# /u01/app/11.2.0/grid/crs/
auth/  demo/  install/ log/  profile/ sbs/  template/ utl/
config/ init/  lib/  msg/  public/  script/  trace/
[root@station31 CVU_11.2.0.3.0_grid]# /u01/app/11.2.0/grid/crs/in
init/  install/
[root@station31 CVU_11.2.0.3.0_grid]# /u01/app/11.2.0/grid/crs/in
init/  install/
[root@station31 CVU_11.2.0.3.0_grid]# /u01/app/11.2.0/grid/crs/install/
cmdllroot.sh          crspatch.pm          oraacfs.pm

```

```

s_crsconfig_defs
crsconfig_addparams.sbs      hasdconfig.pl              oracss.pm
s_crsconfig_lib.pm
crsconfig_lib.pm            install.excl               preupdate.sh
s_crsconfig_station31_env.txt
crsconfig_params            install.incl               rootcrs.pl
crsconfig_params.sbs        installRemove.excl        roothas.pl
crsdelete.pm                onsconfig                  rootofs.sh
[root@station31 CVU_11.2.0.3.0_grid]# /u01/app/11.2.0/grid/crs/install/rootcrs.pl
-deconfig
Using configuration parameter file: /u01/app/11.2.0/grid/crs/install/crsconfig_params
Network exists: 1/192.168.0.0/255.255.255.0/eth0, type static
VIP exists: /station31-vip/192.168.0.231/192.168.0.0/255.255.255.0/eth0, hosting
node station31
GSD exists
ONS exists: Local port 6100, remote port 6200, EM port 2016
PRCR-1014 : Failed to stop resource ora.net1.network
PRCR-1065 : Failed to stop resource ora.net1.network
CRS-2529: Unable to act on 'ora.net1.network' because that would require stopping or
relocating 'ora.scan1.vip', but the force option was not specified

CRS-2791: Starting shutdown of Oracle High Availability Services-managed resources on
'station31'
CRS-2673: Attempting to stop 'ora.crsd' on 'station31'
CRS-2790: Starting shutdown of Cluster Ready Services-managed resources on 'station31'
CRS-2673: Attempting to stop 'ora.scan1.vip' on 'station31'
CRS-2673: Attempting to stop 'ora.scan3.vip' on 'station31'
CRS-2673: Attempting to stop 'ora.DATA.dg' on 'station31'
CRS-2677: Stop of 'ora.scan3.vip' on 'station31' succeeded
CRS-2677: Stop of 'ora.scan1.vip' on 'station31' succeeded
CRS-2677: Stop of 'ora.DATA.dg' on 'station31' succeeded
CRS-2673: Attempting to stop 'ora.asm' on 'station31'
CRS-2677: Stop of 'ora.asm' on 'station31' succeeded
CRS-2673: Attempting to stop 'ora.net1.network' on 'station31'
CRS-2677: Stop of 'ora.net1.network' on 'station31' succeeded
CRS-2792: Shutdown of Cluster Ready Services-managed resources on 'station31' has
completed
CRS-2677: Stop of 'ora.crsd' on 'station31' succeeded
CRS-2673: Attempting to stop 'ora.crf' on 'station31'
CRS-2673: Attempting to stop 'ora.ctssd' on 'station31'
CRS-2673: Attempting to stop 'ora.evmd' on 'station31'
CRS-2673: Attempting to stop 'ora.asm' on 'station31'
CRS-2673: Attempting to stop 'ora.mdnsd' on 'station31'
CRS-2673: Attempting to stop 'ora.drivers.acfs' on 'station31'

```

CRS-2677: Stop of 'ora.crf' on 'station31' succeeded
CRS-2677: Stop of 'ora.mdnsd' on 'station31' succeeded
CRS-2677: Stop of 'ora.evmd' on 'station31' succeeded
CRS-2677: Stop of 'ora.ctssd' on 'station31' succeeded
CRS-2677: Stop of 'ora.asm' on 'station31' succeeded
CRS-2673: Attempting to stop 'ora.cluster_interconnect.haip' on 'station31'
CRS-2677: Stop of 'ora.cluster_interconnect.haip' on 'station31' succeeded
CRS-2673: Attempting to stop 'ora.cssd' on 'station31'
CRS-2677: Stop of 'ora.cssd' on 'station31' succeeded
CRS-2673: Attempting to stop 'ora.gipcd' on 'station31'
CRS-2677: Stop of 'ora.drivers.acfs' on 'station31' succeeded
CRS-2677: Stop of 'ora.gipcd' on 'station31' succeeded
CRS-2673: Attempting to stop 'ora.gpnpd' on 'station31'
CRS-2677: Stop of 'ora.gpnpd' on 'station31' succeeded
CRS-2793: Shutdown of Oracle High Availability Services-managed resources on 'station31' has completed
CRS-4133: Oracle High Availability Services has been stopped.
Successfully deconfigured Oracle clusterware stack on this node
You have new mail in /var/spool/mail/root
[root@station31 CVU_11.2.0.3.0_grid]# /u01/app/11.2.0/grid/root.sh
Performing root user operation for Oracle 11g

The following environment variables are set as:

ORACLE_OWNER= grid
ORACLE_HOME= /u01/app/11.2.0/grid

Enter the full pathname of the local bin directory: [/usr/local/bin]:
The contents of "dbhome" have not changed. No need to overwrite.
The contents of "oraenv" have not changed. No need to overwrite.
The contents of "coraenv" have not changed. No need to overwrite.

Entries will be added to the /etc/oratab file as needed by
Database Configuration Assistant when a database is created
Finished running generic part of root script.
Now product-specific root actions will be performed.
Using configuration parameter file: /u01/app/11.2.0/grid/crs/install/crsconfig_params
User ignored Prerequisites during installation
OLR initialization - successful
Adding Clusterware entries to inittab
CRS-2672: Attempting to start 'ora.mdnsd' on 'station31'
CRS-2676: Start of 'ora.mdnsd' on 'station31' succeeded
CRS-2672: Attempting to start 'ora.gpnpd' on 'station31'
CRS-2676: Start of 'ora.gpnpd' on 'station31' succeeded
CRS-2672: Attempting to start 'ora.cssdmonitor' on 'station31'

CRS-2672: Attempting to start 'ora.gipcd' on 'station31'
CRS-2676: Start of 'ora.cssdmonitor' on 'station31' succeeded
CRS-2676: Start of 'ora.gipcd' on 'station31' succeeded
CRS-2672: Attempting to start 'ora.cssd' on 'station31'
CRS-2672: Attempting to start 'ora.diskmon' on 'station31'
CRS-2676: Start of 'ora.diskmon' on 'station31' succeeded
CRS-2676: Start of 'ora.cssd' on 'station31' succeeded
PRCS-1037 : Single Client Access Name VIPs already exist
PRCS-1028 : Single Client Access Name listeners already exist
OC4J could not be created as it already exists
PRCR-1086 : resource ora.oc4j is already registered
PRCR-1086 : resource ora.cvu is already registered
PRCC-1014 : scan1 was already running
PRCR-1004 : Resource ora.scan1.vip is already running
PRCR-1079 : Failed to start resource ora.scan1.vip
CRS-5702: Resource 'ora.scan1.vip' is already running on 'station31'
PRCC-1014 : scan2 was already running
PRCR-1004 : Resource ora.scan2.vip is already running
PRCR-1079 : Failed to start resource ora.scan2.vip
CRS-5702: Resource 'ora.scan2.vip' is already running on 'station31'
PRCC-1014 : scan3 was already running
PRCR-1004 : Resource ora.scan3.vip is already running
PRCR-1079 : Failed to start resource ora.scan3.vip
CRS-5702: Resource 'ora.scan3.vip' is already running on 'station31'

Preparing packages for installation...

cvuqdisk-1.0.9-1

Configure Oracle Grid Infrastructure for a Cluster ... succeeded

[root@station31 CVU_11.2.0.3.0_grid]#

2.Create ASM Disk Groups

compatible.asm=11.2

compatible.rdbms=11.2

compatible.advm 11.2

disk_repair_time=5m

```
create diskgroup mydg external redundancy  
disk 'ORCL:VOL10'  
quorum disk 'ORCL:VOL11'  
attribute 'compatible.asm'='11.2';
```

```
alter system set asm_preferred_read_failure_groups='data.vol1' sid='+ASM1';
```

```
alter system set asm_preferred_read_failure_groups='data.vol2' sid='+ASM2';
```

```
alter diskgroup data offline disk mydg drop after 1h;
```

关于 oracle asm 添加磁盘组时

ORA-15014 : path '/dev/xxx ' is not in the discovery set 问题

从报错信息中看出 当前处于正常 MOUNTED 状态的磁盘组 DATA 中第一块磁盘 ASMDISK01 路径是 'ORCL:ASMDISK01'

并不是 /dev/oracleasm/disks/ASMDISK01

于是使用此路径添加

```
ASMCMD> mkgd <dg name="DATA01" redundancy="external"><dsk string="ORCL:ASMDISK05" /><dsk string="ORCL:ASMDISK06" /></dg>
```

无报错信息，添加后 lsdg 查看 ASM 磁盘组 新磁盘组 DATA01 已创建成功

```
ASMCMD> lsdg
```

State	Type	Rebal	Sector	Block	AU	Total_MB	Free_MB	Req_mir_free_MB
MOUNTED	NORMAL	N	512	4096	1048576	20456	16176	5114
5531	0	N	DATA/					
MOUNTED	EXTERN	N	512	4096	1048576	2038	1986	0
1986	0	N	DATA01/					

```
ASMCMD>
```

关于 PATH 问题，在 v\$asm_disk 数据字典中可查

```
sys@+ASM>select path from v$asm_disk;
```

```
PATH
```

```
-----  
ORCL:ASMDISK01
```

```
ORCL:ASMDISK02
```

```
ORCL:ASMDISK03
```

```
ORCL:ASMDISK04
```

```
ORCL:ASMDISK05
```

```
ORCL:ASMDISK06
```

```
6 rows selected.
```

实验环境是 Oracle Linux 5.4，在安装 ASM 组件时，曾安装 oracleasm lib

```
[root@OL54.damon.net:/root]$ rpm -qa | grep asm
```

```
oracleasm lib-2.0.4-1.el5
```

```
oracleasm-support-2.1.8-1.el5
```

```
oracleasm-2.6.18-164.el5-2.0.5-1.el5
```

查询 ORACLE 11G 官方文档

在【Administering Oracle ASM Disk Groups】中，See Also，有关于 ASMLib 的链接：

<http://www.oracle.com/technetwork/topics/linux/asmlib/index-101839.html>

Contents

- Oracle Automatic Storage Management
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 - Administering Oracle ASM Files, Directories, and Templates
 - Performing Oracle ASM Data Migration with

for the Oracle ASM disks and failure groups are not explicitly specified. This example assumes that disk1 through disk9 are present in the /dev/

Example 4-2 Creating the FRA disk group

```
CREATE DISKGROUP fra NORMAL REDUNDANCY
DISK '/dev/ces/disk*' ;
```

See Also:
For information about using ASMLib when creating disk groups, refer to the Oracle ASMLib page on the Oracle Technology Network Web site at <http://www.oracle.com/technetwork/topics/linux/asmlib/index-101839.html>

Creating Disk Groups for a New Oracle Installation

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Oracle ASMLib

ASMLib is an optional support library for the Automatic Storage Management feature of the Oracle Database. Automatic Storage Management (ASM) simplifies database administration and greatly reduces kernel resource usage (e.g. the number of open file descriptors). It eliminates the need for the DBA to directly manage potentially thousands of Oracle database files, requiring only the management of groups of disks allocated to the Oracle Database. ASMLib allows an Oracle Database using ASM more efficient and capable access to the disk groups it is using.

ASMLib in the Unbreakable Enterprise Kernel

The Oracle ASMLib kernel driver is now included in the [Unbreakable Enterprise Kernel](#). No driver package needs to be installed when using this kernel. The `oracleasm-support` and `oracleasm-lib` packages still need to be installed from ULN.

Technical Information

Asmlib (Wim Coekaerts Blog)	[05-Jul-2012]
Tips on Installing and Using the Software	[08-Oct-2010]
Driver Matrix for Linux 2.4 and 2.6 Kernels	[29-Apr-2005]
Getting Oracle ASMLib via the Unbreakable Linux Network	[08-Oct-2010]
Automatically Selecting the Correct Oracle ASMLib Driver	[08-Oct-2008]
Note on Installing with 10g R1	[29-Apr-2005]
Migrating Raw Devices to ASMLib	[19-Apr-2005]
Configuring Oracle ASMLib on Multipath Disks	[29-Apr-2005]
Device Persistence and Oracle Linux ASMLib	[04-Oct-2006]
Note on using ASMLib with EL4 Paravirtualized Guests	[13-Feb-2009]

在【Tips on Installing and using the software】中，有关于 discovery strings 的介绍
<http://www.oracle.com/technetwork/server-storage/linux/install-082632.html>

<http://www.oracle.com/technetwork/server-storage/linux/install-082632.html>

Discovery Strings for Linux ASMLib

ASMLib uses discovery strings to determine what disks ASM is asking for. The generic Linux ASMLib uses glob strings. The string must be prefixed with "ORCL:". Disks are specified by name. A disk created with the name "VOL1" can be discovered in ASM via the discovery string "ORCL:VOL1". Similarly, all disks that start with the string "VOL" can be queried with the discovery string "ORCL:VOL*".

Disks cannot be discovered with path names in the discovery string. If the prefix is missing, the generic Linux ASMLib will ignore the discovery string completely, expecting that it is intended for a different ASMLib. The only exception is the empty string (""), which is considered a full wildcard. This is precisely equivalent to the discovery string "ORCL:*".

generic:一般的

be prefixed with : 以 xxx 作为前缀

从以上信息可以看出，ASMLib 使用发现字符串来判断 ASM 正在请求什么磁盘，而一般的 linux ASMLib，使用 glob 字符串作为 discovery strings。这些字符串必须以"ORCL:"作为前缀。

<https://blogs.oracle.com/wim/entry/asmlib>

- Oracle ASM does **not** in any way require ASMLib to function completely. ASMLib is a small set of extensions, in particular to make device management easier but there are no extra features exposed through Oracle ASM with ASMLib enabled or disabled. Often customers confuse ASMLib with ASM. again, ASM exists on every Oracle supported OS and on every supported Linux OS, SLES, RHEL, OL **without**ASMLib
- Oracle ASMLib userspace is available for OTN and the kernel module is shipped along with OL/UEK for every build and by SuSE for SLES for every of their builds
- ASMLib kernel module was built by us for RHEL4 and RHEL5 but we do not build it for RHEL6, nor for the OL6 RHCK kernel. Only for UEK
- ASMLib for Linux is/was a reference implementation for **any** third party vendor to be able to offer, if they want to, their own version for their own OS or storage
- ASMLib as provided by Oracle for Linux continues to be enhanced and evolve and for the kernel module we use UEK as the base OS kernel

3.Create and manage as ASM instance

4.Implement ASM failure groups

5.Creating ACFS File System

```
ASMCMD> volinfo -a
```

```
acfsutil registry -a /dev/asm/testvol-294 /u01/app/grid/acfsmounts/mydg_testvol
```

```
acfsutil snap create testsnap /u01/app/grid/acfsmounts/mydg_testvol
```

```
acfsutil snap info /u01/app/grid/acfsmounts/mydg_testvol
```

```
acfsutil snap delete testsnap /u01/app/grid/acfsmounts/mydg_testvol
```

6.Start, stop, configure and administer Oracle Grid Infrastructure

```
ocrcheck -local  
ocrdump -local -stdout  
ocrconfig -local -manualbackup  
运行下面的命令显示备份：
```

```
[grid@rac01 ~]$ ocrconfig -showbackup  
rac01 2011/01/08 17:54:51 /u01/grid/11.2.0/cdata/rac/backup00.ocr  
rac01 2011/01/08 13:54:49 /u01/grid/11.2.0/cdata/rac/backup01.ocr  
rac02 2011/01/08 06:34:46 /u01/grid/11.2.0/cdata/rac/backup02.ocr  
rac01 2011/01/07 02:15:37 /u01/grid/11.2.0/cdata/rac/day.ocr  
rac01 2011/01/02 07:51:43 /u01/grid/11.2.0/cdata/rac/week.ocr  
PROT-25: Manual backups for the Oracle Cluster Registry are not available
```

当 Oracle Clusterware 起来的时候，在一个节点上运行 ocrconfig -manualbackup 命令

```
[grid@rac01 ~]$ ocrconfig -manualbackup  
在 /u01/grid/11.2.0/cdata/rac/day.ocr 下生成备份文件 backup_20100112_141900.ocr
```

然后使用 \$ ocrconfig -showbackup 可以查看到备份信息。

运行下面的命令检验备份文件内容及完整性。

```
$ ocrdump -backupfile backup_file_name  
ocrconfig -replace current_OCR_location -replacement new_OCR_location  
ocrconfig -add +new_storage_disk_group  
ocrconfig -delete +current_disk_group
```

OCR 恢复步骤：1)、关闭运行在集群数据库的所有节点上的 CRS 服务程序
/etc/init.d/init.crs stop 2)、通过 ocrconfig 的 showbackup 选项查看最近的备份 ocrconfig
-showbackup 3)、通过 ocrconfig 的 restore 或 import 选项导入 OCR 数据 ocrconfig -restore
filename_location ocrconfig -import filename_location 4)、在所有节点上重新启动 CRS
/etc/init.d/init.crs start

7.Use Grid Infrastructure to manage oracle databases and other resources

restart 陷阱很多

```
srvctl start service -d PROD1 -s "service1,service2"  
srvctl start diskgroup -g "DATA,FRA"  
srvctl config database -d PROD1  
srvctl add listener -l MYLISTENER -p TCP:1526 -o /u01/app/oracle/product/11.2.0/grid  
srvctl setenv listener -l MYLISTENER -t  
TNS_ADMIN=/u01/app/oracle/product/11.2.0/dbhome_1
```