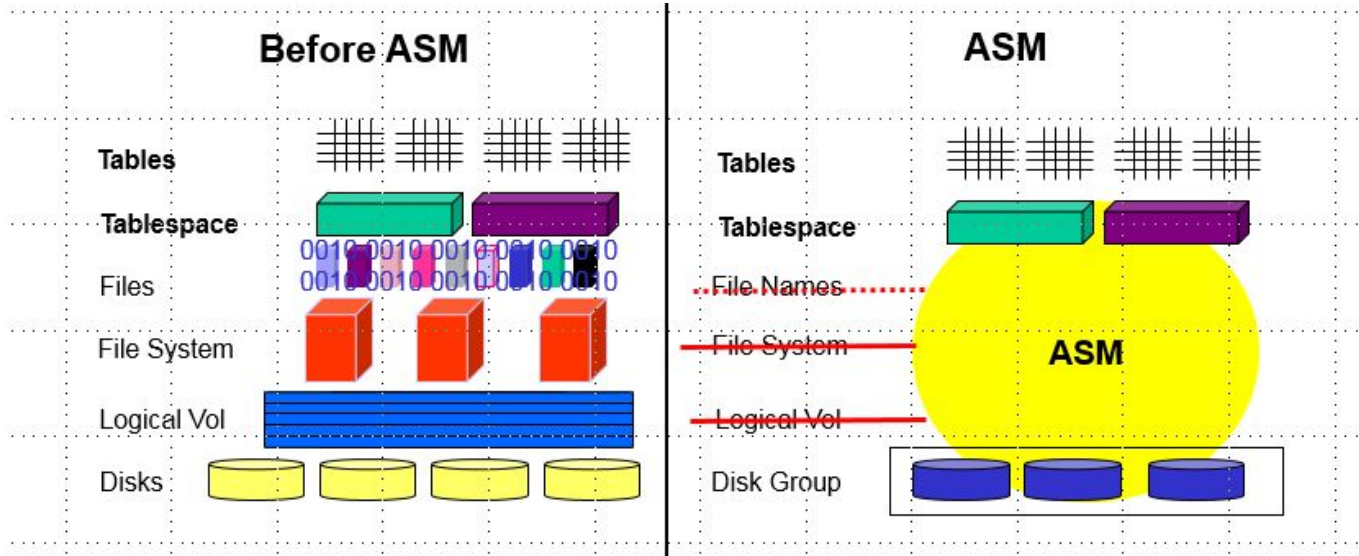


Oracle 11g R2에서 ASM 사용하기

ASM(Automatic Storage Management)이란 클러스터를 지원하는 논리 볼륨 관리자(LVM)이며, 오라클에서 파일들이 저장되는 Storage를 직접 관리하는 방식이다. 오라클의 물리적 데이터베이스 구조를 저장하기 위해 사용된다. File System 과 Raw Device의 장점만을 결합한 방식으로, 데이터를 저장하거나 불러오는 원리는 File system과 비슷하지만, OS가 아닌 ASM에게 요청하는 부분에서 차이가 난다.

File System	OS를 통하여 데이터를 저장하고 관리하는 방식으로 사용자가 관리하기는 쉽지만, OS 성능에 따라 오라클 성능에 영향을 받는다
Raw Device	오라클에서 직접 storage에 데이터를 저장하는 방식이다. OS를 거치지 않고 Application이 직접 디스크에 I/O를 발생한다. 성능은 File System보다 좋으나 관리하기가 어렵고 불편하다.



ASM Architecture : Logical volume / 파일시스템 / 그리고 오라클 데이터파일에 대한 개념이 ASM에 의해 제거되었다.

★ 특징

- 1) 효율적 디스크 관리
 - 디스크추가/삭제 보다 쉽게할수 있다.(정확히는 디스크 추가후 파일 재배치작업)
 - 관리자가 ASM 디스크 그룹에 새로운 디스크를 추가하거나 제거하기만 하면
 - ASM에서 자동으로 Rebalancing 작업을 해준다.
- 2) 디스크 I/O의 효과적 분산
 - 기존 방식은 디스크가 교체되거나 추가되면 데이터가 균등하게 분산되지 못하고 한쪽으로 쏠리는 현상이 발생
 - ASM은 AU(Allocation Unit) 이란 단위로 나누어서 서로 다른 디스크에 균등하게 분산시켜 저장함.

1) ASM 사전 세팅

ASM과 클러스터를 사용하기 위해 grid 디렉토리 path를 환경변수에 추가해준다.

```
[root@host1 ~]# vi /home/oracle/.bash_profile

# .bash_profile

# Get the aliases and functions
if [ -f ~/.bashrc ]; then
    . ~/.bashrc
fi

# User specific environment and startup programs

PATH=$PATH:$HOME/bin

export PATH

# Oracle Settings
export ORACLE_BASE=/u01/app/oracle
export ORACLE_HOME=/u01/app/oracle/product/11.2.0.3/dbhome_1
export GRID_HOME=/u01/app/oracle/product/11.2.0.3/grid
export PATH=$ORACLE_HOME/bin:$GRID_HOME/bin:$PATH
export ORACLE_SID=PROD
export PS1="[ \echo \$ORACLE_SID \ '@\h W]\$ "
unset LANG

[root@host01 ~]# mkdir -p /u01/app/oracle
[root@host01 ~]# chown -R oracle:oinstall /u01
[root@host01 ~]# chmod -R 775 /u01
```

ASM을 설정한다.

```
[root@host1 ~]# rpm -qa oracleasm*
oracleasm-2.6.18-164.el5-2.0.5-1.el5
oracleasm-lib-2.0.4-1.el5
oracleasm-support-2.1.8-1.el5

※ 만약 없다면 설치한다.
[root@host1 ~]# cd /mnt/hgfs/share

[root@host1 share]# ls
enterprise-r5-u4-server-x86_64-dvd.iso  p10404530_112030_linux-x86-64_1of7.zip
linuxamd64_12102_database_1of2.zip      p10404530_112030_linux-x86-64_2of7.zip
linuxamd64_12102_database_2of2.zip      p10404530_112030_linux-x86-64_3of7.zip
linuxamd64_12102_grid_1of2.zip          rpm.tar.gz
linuxamd64_12102_grid_2of2.zip

[root@host1 share]# tar xvzf rpm.tar.gz

[root@host1 share]# cd rpm
[root@host1 rpm]# rpm -Uvh oracleasm*
[root@host1 rpm]# rpm -Uvh cvuqdisk*
[root@host1 rpm]# rpm -Uvh flash-player-npapi*
```

커널 설정값 확인

```
[root@host1 ~]# cat /etc/sysctl.conf
# for Oracle Database 11gR2
fs.suid_dumpable = 1
fs.aio-max-nr = 1048576
fs.file-max = 6815744
kernel.shmall = 2097152
kernel.shmmax = 4294967295
kernel.shmmni = 4096
kernel.sem = 250 32000 100 128
net.ipv4.ip_local_port_range = 9000 65500
net.core.rmem_default = 262144
net.core.rmem_max = 4194304
net.core.wmem_default = 262144
net.core.wmem_max = 1048576

[root@host1 ~]# cat /etc/security/limits.conf
# End of file
oracle soft nproc 2047
oracle hard nproc 16384
oracle soft nofile 4096
oracle hard nofile 65536
oracle soft stack 10240

[root@host1 ~]# cat /etc/hosts
# Do not remove the following line, or various programs
# that require network functionality will fail.
127.0.0.1          host1 localhost.localdomain localhost
::1               localhost6.localdomain6 localhost6
192.168.100.111   host01
```

ASM을 사용하기 위한 디렉토리를 생성하고, 폴더 소유권과 권한을 변경한다.

```
[root@host1 ~]# mkdir -p /u02/asmdisks
[root@host1 ~]# chown -R oracle:oinstall /u02/asmdisks
[root@host1 ~]# chmod 666 /u02/asmdisks
[root@host1 ~]# cd /u02/asmdisks
```

블록단위로 파일을 복사한 후 권한을 주고 환경변수를 수정한다.

```
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_01 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_02 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_03 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_04 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_05 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_06 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_07 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_08 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_09 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_10 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_11 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_12 bs=1024k count=2304
[root@host01 asmdisks]# dd if=/dev/zero of=_file_disk_13 bs=1024k count=2304

[root@host1 ~]# chmod 666 _file_disk*
```

```
[root@host01 asmdisks]# vi /etc/modprobe.conf
```

```
alias eth0 e1000
alias scsi_hostadapter mptbase
alias scsi_hostadapter1 mptspi
alias scsi_hostadapter2 ata_piix
alias snd-card-0 snd-ens1371
options snd-card-0 index=0
options snd-ens1371 index=0
remove snd-ens1371 { /usr/sbin/alsactl store 0 >/dev/null 2>&1 || : ; } /sbin/modprobe -r --ignore-remove
snd-ens1371
options loop max_loop=32
```

데몬 설정

```
[root@host1 ~]# cat >> /etc/rc5.d/S91ora_start <<EOF
> !/bin/bash
>
> description: Start Oracle ASM Disk after reboots
su - root -c '/sbin/modprobe loop'
su - root -c 'losetup /dev/loop1 /u02/asmdisks/_file_disk_01'
su - root -c 'losetup /dev/loop2 /u02/asmdisks/_file_disk_02'
su - root -c 'losetup /dev/loop3 /u02/asmdisks/_file_disk_03'
su - root -c 'losetup /dev/loop4 /u02/asmdisks/_file_disk_04'
su - root -c 'losetup /dev/loop5 /u02/asmdisks/_file_disk_05'
su - root -c 'losetup /dev/loop6 /u02/asmdisks/_file_disk_06'
su - root -c 'losetup /dev/loop7 /u02/asmdisks/_file_disk_07'
su - root -c 'losetup /dev/loop8 /u02/asmdisks/_file_disk_08'
su - root -c 'losetup /dev/loop9 /u02/asmdisks/_file_disk_09'
su - root -c 'losetup /dev/loop10 /u02/asmdisks/_file_disk_10'
su - root -c 'losetup /dev/loop11 /u02/asmdisks/_file_disk_11'
su - root -c 'losetup /dev/loop12 /u02/asmdisks/_file_disk_12'
su - root -c 'losetup /dev/loop13 /u02/asmdisks/_file_disk_13'
su - root -c 'ln -s /dev/loop1 /dev/xvdb'
su - root -c 'ln -s /dev/loop2 /dev/xvdc'
su - root -c 'ln -s /dev/loop3 /dev/xvdd'
su - root -c 'ln -s /dev/loop4 /dev/xvde'
su - root -c 'ln -s /dev/loop5 /dev/xvdf'
su - root -c 'ln -s /dev/loop6 /dev/xvdg'
su - root -c 'ln -s /dev/loop7 /dev/xvdh'
su - root -c 'ln -s /dev/loop8 /dev/xvdi'
su - root -c 'ln -s /dev/loop9 /dev/xvdj'
su - root -c 'ln -s /dev/loop10 /dev/xvdk'
su - root -c 'ln -s /dev/loop11 /dev/xvdl'
su - root -c 'ln -s /dev/loop12 /dev/xvdm'
su - root -c 'ln -s /dev/loop13 /dev/xvdm'
su - root -c 'chmod 666 /dev/loop1'
su - root -c 'chmod 666 /dev/loop2'
su - root -c 'chmod 666 /dev/loop3'
su - root -c 'chmod 666 /dev/loop4'
su - root -c 'chmod 666 /dev/loop5'
su - root -c 'chmod 666 /dev/loop6'
su - root -c 'chmod 666 /dev/loop7'
su - root -c 'chmod 666 /dev/loop8'
su - root -c 'chmod 666 /dev/loop9'
su - root -c 'chmod 666 /dev/loop10'
```

```

su - root -c 'chmod 666 /dev/loop11'
su - root -c 'chmod 666 /dev/loop12'
su - root -c 'chmod 666 /dev/loop13'
su - root -c 'chown oracle:oinstall /dev/loop1'
su - root -c 'chown oracle:oinstall /dev/loop2'
su - root -c 'chown oracle:oinstall /dev/loop3'
su - root -c 'chown oracle:oinstall /dev/loop4'
su - root -c 'chown oracle:oinstall /dev/loop5'
su - root -c 'chown oracle:oinstall /dev/loop6'
su - root -c 'chown oracle:oinstall /dev/loop7'
su - root -c 'chown oracle:oinstall /dev/loop8'
su - root -c 'chown oracle:oinstall /dev/loop9'
su - root -c 'chown oracle:oinstall /dev/loop10'
su - root -c 'chown oracle:oinstall /dev/loop11'
su - root -c 'chown oracle:oinstall /dev/loop12'
su - root -c 'chown oracle:oinstall /dev/loop13'
su - root -c 'oracleasm scandisks'
> EOF

[root@host01 asmdisks]# chmod 777 /etc/rc5.d/S91ora_start
[root@host01 asmdisks]# reboot

```

위치 정보 확인

```

[root@host1 ~]# ls -l /dev/xv*
lrwxrwxrwx 1 root root 10 Jul 17 13:26 /dev/xvdb -> /dev/loop1
lrwxrwxrwx 1 root root 10 Jul 17 13:26 /dev/xvdc -> /dev/loop2
lrwxrwxrwx 1 root root 10 Jul 17 13:26 /dev/xvdd -> /dev/loop3
lrwxrwxrwx 1 root root 10 Jul 17 13:26 /dev/xvde -> /dev/loop4
lrwxrwxrwx 1 root root 10 Jul 17 13:26 /dev/xvdf -> /dev/loop5
lrwxrwxrwx 1 root root 10 Jul 17 13:26 /dev/xvdg -> /dev/loop6
lrwxrwxrwx 1 root root 10 Jul 17 13:26 /dev/xvdh -> /dev/loop7
lrwxrwxrwx 1 root root 10 Jul 17 13:26 /dev/xvdi -> /dev/loop8
lrwxrwxrwx 1 root root 10 Jul 17 13:26 /dev/xvdj -> /dev/loop9
lrwxrwxrwx 1 root root 11 Jul 17 13:26 /dev/xvdk -> /dev/loop10
lrwxrwxrwx 1 root root 11 Jul 17 13:26 /dev/xvdl -> /dev/loop11
lrwxrwxrwx 1 root root 11 Jul 17 13:26 /dev/xvdm -> /dev/loop12
lrwxrwxrwx 1 root root 11 Jul 17 13:26 /dev/xvdn -> /dev/loop13

```

oracleasm 설정하기

```

[root@host1 ~]# oracleasm configure -i
Configuring the Oracle ASM library driver.

```

This will configure the on-boot properties of the Oracle ASM library driver. The following questions will determine whether the driver is loaded on boot and what permissions it will have. The current values will be shown in brackets ('[]'). Hitting <ENTER> without typing an answer will keep that current value. Ctrl-C will abort.

```

Default user to own the driver interface []: oracle
Default group to own the driver interface []: asmadmin
Start Oracle ASM library driver on boot (y/n) [n]: y
Scan for Oracle ASM disks on boot (y/n) [y]: y
Writing Oracle ASM library driver configuration: done

```

※ oracleasm 드라이버 끄기

```
[root@host1 ~]# oracleasm exit
```

※ oracleasm 구성한대로 초기설정

```
[root@host1 ~]# oracleasm init
```

Creating /dev/oracleasm mount point: /dev/oracleasm

Loading module "oracleasm": oracleasm

Mounting ASMLib driver filesystem: /dev/oracleasm

※ oracleasm 상태보기

```
[root@host1 ~]# oracleasm status
```

Checking if ASM is loaded: yes

Checking if /dev/oracleasm is mounted: yes

※ ASM에서 사용할 디스크 생성

```
[root@host1 ~]# oracleasm createdisk ASMDISK01 /dev/xvdb
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK02 /dev/xvdc
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK03 /dev/xvdd
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK04 /dev/xvde
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK05 /dev/xvdf
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK06 /dev/xvdg
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK07 /dev/xvdh
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK08 /dev/xvdi
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK09 /dev/xvdj
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK10 /dev/xvdk
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK11 /dev/xvdl
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK12 /dev/xvdm
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK13 /dev/xvdn
```

Writing disk header: done

Instantiating disk: done

※ 디스크 목록 스캔

```
[root@host1 ~]# oracleasm scandisks
```

Reloading disk partitions: done

Cleaning any stale ASM disks...

Scanning system for ASM disks...

※ 디스크 목록 조회

```
[root@host1 ~]# oracleasm listdisks
```

ASMDISK01

ASMDISK02

ASMDISK03

ASMDISK04

ASMDISK05

ASMDISK06

ASMDISK07

ASMDISK08

ASMDISK09

ASMDISK10

ASMDISK11

ASMDISK12

ASMDISK13

```
[root@host1 ~]# shutdown -h now
```

2) ASM 생성

오라클로 재접속

```
[oracle@host1 ~]$ cd /stage/grid  
[oracle@host1 grid]$ ./runInstaller
```

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 1 of 10

Download Software Updates

Download software updates for this installation. Software updates consist of recommended updates to the installer system requirement checks, patchset updates (PSUs), and other recommended patches.

Select one of the following options:

☐ Use My Oracle Support credentials for download

My Oracle Support user name:

My Oracle Support password:

☐ Use pre-downloaded software updates

Location:

☒ Skip software updates

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 2 of 9

Select Installation Option

Select any of the following installation options

☐ Install and Configure Oracle Grid Infrastructure for a Cluster

☒ Configure Oracle Grid Infrastructure for a Standalone Server

☐ Upgrade Oracle Grid Infrastructure or Oracle Automatic Storage Management

☐ Install Oracle Grid Infrastructure Software Only

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 3 of 11

Select Product Languages

Select the languages in which your product will run.

Available Languages:

- Arabic
- Bengali
- Brazilian Portuguese
- Bulgarian
- Canadian French
- Catalan
- Croatian
- Czech
- Danish

Selected Languages:

- English

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 4 of 11

Create ASM Disk Group

Select Disk Group Characteristics and select disks

Disk Group Name:

Redundancy: ☐ High ☒ Normal ☐ External

AU Size: MB

Add Disks

☒ Candidate Disks ☐ All Disks

	Disk Path	Size (in MB)	Status
<input checked="" type="checkbox"/>	ORCL:ASMDISK01	2304	Candidate
<input checked="" type="checkbox"/>	ORCL:ASMDISK02	2304	Candidate
<input checked="" type="checkbox"/>	ORCL:ASMDISK03	2304	Candidate
<input checked="" type="checkbox"/>	ORCL:ASMDISK04	2304	Candidate
<input type="checkbox"/>	ORCL:ASMDISK05	2304	Candidate
<input type="checkbox"/>	ORCL:ASMDISK06	2304	Candidate
<input type="checkbox"/>	ORCL:ASMDISK07	2304	Candidate

[Change Discovery Path](#)

High (3중화), Normal (2중화), External (다중화안함)

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 5 of 11

Specify ASM Password

The new Oracle Automatic Storage Management (Oracle ASM) instance requires its own SYS user with SYSASM privileges for administration. Oracle recommends that you create a less privileged ASMSNMP user with SYSDBA privileges to monitor the ASM instance.

Specify the password for these user accounts.

☐ Use different passwords for these accounts

	Password	Confirm Password
SYS	<input type="text"/>	<input type="text"/>
ASMSNMP	<input type="text"/>	<input type="text"/>

☒ Use same passwords for these accounts

Specify Password: Confirm Password:

oracle_4U 로 비밀번호 설정

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 6 of 11

Privileged Operating System Groups

Download Software Updates
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Operating System Groups

Select the name of the operating system group, of which the user you are running this installation is a member, that you want to use for operating system authentication to Oracle Automatic Storage Management.

Oracle ASM DBA (OSDBA for ASM) Group

Oracle ASM Operator (OSOPER for ASM) Group (Optional)

Oracle ASM Administrator (OSASM) Group

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 7 of 11

Specify Installation Location

Download Software Updates
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Operating System Groups
Installation Location
Prerequisite Checks

Specify a base location for storing all Oracle software and configuration-related files. This location is the Oracle base directory. Create one Oracle base for each operating system user. By default, software and configuration files are installed by version and database name in the Oracle base directory.

Oracle Base:

Specify a location for storing Oracle software files separate from configuration files in the Oracle base directory. This software directory is the Oracle Grid Infrastructure home directory.

Software Location:

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 8 of 12

Create Inventory

Download Software Updates
Installation Option
Product Languages
Create ASM Disk Group

You are starting your first installation on this host. Specify a directory for installation files. This directory is called the "inventory directory". The installer automatically sets up subdirectories for each product to contain inventory data. The subdirectory for each product typically requires 150 kilobytes of disk space.

Inventory Directory:

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 11 of 12

Install Product

Download Software Updates
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Operating System Groups
Installation Location
Create Inventory
Prerequisite Checks
Summary
Install Product
Finish

Progress

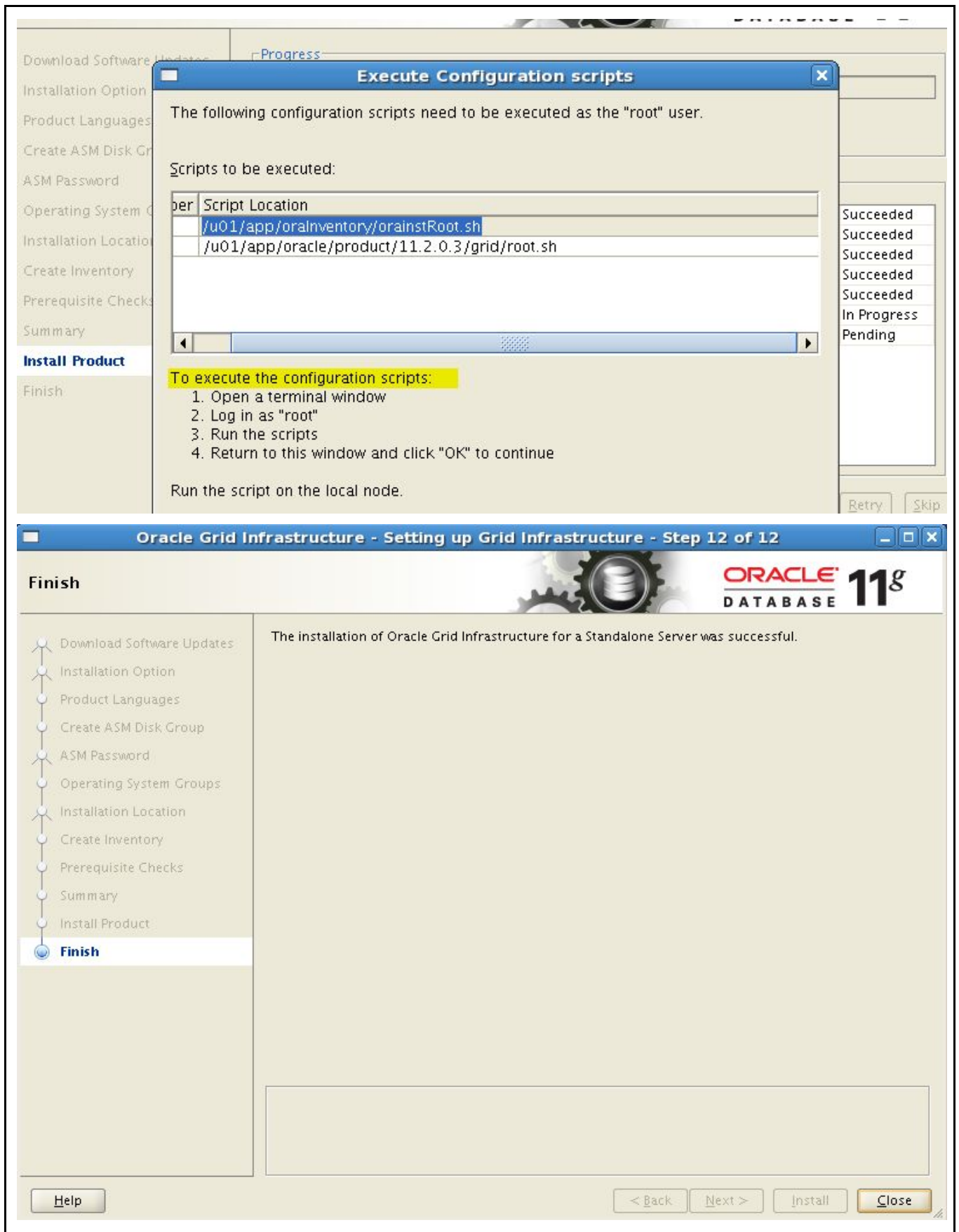
8%

Extracting files to '/u01/app/oracle/product/11.2.0.3/grid'.

Status

Install Oracle Grid Infrastructure and Automatic Storage Management for a Stand...	In Progress
• Prepare	Succeeded
• Copy files	In Progress
• Link binaries	Pending
• Setup files	Pending
Execute Root Scripts	Pending
Configure Oracle Grid Infrastructure for a Standalone Server	Pending

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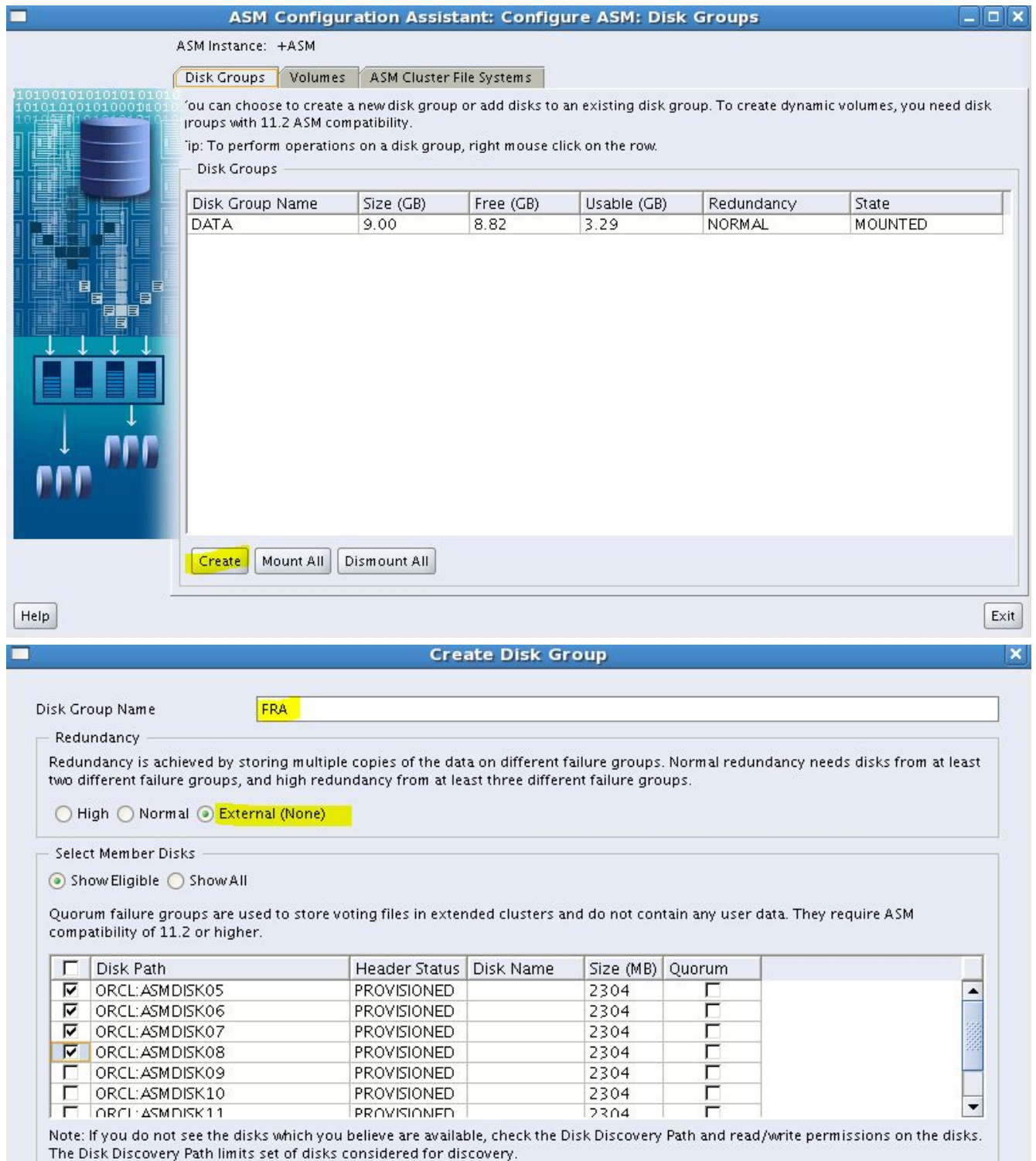


DB에 ASM 붙이기

```
[oracle@host1 ~]$ . oraenv
ORACLE_SID = [PROD] ? +ASM
The Oracle base remains unchanged with value /u01/app/oracle
```

ASM 구성하기

```
[oracle@host1 ~]$ asmca
```



oracle 계정으로 로그인하여 오라클 소프트웨어를 설치한다.


```
[oracle@host1 ~]$ cd /stage/database/

[oracle@host1 database]$ ls
doc      readme.html  rpm          sshsetup    welcome.html
install  response    runInstaller stage

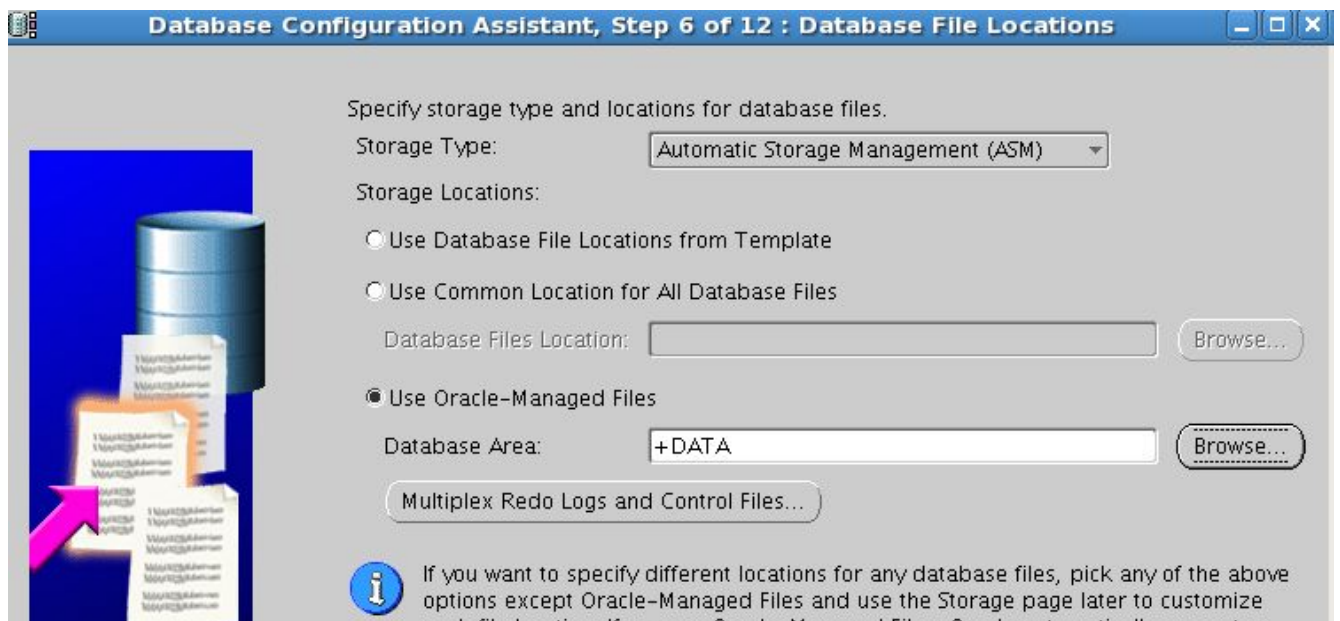
[oracle@host1 database]$ ./runInstaller
```

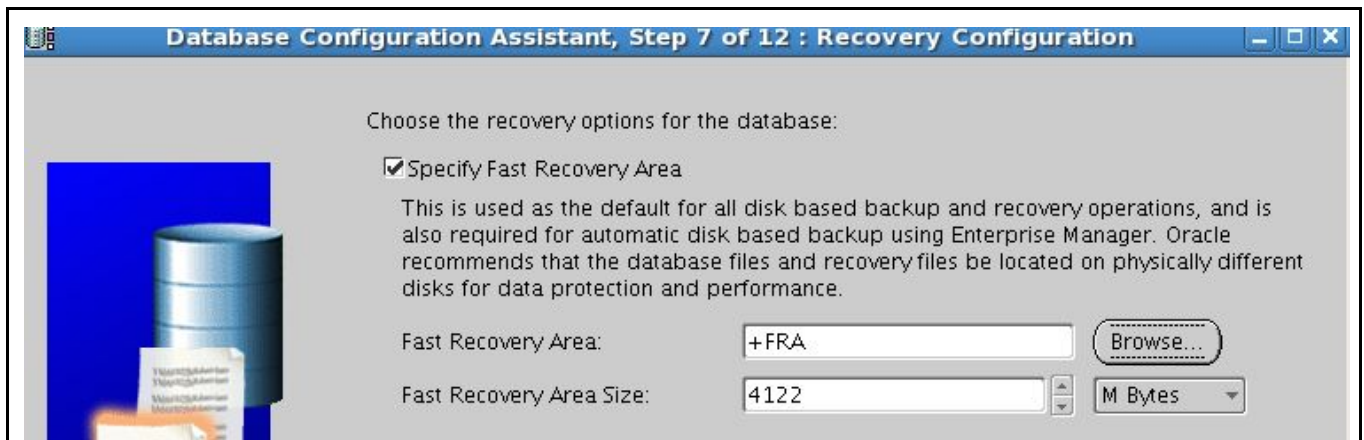
※ 경로주의



재시작 후 오라클 11g R2를 설치한다.

```
[oracle@host1 ~]$ dbca
```





```
[oracle@host1 ~]$ sqlplus / as sysdba
```

```
SQL*Plus: Release 11.2.0.3.0 Production on Fri Jul 17 17:07:36 2020
```

```
Copyright (c) 1982, 2011, Oracle. All rights reserved.
```

```
Connected to:
```

```
Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64bit Production  
With the Partitioning, Automatic Storage Management, OLAP, Data Mining  
and Real Application Testing options
```

```
SQL> select status from v$instance;
```

```
STATUS
```

```
-----
```

```
OPEN
```

3) ASM 을 사용할 때 오라클 버전 업그레이드 하기

ASM을 사용하기 위해 ASM 인스턴스를 켜다.

```
[oracle@host1 ~]$ srvctl start asm
PRCC-1014 : asm was already running
PRCR-1004 : Resource ora.asm is already running
PRCR-1079 : Failed to start resource ora.asm
CRS-5702: Resource 'ora.asm' is already running on 'host1'

SQL> select file_name
       2  from dba_data_files;

FILE_NAME
-----
+DATA/prod/datafile/users.259.1046019577
+DATA/prod/datafile/undotbs1.258.1046019577
+DATA/prod/datafile/sysaux.257.1046019577
+DATA/prod/datafile/system.256.1046019577
+DATA/prod/datafile/example.265.1046019727
```

초기설정) 11.2.0.4 버전 압축을 해제한다.

```
[oracle@host1 ~]$ mkdir /stage/11.2.0.4

[oracle@host1 ~]$ cd /mnt/hgfs/share/11.2.0.4

[oracle@host1 11.2.0.4]$ unzip -d /stage/11.2.0.4 p13390677_112040_linux-x86-64_1of7.zip
[oracle@host1 11.2.0.4]$ unzip -d /stage/11.2.0.4 p13390677_112040_linux-x86-64_2of7.zip
[oracle@host1 11.2.0.4]$ unzip -d /stage/11.2.0.4 p13390677_112040_linux-x86-64_3of7.zip
```

초기설정) 환경변수 해제

```
[oracle@host1 ~]$ cd /stage/11.2.0.4/grid
[oracle@host1 grid]$ unset ORACLE_HOME
[oracle@host1 grid]$ unset ORACLE_BASE
[oracle@host1 grid]$ unset ORACLE_SID
```

Grid를 업그레이드한다.

※ 업그레이드를 위한 디렉토리 생성

```
[oracle@host1 ~]$ mkdir -p /u01/app/oracle/product/11.2.0.4/grid
[oracle@host1 ~]$ mkdir -p /u01/app/oracle/product/11.2.0.4/dbhome_1
```

※ 인스톨러 실행

```
[oracle@host1 ~]$ cd /stage/11.2.0.4/grid
[oracle@host1 grid]$ ./runInstaller
```

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 1 of 10

Download Software Updates

Download Software Updates

Apply Software Updates

Installation Option

Installation Type

Cluster Configuration

Install Locations

Prerequisite Checks

Summary

Install Product

Finish

Download software updates for this installation. Software updates consist of recommended updates to the installer system requirement checks, PatchSet Updates (PSUs), and other recommended patches.

Select one of the following options:

☐ Use My Oracle Support credentials for download

My Oracle Support user name:

My Oracle Support password:

Proxy Settings...

Test Connection

☐ Use pre-downloaded software updates

Location:

Browse...

?

Skip software updates

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 2 of 9

Select Installation Option

Download Software Updates

Installation Option

Installation Type

Cluster Configuration

Install Locations

Prerequisite Checks

Summary

Select any of the following installation options

☐ Install and Configure Oracle Grid Infrastructure for a Cluster

☐ Configure Oracle Grid Infrastructure for a Standalone Server

?

☒ Upgrade Oracle Grid Infrastructure or Oracle Automatic Storage Management

☐ Install Oracle Grid Infrastructure Software Only

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 3 of 9

Select Product Languages

Download Software Updates

Installation Option

Product Languages

Operating System Groups

Installation Location

Prerequisite Checks

Summary

Install Product

Finish

Select the languages in which your product will run.

Available Languages:

Selected Languages:

Korean

Latin American Spanish

Latvian

Lithuanian

Malay

Mexican Spanish

Norwegian

Polish

Portuguese

Romanian

Russian

Simplified Chinese

Slovak

Slovenian

Spanish

Swedish

Thai

Traditional Chinese

Turkish

Ukrainian

Vietnamese

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Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 4 of 9

Privileged Operating System Groups

Select the name of the operating system group, of which the user you are running this installation is a member, that you want to use for operating system authentication to Oracle Automatic Storage Management.

Oracle ASM Administrator (OSASM) Group:

Oracle ASM DBA (OSDBA for ASM) Group:

Oracle ASM Operator (OSOPER for ASM) Group (Optional):

Download Software Updates

Installation Option

Product Languages

Operating System Groups

Installation Location

Prerequisite Checks

Summary

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 5 of 9

Specify Installation Location

Specify a base location for storing all Oracle software and configuration-related files. This location is the Oracle base directory. Create one Oracle base for each operating system user. By default, software and configuration files are installed by version and database name in the Oracle base directory.

Oracle Base:

Specify a location for storing Oracle software files separate from configuration files in the Oracle base directory. This software directory is the Oracle Grid Infrastructure home directory.

Software Location:

Download Software Updates

Installation Option

Product Languages

Operating System Groups

Installation Location

Prerequisite Checks

Summary

Install Product

※ 경로주의 (11.2.0.4)

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 7 of 9

Summary

Download Software Updates

Installation Option

Product Languages

Operating System Groups

Installation Location

Prerequisite Checks

Summary

Install Product

Finish

Oracle Grid Infrastructure

Global Settings

- Disk Space: required 5.5 GB available 408.34 GB
- Install Option: Upgrade Oracle Grid Infrastructure or Oracle Automatic Storage Management
- Oracle base for Oracle Grid Infrastructure: /u01/app/oracle
- Grid home: /u01/app/oracle/product/11.2.0/grid
- Source Location: /stage/11.2.0.4/grid/install/./stage/products.xml
- Privileged Operating System Groups: asmdba (OSDBA), asmoper (OSOPER), asmadmin (OSASM)
- Upgrade Oracle ASM: true



```
[root@host1 ~]# /u01/app/oracle/product/11.2.0.4/grid/rootupgrade.sh
Performing root user operation for Oracle 11g
```

The following environment variables are set as:

```
ORACLE_OWNER= oracle
```

```
ORACLE_HOME= /u01/app/oracle/product/11.2.0.4/grid
```

Enter the full pathname of the local bin directory: [/usr/local/bin]: **Enter**

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/oracle/product/11.2.0.4/grid/crs/install/crsconfig_params
```

Creating trace directory

ASM Configuration upgraded successfully.

Creating OCR keys for user 'oracle', privgrp 'oinstall'..

Operation successful.

LOCAL ONLY MODE

Successfully accumulated necessary OCR keys.

Creating OCR keys for user 'root', privgrp 'root'..

Operation successful.

CRS-4664: Node host1 successfully pinned.

Replacing Clusterware entries in inittab

Replacing Clusterware entries in inittab

```
host1      2020/07/21 13:35:45
```

```
/u01/app/oracle/product/11.2.0.4/grid/cdata/host1/backup_20200721_133545.olr
```

```
host1      2020/07/20 16:32:06
```

```
/u01/app/oracle/product/11.2.0.3/grid/cdata/host1/backup_20200720_163206.olr
```

Successfully configured Oracle Grid Infrastructure for a Standalone Server

버전이 바뀌었는지 확인한다.

```
[oracle@host1 grid]$ crsctl query has softwareversion
Oracle High Availability Services version on the local node is [11.2.0.4.0]
```

bash_profile 환경변수 경로를 11.2.0.4로 변경해준다.

```
[root@host1 ~]# vi /home/oracle/.bash_profile
# Oracle Settings
export ORACLE_BASE=/u01/app/oracle
export ORACLE_HOME=/u01/app/oracle/product/11.2.0.4/dbhome_1
export GRID_HOME=/u01/app/oracle/product/11.2.0.4/grid
export PATH=$ORACLE_HOME/bin:$GRID_HOME/bin:$PATH
export ORACLE_SID=PROD
```

DB도 업그레이드 해준다.

```
[oracle@host1 ~]$ cd /stage/11.2.0.4/database/
[oracle@host1 database]$ ./runInstaller
```



업그레이드 가능한지 확인

```
[oracle@host1 ~]$ export ORACLE_BASE=/u01/app/oracle
[oracle@host1 ~]$ export ORACLE_HOME=/u01/app/oracle/product/11.2.0.3/dbhome_1
[oracle@host1 ~]$ export ORACLE_SID=PROD
```

```
[oracle@host1 ~]$ sqlplus / as sysdba
SQL > @/u01/app/oracle/product/11.2.0.4/dbhome_1/rdbms/admin/utlu112i.sql
```

SQL*Plus: Release 11.2.0.3.0 Production on Mon Jul 20 18:08:35 2020
Copyright (c) 1982, 2011, Oracle. All rights reserved.

```
.....
*****
Database:
*****
--> name:      PROD
--> version:   11.2.0.3.0
--> compatible: 11.2.0.0.0
--> blocksize: 8192
--> platform:  Linux x86 64-bit
--> timezone file: V14
.
```

```

*****
Tablespaces: [make adjustments in the current environment]
*****
--> SYSTEM tablespace is adequate for the upgrade.
.... minimum required size: 924 MB
--> SYSAUX tablespace is adequate for the upgrade.
.... minimum required size: 643 MB
--> UNDOTBS1 tablespace is adequate for the upgrade.
.... minimum required size: 400 MB
--> TEMP tablespace is adequate for the upgrade.
.... minimum required size: 60 MB
--> EXAMPLE tablespace is adequate for the upgrade.
.... minimum required size: 310 MB
.

*****
Flashback: OFF
*****
*****
Update Parameters: [Update Oracle Database 11.2 init.ora or spfile]
Note: Pre-upgrade tool was run on a lower version 64-bit database.
*****
--> If Target Oracle is 32-Bit, refer here for Update Parameters:
-- No update parameter changes are required.
.

--> If Target Oracle is 64-Bit, refer here for Update Parameters:
-- No update parameter changes are required.
.

*****
Renamed Parameters: [Update Oracle Database 11.2 init.ora or spfile]
*****
-- No renamed parameters found. No changes are required.
.

*****
Obsolete/Deprecated Parameters: [Update Oracle Database 11.2 init.ora or spfile]
*****
-- No obsolete parameters found. No changes are required
.

*****
Components: [The following database components will be upgraded or installed]
*****
--> Oracle Catalog Views      [upgrade] VALID
--> Oracle Packages and Types [upgrade] VALID
--> JServer JAVA Virtual Machine [upgrade] VALID
--> Oracle XDK for Java       [upgrade] VALID
--> Oracle Workspace Manager  [upgrade] VALID
--> OLAP Analytic Workspace   [upgrade] VALID
--> OLAP Catalog              [upgrade] VALID
--> EM Repository             [upgrade] VALID
--> Oracle Text                [upgrade] VALID
--> Oracle XML Database        [upgrade] VALID
--> Oracle Java Packages       [upgrade] VALID
--> Oracle interMedia          [upgrade] VALID
--> Spatial                    [upgrade] VALID
--> Expression Filter          [upgrade] VALID
--> Rule Manager               [upgrade] VALID
--> Oracle Application Express [upgrade] VALID
... APEX will only be upgraded if the version of APEX in
... the target Oracle home is higher than the current one.
--> Oracle OLAP API           [upgrade] VALID
.

```

```

*****
Miscellaneous Warnings
*****
WARNING: --> Your recycle bin is turned on and currently contains no objects.
.... Because it is REQUIRED that the recycle bin be empty prior to upgrading
.... and your recycle bin is turned on, you may need to execute the command:
      PURGE DBA_RECYCLEBIN
.... prior to executing your upgrade to confirm the recycle bin is empty.
WARNING: --> Database contains schemas with objects dependent on DBMS_LDAP package.
.... Refer to the 11g Upgrade Guide for instructions to configure Network ACLs.
.... USER APEX_030200 has dependent objects.
.
*****
Recommendations
*****
Oracle recommends gathering dictionary statistics prior to
upgrading the database.
To gather dictionary statistics execute the following command
while connected as SYSDBA:

      EXECUTE dbms_stats.gather_dictionary_stats;

*****
Oracle recommends reviewing any defined events prior to upgrading.

To view existing non-default events execute the following commands
while connected AS SYSDBA:
Events:
      SELECT (translate(value,chr(13)||chr(10),' ')) FROM sys.v$parameter2
      WHERE UPPER(name) = 'EVENT' AND isdefault='FALSE'

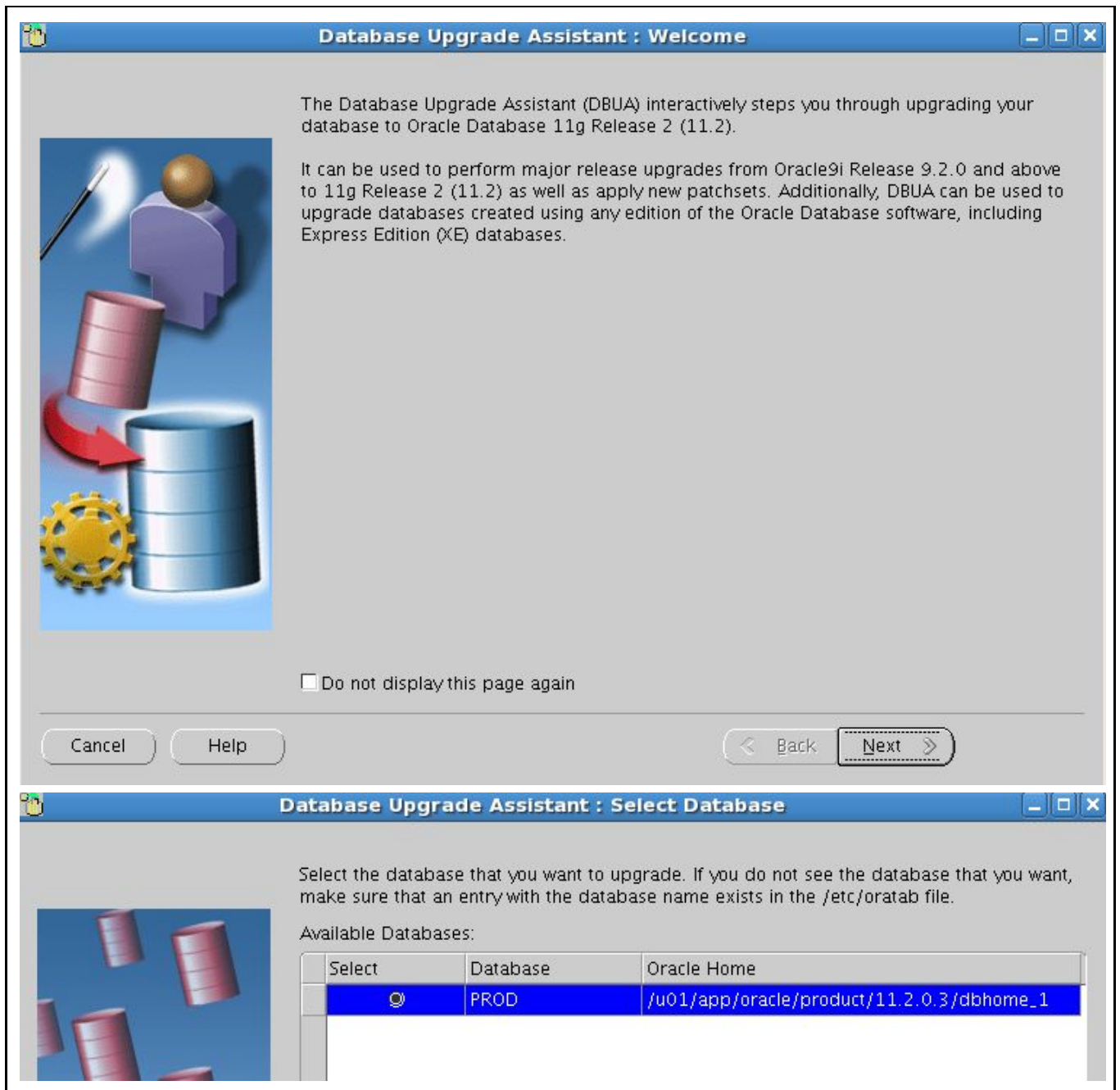
Trace Events:
      SELECT (translate(value,chr(13)||chr(10),' ')) from sys.v$parameter2
      WHERE UPPER(name) = '_TRACE_EVENTS' AND isdefault='FALSE'

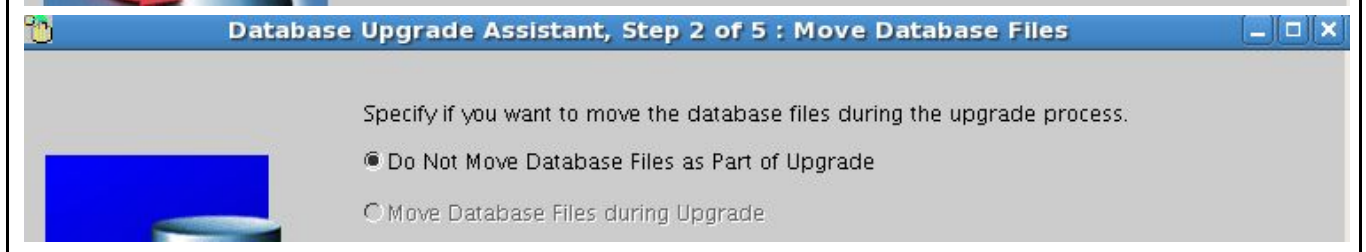
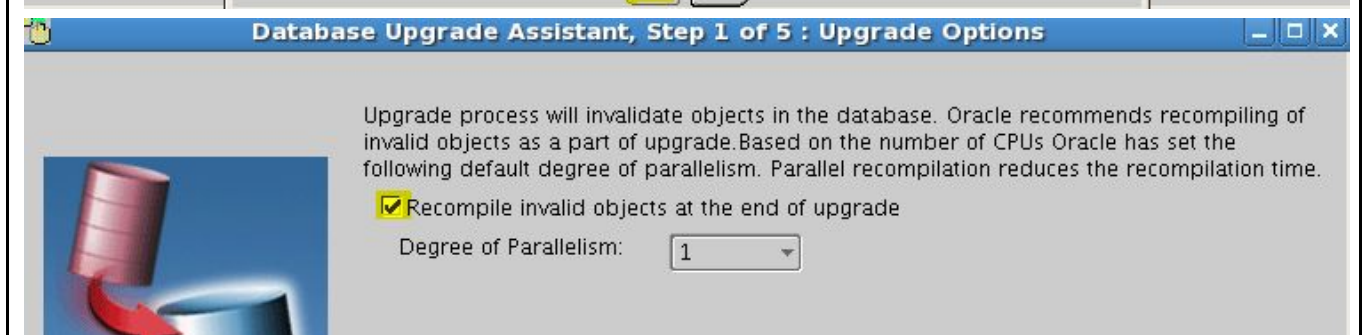
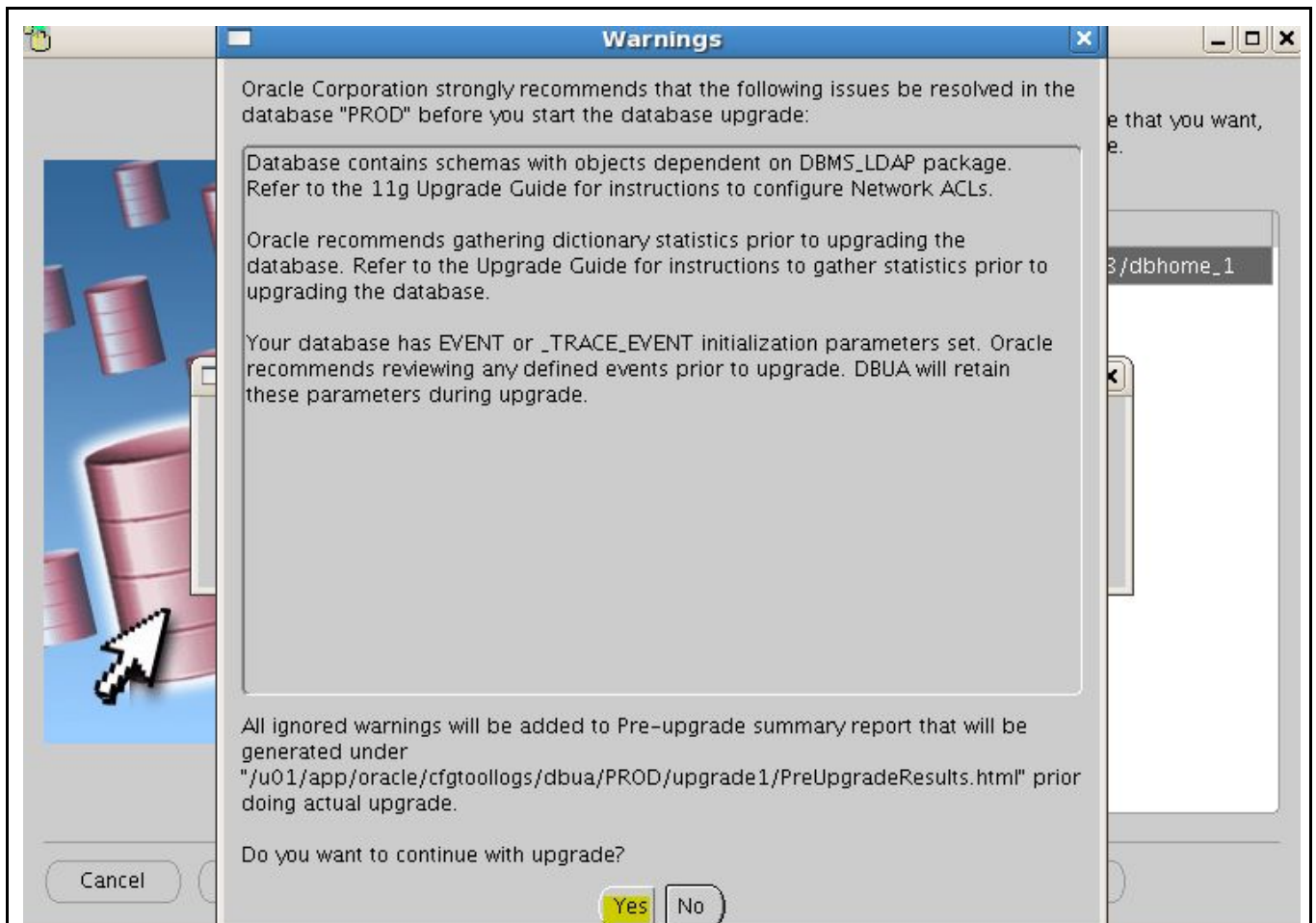
Changes will need to be made in the init.ora or spfile.

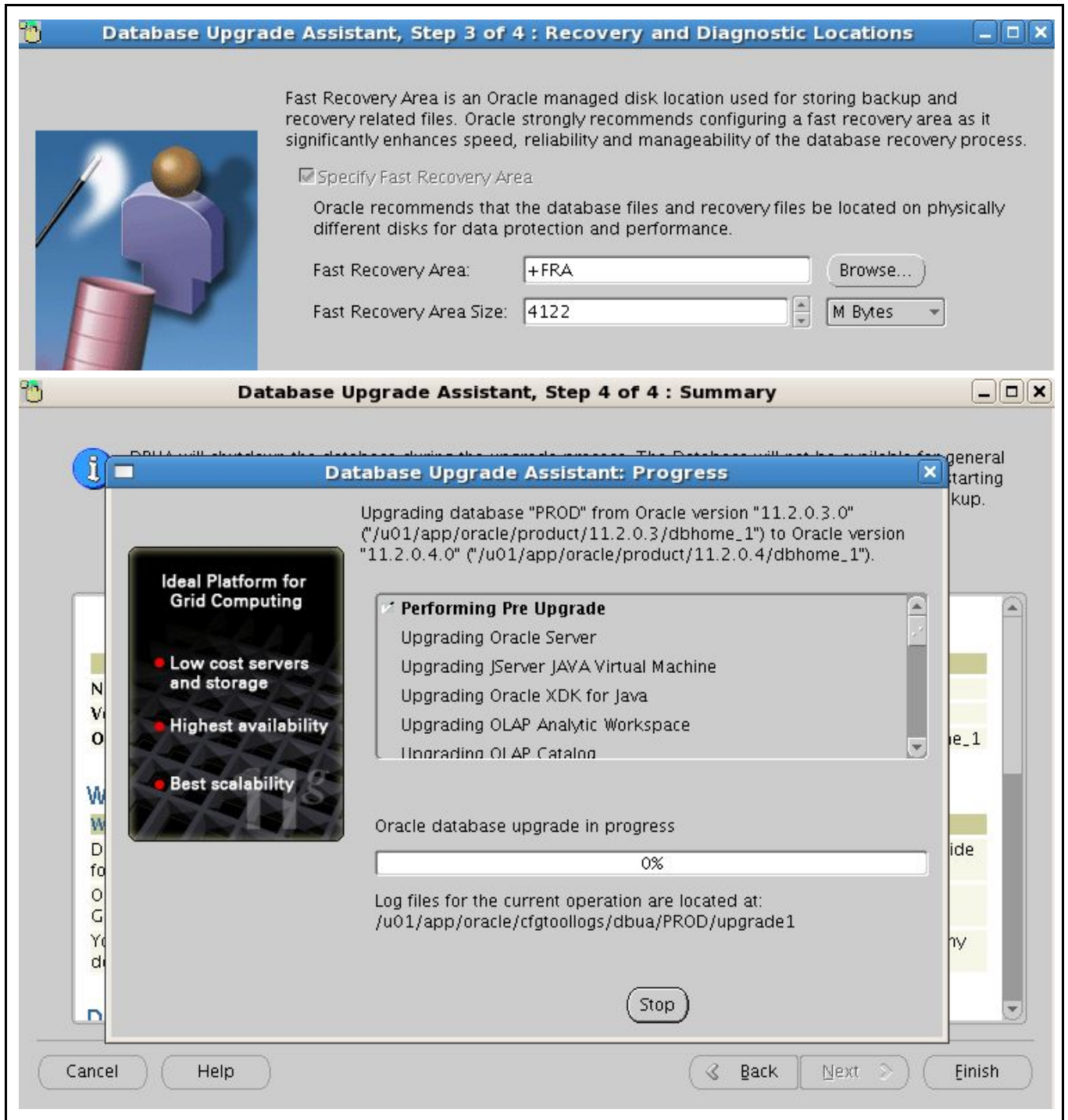
```

dbua 실행

```
[oracle@host1 ~]$ /u01/app/oracle/product/11.2.0.4/dbhome_1/bin/dbua
```







```

[oracle@host1 ~]$ cat /etc/oratab
#Backup file is /u01/app/oracle/product/11.2.0.4/grid/srvm/admin/oratab.bak.host1
line added by Agent

# This file is used by ORACLE utilities. It is created by root.sh
# and updated by either Database Configuration Assistant while creating
# a database or ASM Configuration Assistant while creating ASM instance.

# A colon, ':', is used as the field terminator. A new line terminates
# the entry. Lines beginning with a pound sign, '#', are comments.
#
# Entries are of the form:
# $ORACLE_SID:$ORACLE_HOME:<N|Y>:
#
# The first and second fields are the system identifier and home
# directory of the database respectively. The third field indicates
# to the dbstart utility that the database should , "Y", or should not,
# "N", be brought up at system boot time.
#
# Multiple entries with the same $ORACLE_SID are not allowed.
+ASM:/u01/app/oracle/product/11.2.0.4/grid:N
PROD:/u01/app/oracle/product/11.2.0.4/dbhome_1:N
# line added by Agent

[oracle@host1 ~]$ . oraenv

ORACLE_SID = [PROD] ? PROD
The Oracle base remains unchanged with value /u01/app/oracle

[oracle@host1 ~]$ cat >> $ORACLE_HOME/sqlplus/admin/glogin.sql <<EOF
set linesize 150
set pagesize 100
set arraysize 100
set echo off
set verify off
set timing on
--set time on
define _editor=vi
set sqlprompt "_USER'@'_CONNECT_IDENTIFIER> "
> EOF

[oracle@host1 ~]$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.4.0 Production on Tue Jul 21 14:29:22 2020

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

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.4.0 - 64bit Production
With the Partitioning, Automatic Storage Management, OLAP, Data Mining
and Real Application Testing options

SYS@PROD>

```

```
SYS@PROD> select comp_name, version, status, schema from dba_registry;
```

COMP_NAME	VERSION	STATUS	SCHEMA
OWB	11.2.0.3.0	VALID	OWBSYS
Oracle Application Express	3.2.1.00.12	VALID	APEX_030200
Oracle Enterprise Manager	11.2.0.4.0	VALID	SYSMAN
Spatial	11.2.0.4.0	VALID	MDSYS
OLAP Catalog	11.2.0.4.0	VALID	OLAPSYS
Oracle OLAP API	11.2.0.4.0	VALID	SYS
OLAP Analytic Workspace	11.2.0.4.0	VALID	SYS
Oracle Multimedia	11.2.0.4.0	VALID	ORDSYS
Oracle Rules Manager	11.2.0.4.0	VALID	EXFSYS
Oracle XML Database	11.2.0.4.0	VALID	XDB
Oracle Text	11.2.0.4.0	VALID	CTXSYS
Oracle Expression Filter	11.2.0.4.0	VALID	EXFSYS
Oracle Database Java Packages	11.2.0.4.0	VALID	SYS
Oracle XDK	11.2.0.4.0	VALID	SYS
JServer JAVA Virtual Machine	11.2.0.4.0	VALID	SYS
Oracle Workspace Manager	11.2.0.4.0	VALID	WMSYS
Oracle Database Packages and Types	11.2.0.4.0	VALID	SYS
Oracle Database Catalog Views	11.2.0.4.0	VALID	SYS

```
18 rows selected.
```

```
SYS@PROD> exit
```

```
SYS@PROD> SELECT owner,object_name,object_type,status FROM dba_objects WHERE status  
!= 'VALID';
```

```
no rows selected
```

```
[PROD@host01 ~]$ su - root
```

```
[root@host01 ~]# rm -rf /u01/app/oracle/product/11.2.0.3
```

4) 물리적으로 디스크를 생성한 후 ASM 디스크 그룹 만들기

사전설정) stage 까지 완료된 이미지로 작업, 아이피 고정하는 방법

Ethernet Device

General Route Hardware Device

Nickname: eth0

☒ Activate device when computer starts

☐ Allow all users to enable and disable the device

☐ Enable IPv6 configuration for this interface

☐ Automatically obtain IP address settings with: dhcp

DHCP Settings

Hostname (optional):

☒ Automatically obtain DNS information from provider

☒ Statically set IP addresses:

Manual IP Address Settings

Address: 192.168.100.111

Subnet mask: 255.255.255.0

Default gateway address: 192.168.100.2

☐ Set MTU to: 0

☐ Set MRU to: 0

Cancel OK

[system -administration- network - eth0 더블클릭]

ASM을 사용하기 위한 설정 (환경변수 설정, ASM 패키지 설치)

```
[root@host1 ~]# vi /home/oracle/.bash_profile

[root@host1 ~]# rpm -qa oracleasm*
oracleasm-2.6.18-164.el5-2.0.5-1.el5
oracleasm-lib-2.0.4-1.el5
oracleasm-support-2.1.8-1.el5
```

disk 01 ~ disk 06 까지 추가

Add Hardware Wizard

Specify Disk Capacity
How large do you want this disk to be?

Maximum disk size (GB):

Recommended size for Oracle Enterprise Linux 64-bit: 20 GB

☐ Allocate all disk space now.

Allocating the full capacity can enhance performance but requires all of the physical disk space to be available right now. If you do not allocate all the space now, the virtual disk starts small and grows as you add data to it.

☒ Store virtual disk as a single file:

☐ Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

< Back Next > Cancel

```
[root@host1 ~]# fdisk -l
```

```
Disk /dev/sda: 536.8 GB, 536870912000 bytes
255 heads, 63 sectors/track, 65270 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	1	13	104391	83	Linux
/dev/sda2		14	535	4192965	82	Linux swap / Solaris
/dev/sda3		536	65270	519983887+	83	Linux

```
Disk /dev/sdb: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

```
Disk /dev/sdb doesn't contain a valid partition table
```

```
Disk /dev/sdc: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

```
Disk /dev/sdc doesn't contain a valid partition table
```

```
Disk /dev/sdd: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

```
Disk /dev/sdd doesn't contain a valid partition table
```

```
Disk /dev/sde: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

```
Disk /dev/sde doesn't contain a valid partition table
```

```
Disk /dev/sdf: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

```
Disk /dev/sdf doesn't contain a valid partition table
```

```
Disk /dev/sdg: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

```
Disk /dev/sdg doesn't contain a valid partition table
```

```
[root@host1 ~]# fdisk /dev/sdb
```

Device contains neither a valid DOS partition table, nor Sun, SGI or OSF disklabel
Building a new DOS disklabel. Changes will remain in memory only,
until you decide to write them. After that, of course, the previous
content won't be recoverable.

The number of cylinders for this disk is set to 1305.

There is nothing wrong with that, but this is larger than 1024,
and could in certain setups cause problems with:

- 1) software that runs at boot time (e.g., old versions of LILO)
- 2) booting and partitioning software from other OSs
(e.g., DOS FDISK, OS/2 FDISK)

Warning: invalid flag 0x0000 of partition table 4 will be corrected by w(rite)

Command (m for help): **n**

Command action

e extended

p primary partition (1-4)

p

Partition number (1-4): **1**

First cylinder (1-1305, default 1): **(Enter)**

Using default value 1

Last cylinder or +size or +sizeM or +sizeK (1-1305, default 1305): **(Enter)**

Using default value 1305

Command (m for help): **w**

The partition table has been altered!

Calling ioctl() to re-read partition table.

Syncing disks.

```
[root@host1 ~]# fdisk -l
```

```
Disk /dev/sda: 536.8 GB, 536870912000 bytes
255 heads, 63 sectors/track, 65270 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	1	13	104391	83	Linux
/dev/sda2		14	535	4192965	82	Linux swap / Solaris
/dev/sda3		536	65270	519983887+	83	Linux

```
Disk /dev/sdb: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdb1		1	1305	10482381	83	Linux

```
Disk /dev/sdc: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdc1		1	1305	10482381	83	Linux

```
Disk /dev/sdd: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdd1		1	1305	10482381	83	Linux

```
Disk /dev/sde: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sde1		1	1305	10482381	83	Linux

```
Disk /dev/sdf: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdf1		1	1305	10482381	83	Linux

```
Disk /dev/sdg: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sdg1		1	1305	10482381	83	Linux


```
[root@host1 ~]# oracleasm configure -i
```

Configuring the Oracle ASM library driver.

This will configure the on-boot properties of the Oracle ASM library driver. The following questions will determine whether the driver is loaded on boot and what permissions it will have. The current values will be shown in brackets ('[]'). Hitting <ENTER> without typing an answer will keep that current value. Ctrl-C will abort.

Default user to own the driver interface []: **oracle**

Default group to own the driver interface []: **asmadmin**

Start Oracle ASM library driver on boot (y/n) [n]: **y**

Scan for Oracle ASM disks on boot (y/n) [y]: **y**

Writing Oracle ASM library driver configuration: done

```
[root@host1 ~]# oracleasm exit
```

```
[root@host1 ~]# oracleasm init
```

Creating /dev/oracleasm mount point: /dev/oracleasm

Loading module "oracleasm": oracleasm

Mounting ASMLib driver filesystem: /dev/oracleasm

```
[root@host1 ~]# oracleasm scandisks
```

Reloading disk partitions: done

Cleaning any stale ASM disks...

Scanning system for ASM disks...

```
[root@host1 ~]# oracleasm createdisk ASMDISK01 /dev/sdb1
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK02 /dev/sdc1
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK03 /dev/sdd1
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK04 /dev/sde1
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK05 /dev/sdf1
```

```
[root@host1 ~]# oracleasm createdisk ASMDISK06 /dev/sdg1
```

Writing disk header: done

Instantiating disk: done

```
[root@host1 ~]# oracleasm listdisks
```

ASMDISK01

ASMDISK02

ASMDISK03

ASMDISK04

ASMDISK05

ASMDISK06

```
[root@host1 ~]# oracleasm status
```

Checking if ASM is loaded: yes

Checking if /dev/oracleasm is mounted: yes

```
[root@host1 ~]# reboot
```

ASMDISK01, ASMDISK02를 DATA로

```
[oracle@host1 ~]# ./runInstaller
```

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 4 of 11

Create ASM Disk Group

Select Disk Group Characteristics and select disks

Disk Group Name:

Redundancy: ☐ High ☒ Normal ☐ External

AU Size: MB

Add Disks

☒ Candidate Disks ☐ All Disks

	Disk Path	Size (in MB)	Status
<input checked="" type="checkbox"/>	ORCL:ASMDISK01	10236	Candidate
<input checked="" type="checkbox"/>	ORCL:ASMDISK02	10236	Candidate
<input type="checkbox"/>	ORCL:ASMDISK03	10236	Candidate
<input type="checkbox"/>	ORCL:ASMDISK04	10236	Candidate
<input type="checkbox"/>	ORCL:ASMDISK05	10236	Candidate
<input type="checkbox"/>	ORCL:ASMDISK06	10236	Candidate

[Change Discovery Path](#)

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 7 of 11

Specify Installation Location

Specify a base location for storing all Oracle software and configuration-related files. This location is the Oracle base directory. Create one Oracle base for each operating system user. By default, software and configuration files are installed by version and database name in the Oracle base directory.

Oracle Base: [Browse...](#)

Specify a location for storing Oracle software files separate from configuration files in the Oracle base directory. This software directory is the Oracle Grid Infrastructure home directory.

Software Location: [Browse...](#)

ASMDISK03, ASMDISK04를 FRA로

```
[oracle@host1 ~]$ . oraenv
ORACLE_SID = [PROD] ? +ASM
The Oracle base remains unchanged with value /u01/app/oracle
[oracle@host1 ~]$ asmc
```

ASM Configuration Assistant: Configure ASM: Disk Groups

ASM Instance: +ASM

you can choose to create a new disk group or add disks to an existing disk group. To create dynamic volumes, you need disk groups with 11.2 ASM compatibility.

To perform operations on a disk group, right mouse click on the row.

Disk Groups

Disk Group Name	Size (GB)	Free (GB)	Usable (GB)	Redundancy	State
DATA	19.99	19.88	9.94	NORMAL	MOUNTED
FRA	19.99	19.94	19.94	EXTERN	MOUNTED

```
[oracle@host1 ~]$ cd /stage/database/  
[oracle@host1 database]$ ./runInstaller
```

Oracle Database 11g Release 2 Installer - Installing database - Step 7 of 12

Specify Installation Location

Configure Security Updates

Download Software Updates

Installation Option

Grid Installation Options

Product Languages

Database Edition

Installation Location

Specify a path to place all Oracle software and configuration-related files installed by this installation owner. This location is the Oracle base directory for the installation owner.

Oracle Base: /u01/app/oracle

Browse...

Specify a location for storing Oracle database software files separate from database configuration files in the Oracle base directory. This software directory is the Oracle database home directory.

Software Location: /u01/app/oracle/product/11.2.0.3/dbhome_1

Browse...

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```
[oracle@host1 ~]$ echo $ORACLE_HOME
/u01/app/oracle/product/11.2.0.3/dbhome_1
[oracle@host1 ~]$ dbca
```

Database Configuration Assistant, Step 6 of 12 : Database File Locations

Specify storage type and locations for database files.

Storage Type: **Automatic Storage Management (ASM)**

Storage Locations:

☐ Use Database File Locations from Template

☐ Use Common Location for All Database Files

Database Files Location: **Browse...**

☒ Use Oracle-Managed Files

Database Area: **+DATA** **Browse...**

Multiplex Redo Logs and Control Files...

i If you want to specify different locations for any database files, pick any of the above options except Oracle-Managed Files and use the Storage page later to customize each file location. If you use Oracle-Managed Files, Oracle automatically generates the names for database files, which can not be changed on the Storage page.

File Location Variables...

Cancel **Help** **< Back** **Next >**

Database Configuration Assistant, Step 7 of 12 : Recovery Configuration

Choose the recovery options for the database:

☒ **Specify Fast Recovery Area**

This is used as the default for all disk based backup and recovery operations, and is also required for automatic disk based backup using Enterprise Manager. Oracle recommends that the database files and recovery files be located on physically different disks for data protection and performance.

Fast Recovery Area: **+FRA** **Browse...**

Fast Recovery Area Size: **4122** **M Bytes**

```
SQL> select file_name from dba_data_files;
```

```
FILE_NAME
```

```
-----  
+DATA/prod/datafile/users.259.1046434207  
+DATA/prod/datafile/undotbs1.258.1046434207  
+DATA/prod/datafile/sysaux.257.1046434207  
+DATA/prod/datafile/system.256.1046434207  
+DATA/prod/datafile/example.265.1046434295  
SQL> show parameter db_recovery
```

NAME	TYPE	VALUE
-----	-----	-----
db_recovery_file_dest	string	+FRA
db_recovery_file_dest_size	big integer	4122M

ASM 에서 ASMCMD 사용하기

※ 바라보는 DB를 확인하고 진행한다.

```
[\'echo +ASM\'@host1 ~]$ echo $ORACLE_SID  
+ASM
```

```
[\'echo +ASM\'@host1 ~]$ asmcmd
```

```
ASMCMD> ls
```

```
DATA/
```

```
FRA/
```

```
ASMCMD> cd +DATA
```

```
ASMCMD> ls
```

```
ASM/
```

```
PROD/
```

```
ASMCMD> cd PROD
```

```
ASMCMD> ls
```

```
CONTROLFILE/
```

```
DATAFILE/
```

```
ONLINELOG/
```

```
PARAMETERFILE/
```

```
TEMPFILE/
```

```
spfileprod.ora
```

```
ASMCMD> cd controlfile
```

```
ASMCMD> ls
```

```
Current.260.1046278601
```

```
ASMCMD> rm Current.260.1046278601
```

```
ORA-15032: not all alterations performed
```

```
ORA-15028: ASM file '+DATA/PROD/controlfile/Current.260.1046278601' not dropped; currently being accessed  
(DBD ERROR: OCISmtExecute)
```

```
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	6912	1621	2304	-341	0 N DATA/
MOUNTED	EXTERN	N	512	4096	1048576	9216	8982	0	8982	0 N FRA/

```
ASMCMD> mkdg <dg name="DATA2" redundancy="external"> <disk string="ORCL:ASMDISK12" /> <disk  
string="ORCL:ASMDISK13" /> </dg>
```

```
ASMCMD-9390: invalid XML tag 'disk'
```

```
ASMCMD-9390: invalid XML tag 'disk'
```

```
ASMCMD> mkdg <dg name="DATA2" redundancy="external"> <disk string="ORCL:ASMDISK12" /> <disk  
string="ORCL:ASMDISK13" /> </dg>
```

```
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	6912	1621	2304	-341	0 N DATA/
MOUNTED	EXTERN	N	512	4096	1048576	4608	4556	0	4556	0 N DATA2/
MOUNTED	EXTERN	N	512	4096	1048576	9216	8982	0	8982	0 N FRA/

```
ASMCMD> dropdg DATA2
```

```
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	6912	1621	2304	-341	0 N DATA/

MOUNTED EXTERN N 512 4096 1048576 9216 8982 0 8982 0 N FRA/
ASMCMD>