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：oracleasmlib-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 会莫名奇妙报错，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/   mesg/   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> mkdg <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
Usable_file_MB Offline_disks Voting_files Name
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 oracleasmlib
[root@OL54.damon.net:/root]$ rpm -qa | grep asm
oracleasmlib-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

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

Example 4-2 Creating the FRA disk group

```
CREATE DISKGROUP fra NORMAL REDUNDANCY
   DISK '/devices/diskc*';
```

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

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

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。

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
```