1 软件环境

安装环境包括VBox、Linux和Oracle 12c，具体如下：

- VirtualBox 5.2
- Oracle Linux 6.5
- Oracle 12.1.0.2

2 主机设置

2.1 内存要求

安装独立服务器的Grid Infrastructure，内存至少是4GB，如果安装Grid和数据库，建议内存是4GB以上。

2.2 磁盘空间要求

至少6.4GB。

2.3 设置主机名称

[root@strong ~]# vim /etc/hosts

127.0.0.1 localhost localhost.localdomain localhost4 localhost4.localdomain4
::1 localhost localhost.localdomain localhost6 localhost6.localdomain6
192.168.56.102 strong.oracle.com

2.4 配置网络地址（已配置）

[root@strong ~]# cat /etc/sysconfig/network-scripts/ifcfg-eth0
HWADDR=08:00:27:31:FC:D8
TYPE=Ethernet
BOOTPROTO=none

IPADDR=192.168.56.102
PREFIX=24
GATEWAY=192.168.56.1
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
NAME=eth0
UUID=e5bd4711-37e0-4517-addd-d195d56101af
ONBOOT=yes
LAST_CONNECT=1533975147

2.5 关闭防火墙

[root@strong ~]# service iptables stop
iptables: Setting chains to policy ACCEPT: filter [OK]
iptables: Flushing firewall rules: [OK]
iptables: Unloading modules: [OK]
[root@strong ~]# chkconfig iptables off
[root@strong ~]# vim /etc/selinux/config
SELINUX=disabled

2.6 配置本地YUM源（若安装Linux时已配置，则不必配置）

配置本地YUM源，为安装Oracle 12c所需的rpm做准备
[root@strong ~]# mount /dev/cdrom /mnt/
mount: block device /dev/sr0 is write-protected, mounting read-only

> 确保光驱有Linux系统盘，否则出错。

[root@strong ~]# cd /etc/yum.repos.d/
[root@strong yum.repos.d]# ls
packagekit-media.repo public-yum-ol6.repo
[root@strong yum.repos.d]# mv packagekit-media.repo packagekit-media.repo.bak
[root@strong yum.repos.d]# mv public-yum-ol6.repo public-yum-ol6.repo.bak
[root@strong yum.repos.d]# vim server.repo

[server]
name=Oracle Linux
baseurl=file:///mnt/
gpgcheck=0
enabled=1
[root@strong yum.repos.d]# yum clean all
Loaded plugins: refresh-packagekit, security
Cleaning repos: server
Cleaning up Everything
[root@strong yum.repos.d]# yum list

2.7 安装Oracle 12c所需的Package

下面的Packages时安装Oracle 12c所需的，利用yum install 进行安装。
binutils-2.20.51.0.2-5.11.el6 (x86_64)
compat-libcap1-1.10-1 (x86_64)
compat-libstdc++-33-3.2.3-69.el6 (x86_64)
compat-libstdc++-33-3.2.3-69.el6 (i686)
gcc-4.4.4-13.el6 (x86_64)
gcc-c++-4.4.4-13.el6 (x86_64)
glibc-2.12-1.7.el6 (i686)
glibc-2.12-1.7.el6 (x86_64)
glibc-devel-2.12-1.7.el6 (x86_64)
glibc-devel-2.12-1.7.el6 (i686)
ksh
libgcc-4.4.4-13.el6 (i686)
libgcc-4.4.4-13.el6 (x86_64)
libstdc++-4.4.4-13.el6 (x86_64)
libstdc++-4.4.4-13.el6 (i686)
libstdc++-devel-4.4.4-13.el6 (x86_64)
libstdc++-devel-4.4.4-13.el6 (i686)
libaio-0.3.107-10.el6 (x86_64)
libaio-0.3.107-10.el6 (i686)
libaio-devel-0.3.107-10.el6 (x86_64)
libaio-devel-0.3.107-10.el6 (i686)

libXext-1.1 (x86_64)
libXext-1.1 (i686)
libXtst-1.0.99.2 (x86_64)
libXtst-1.0.99.2 (i686)
libX11-1.3 (x86_64)
libX11-1.3 (i686)
libXau-1.0.5 (x86_64)
libXau-1.0.5 (i686)
libxcb-1.5 (x86_64)
libxcb-1.5 (i686)
libXi-1.3 (x86_64)
libXi-1.3 (i686)
make-3.81-19.el6
sysstat-9.0.4-11.el6 (x86_64)
或者利用下面的方式进行安装：
yum -y install binutils compat-libcap1 compat-libstdc* gcc gcc-c++* glibc glibc-devel ksh libgcc libstdc libaio libaio-devel make elfutils-libelf-devel sysstat

2.8 创建用户和组

1）安装组
[root@strong ~]# groupadd oinstall
2）标准祖
[root@strong ~]# groupadd dba
[root@strong ~]# groupadd oper
[root@strong ~]# groupadd asmdba
[root@strong ~]# groupadd asmoper
[root@strong ~]# groupadd asmadmin
3）扩展组
backupdba、dgdba、kmdba、racdba
4）用户
[root@strong ~]# useradd -g oinstall -G dba,asmdba,oper oracle
[root@strong ~]# passwd oracle
Changing password for user oracle.
New password:

Retype new password:
passwd: all authentication tokens updated successfully.
[root@strong ~]# useradd -g oinstall -G asmadmin,asmdba,asmoper,oper,dba grid
[root@strong ~]# passwd grid
Changing password for user grid.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.

2.9 配置内核参数

在/etc/sysctl.conf文件末尾添加以下内容：
[root@strong ~]# vim /etc/sysctl.conf
fs.aio-max-nr = 1048576
fs.file-max = 6815744
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@strong ~]# sysctl -p
在/etc/security/limits.conf末尾添加以下内容：
[root@strong ~]# vim /etc/security/limits.conf
grid soft nproc 2047
grid hard nproc 16384
grid soft nofile 1024
grid hard nofile 65536
oracle soft nproc 2047
oracle hard nproc 16384
oracle soft nofile 1024
oracle hard nofile 65536

2.10 创建目录

```
[root@strong ~]# mkdir -p /u01/app/grid
[root@strong ~]# mkdir -p /u01/app/oracle
[root@strong ~]# chown -R grid:oinstall /u01
[root@strong ~]# chmod -R 775 /u01/
[root@strong ~]# chown oracle:oinstall /u01/app/oracle/
[root@strong ~]# ll /u01/
total 20
drwxrwxr-x. 5 grid oinstall  4096 Aug  9 19:33 app
```

2.11 配置环境变量

1）配置Grid用户环境变量

```
[root@strong ~]# su - grid
[grid@strong ~]$ vim .bash_profile --增加以下内容
ORACLE_BASE=/u01/app/grid
export ORACLE_BASE
ORACLE_SID=+ASM
export ORACLE_SID

export ORACLE_TERM=xterm
[grid@strong ~]$ . .bash_profile
[grid@strong ~]$ echo $ORACLE_SID
+ASM
```

2）配置Oracle用户环境变量

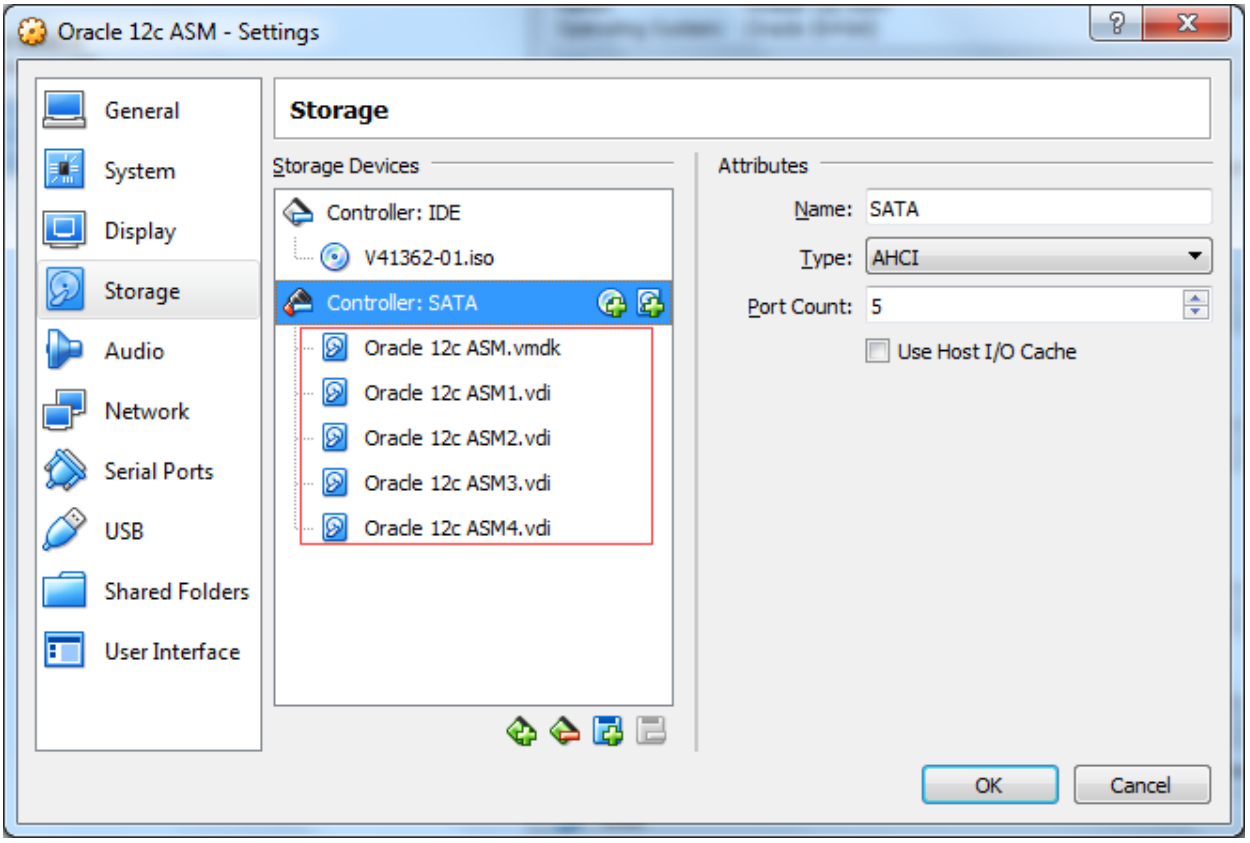
```
[grid@strong ~]$ su - oracle
Password:
[oracle@strong ~]$ vim .bash_profile --增加以下内容
ORACLE_BASE=/u01/app/oracle
ORACLE_SID=orcl
```

export ORACLE_BASE ORACLE_SID

export ORACLE_TERM=xterm
[oracle@strong ~]$ . .bash_profile
[oracle@strong ~]$ echo $ORACLE_BASE
/u01/app/oracle

3 ASM配置（udev）

3.1 Linux系统关闭情况下增加4块硬盘



3.2 创建分区

1）查看新增加的磁盘

[root@strong ~]# fdisk -l |grep /dev/sd
Disk /dev/sda: 53.7 GB, 53687091200 bytes
/dev/sda1 1 3917 31457280 83 Linux
/dev/sda2 3917 4439 4194304 82 Linux swap / Solaris
/dev/sda3 * 4439 6528 16776192 83 Linux

Disk /dev/sdb: 5368 MB, 5368709120 bytes
Disk /dev/sdc: 5368 MB, 5368709120 bytes
Disk /dev/sdd: 5368 MB, 5368709120 bytes
Disk /dev/sde: 5368 MB, 5368709120 bytes

2）对新增磁盘进行分区

[root@strong ~]# fdisk /dev/sdb
Device contains neither a valid DOS partition table, nor Sun, SGI or OSF disklabel
Building a new DOS disklabel with disk identifier 0x6028d66d.
Changes will remain in memory only, until you decide to write them.
After that, of course, the previous content won't be recoverable.

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

WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
switch off the mode (command 'c') and change display units to
sectors (command 'u').

Command (m for help): n
Command action
e extended
p primary partition (1-4)
p
Partition number (1-4): 1
First cylinder (1-652, default 1):
Using default value 1
Last cylinder, +cylinders or +size{K,M,G} (1-652, default 652):
Using default value 652

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.

> 同样方法对 /dev/sdc、 /dev/sdd、 /dev/sde创建分区

3）查看磁盘分区后信息

```
[root@strong ~]# fdisk -l |grep /dev/sd
Disk /dev/sda: 53.7 GB, 53687091200 bytes
/dev/sda1               1        3917    31457280   83  Linux
/dev/sda2            3917        4439     4194304   82  Linux swap / Solaris
/dev/sda3   *        4439        6528    16776192   83  Linux
Disk /dev/sdb: 5368 MB, 5368709120 bytes
/dev/sdb1               1         652     5237158+  83  Linux
Disk /dev/sdc: 5368 MB, 5368709120 bytes
/dev/sdc1               1         652     5237158+  83  Linux
Disk /dev/sdd: 5368 MB, 5368709120 bytes
/dev/sdd1               1         652     5237158+  83  Linux
Disk /dev/sde: 5368 MB, 5368709120 bytes
/dev/sde1               1         652     5237158+  83  Linux
```

3.3 获取块设备信息

```
[root@strong ~]# /sbin/scsi_id -g -u /dev/sdb
1ATA_VBOX_HARDDISK_VB044e35a2-62feff97
[root@strong ~]# /sbin/scsi_id -g -u /dev/sdc
1ATA_VBOX_HARDDISK_VB92072249-6994abe2
[root@strong ~]# /sbin/scsi_id -g -u /dev/sdd
1ATA_VBOX_HARDDISK_VBbbfc2a57-2de2fe3a
[root@strong ~]# /sbin/scsi_id -g -u /dev/sde
1ATA_VBOX_HARDDISK_VBd659eac3-c6b255ce
```

3.4 创建配置文件

```
[root@strong ~]# vim /etc/scsi_id.config

options=-g
```

3.5 创建规则文件

[root@strong ~]# vim /etc/udev/rules.d/99-oracle-asmdevices.rules

KERNEL=="sd?1", BUS=="scsi", PROGRAM=="/sbin/scsi_id -g -u -d /dev/$parent", RESULT=="1ATA_VBOX_HARDDISK_VB044e35a2-62feff97", NAME="asm-disk1", OWNER="grid", GROUP="asmadmin", MODE="0660"
KERNEL=="sd?1", BUS=="scsi", PROGRAM=="/sbin/scsi_id -g -u -d /dev/$parent", RESULT=="1ATA_VBOX_HARDDISK_VB92072249-6994abe2", NAME="asm-disk2", OWNER="grid", GROUP="asmadmin", MODE="0660"
KERNEL=="sd?1", BUS=="scsi", PROGRAM=="/sbin/scsi_id -g -u -d /dev/$parent", RESULT=="1ATA_VBOX_HARDDISK_VBbbfc2a57-2de2fe3a", NAME="asm-disk3", OWNER="grid", GROUP="asmadmin", MODE="0660"
KERNEL=="sd?1", BUS=="scsi", PROGRAM=="/sbin/scsi_id -g -u -d /dev/$parent", RESULT=="1ATA_VBOX_HARDDISK_VBd659eac3-c6b255ce", NAME="asm-disk4", OWNER="grid", GROUP="asmadmin", MODE="0660"

3.6 更新块分区

[root@strong ~]# /sbin/partprobe /dev/sdb1
[root@strong ~]# /sbin/partprobe /dev/sdc1
[root@strong ~]# /sbin/partprobe /dev/sdd1
[root@strong ~]# /sbin/partprobe /dev/sde1

3.7 查看所有者和权限

[root@strong ~]# ll /dev/asm-disk*
brw-rw---- 1 grid asmadmin 8, 17 Aug 11 16:31 /dev/asm-disk1
brw-rw---- 1 grid asmadmin 8, 33 Aug 11 16:31 /dev/asm-disk2
brw-rw---- 1 grid asmadmin 8, 49 Aug 11 16:31 /dev/asm-disk3
brw-rw---- 1 grid asmadmin 8, 65 Aug 11 16:31 /dev/asm-disk4

4 Oracle ASM安装

4.1 上传并解压Grid软件

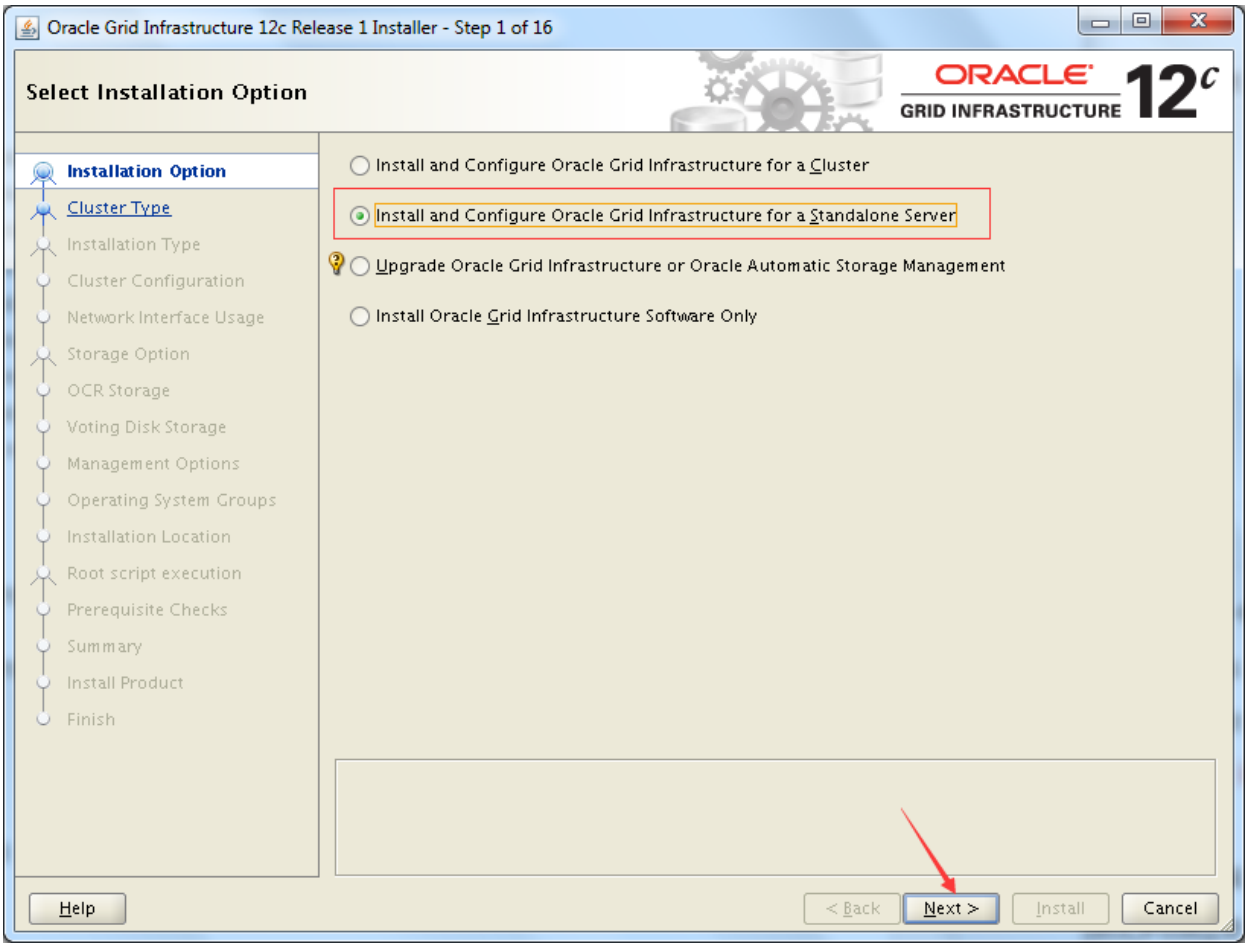
```
[root@strong ~]# su - grid
[grid@strong ~]$ cd /u01/app/grid/
[grid@strong grid]$ mkdir soft
[grid@strong grid]$ cd soft/
[grid@strong soft]$ ll -h
total 2.3G
-rw-r--r-- 1 grid oinstall 1.7G Aug 11 16:34 linuxamd64_12102_grid_1of2.zip
-rw-r--r-- 1 grid oinstall 618M Aug 11 16:33 linuxamd64_12102_grid_2of2.zip
[grid@strong soft]$ unzip linuxamd64_12102_grid_1of2.zip
[grid@strong soft]$ unzip linuxamd64_12102_grid_2of2.zip
```

4.2 切换到软件目录进行安装

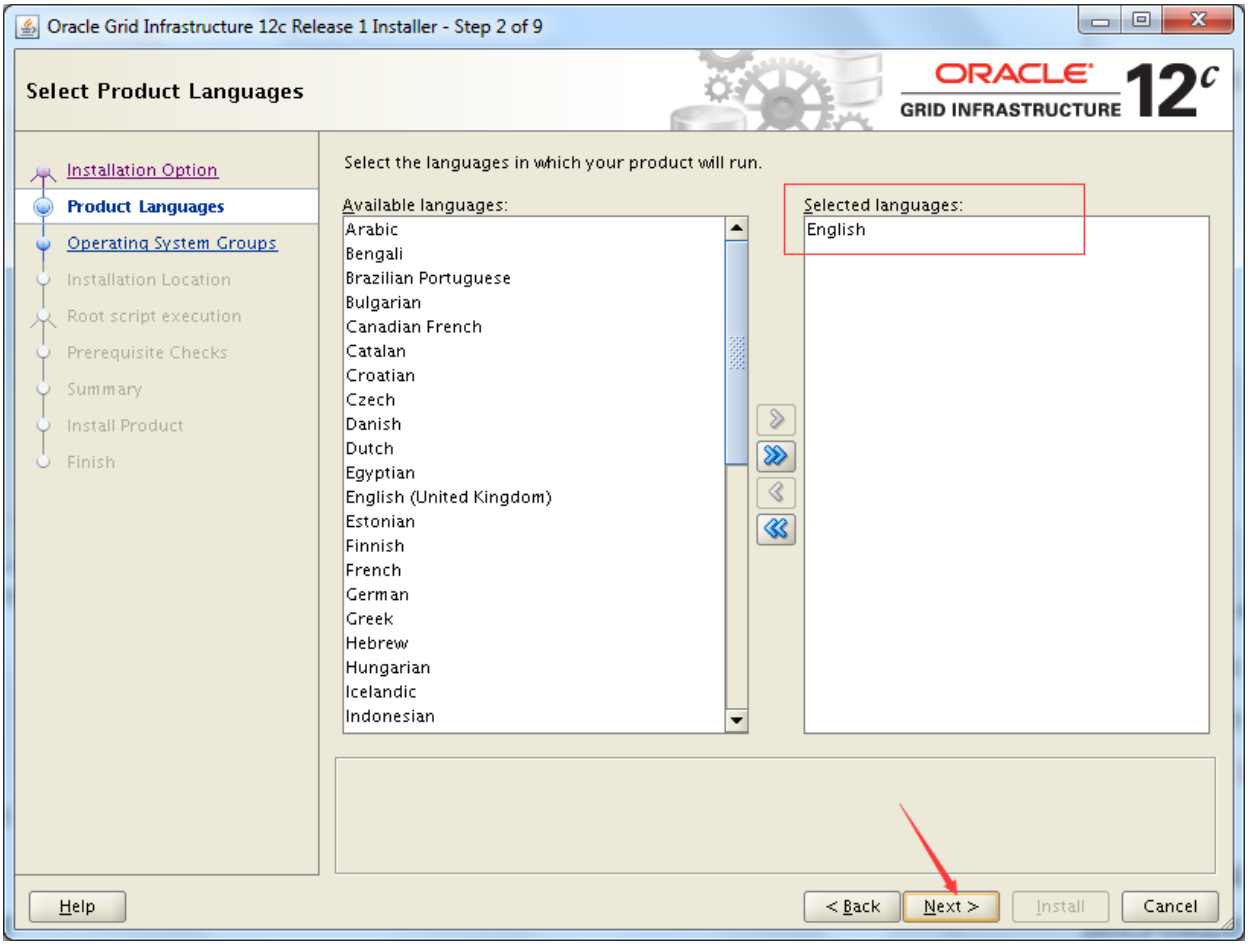
```
[grid@strong soft]$ cd grid/
[grid@strong grid]$ ll
total 44
drwxr-xr-x  4 grid oinstall 4096 Aug 11 16:35 install
drwxrwxr-x  2 grid oinstall 4096 Jul  7  2014 response
drwxr-xr-x  2 grid oinstall 4096 Jul  7  2014 rpm
-rwxr-xr-x  1 grid oinstall 5085 Dec 20  2013 runcluvfy.sh
-rwxr-xr-x  1 grid oinstall 8534 Jul  7  2014 runInstaller
drwxrwxr-x  2 grid oinstall 4096 Jul  7  2014 sshsetup
drwxr-xr-x 14 grid oinstall 4096 Jul  7  2014 stage
-rwxr-xr-x  1 grid oinstall  500 Feb  7  2013 welcome.html
[grid@strong grid]$ ./runInstaller
```

4.3 Grid 软件安装

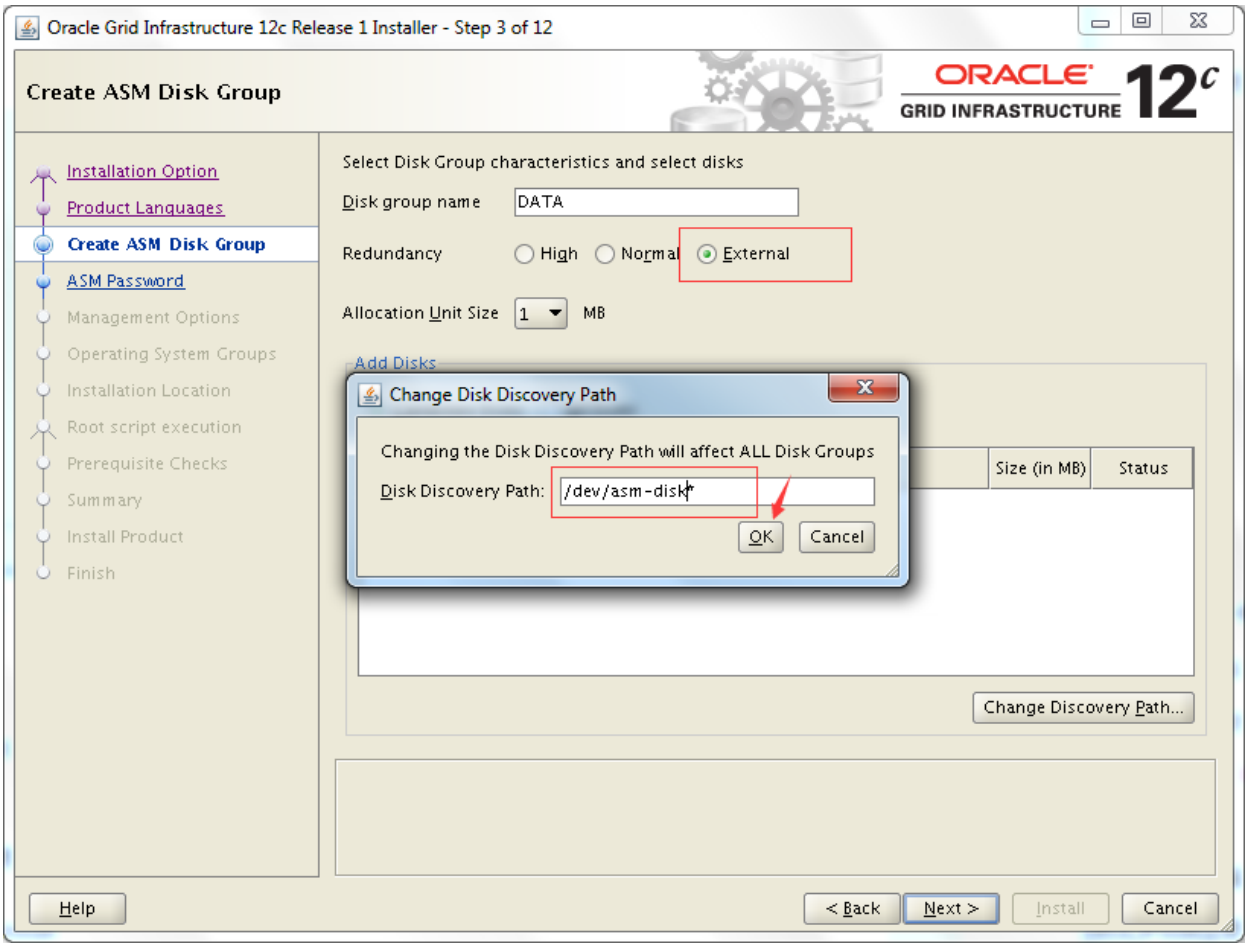
1）选择安装选项，点击Next；

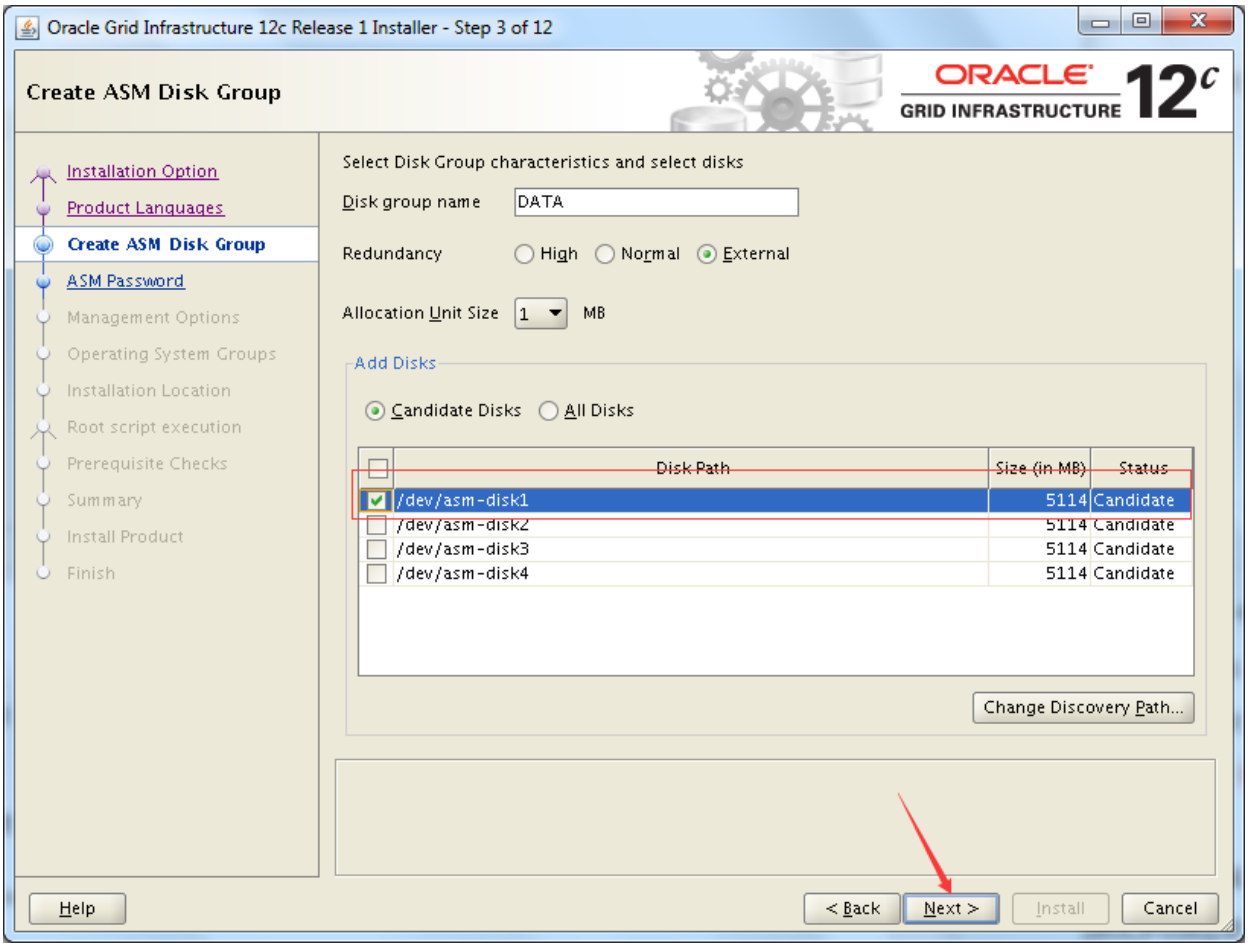


2）选择产品语言，点击Next；

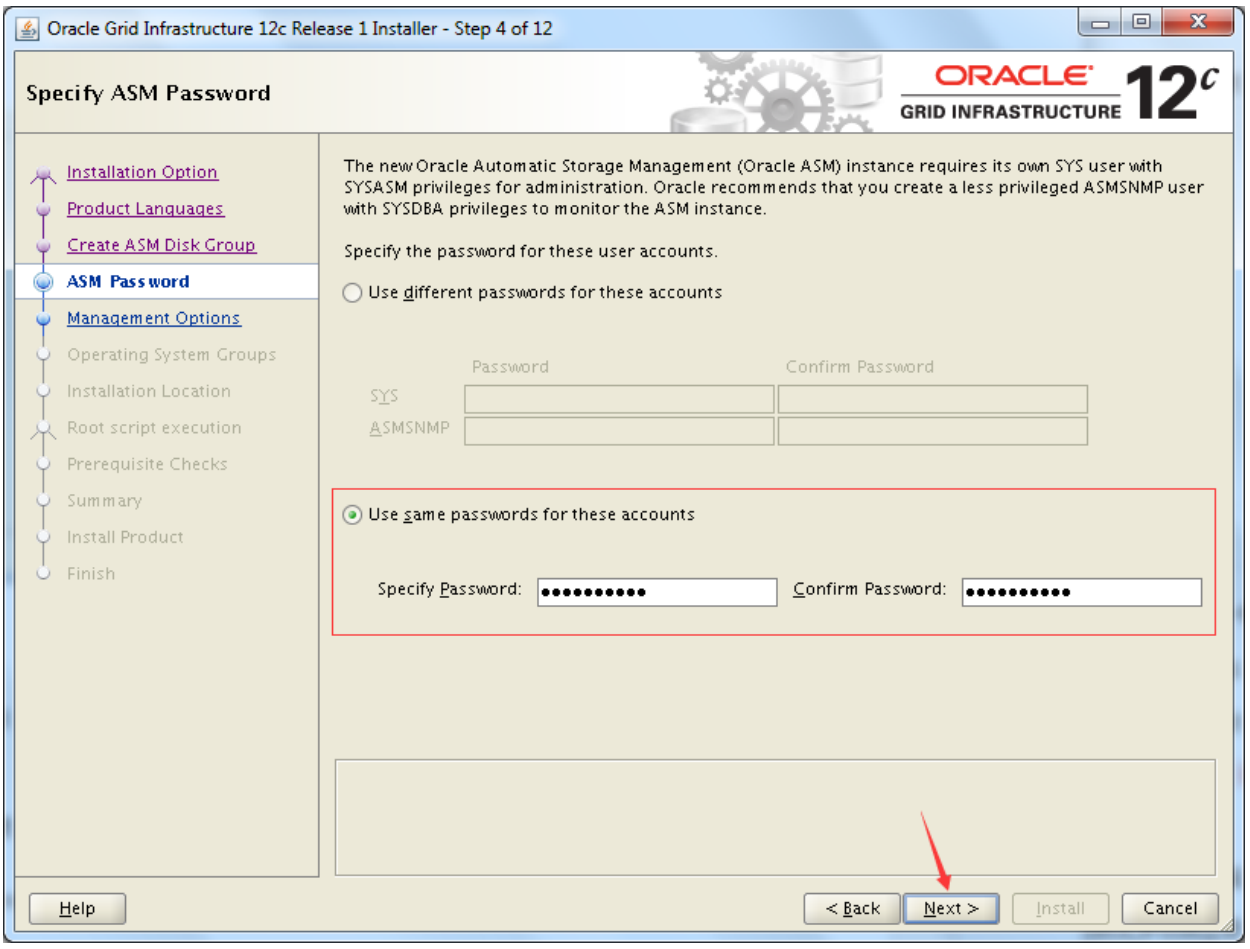


3）创建ASM磁盘组；

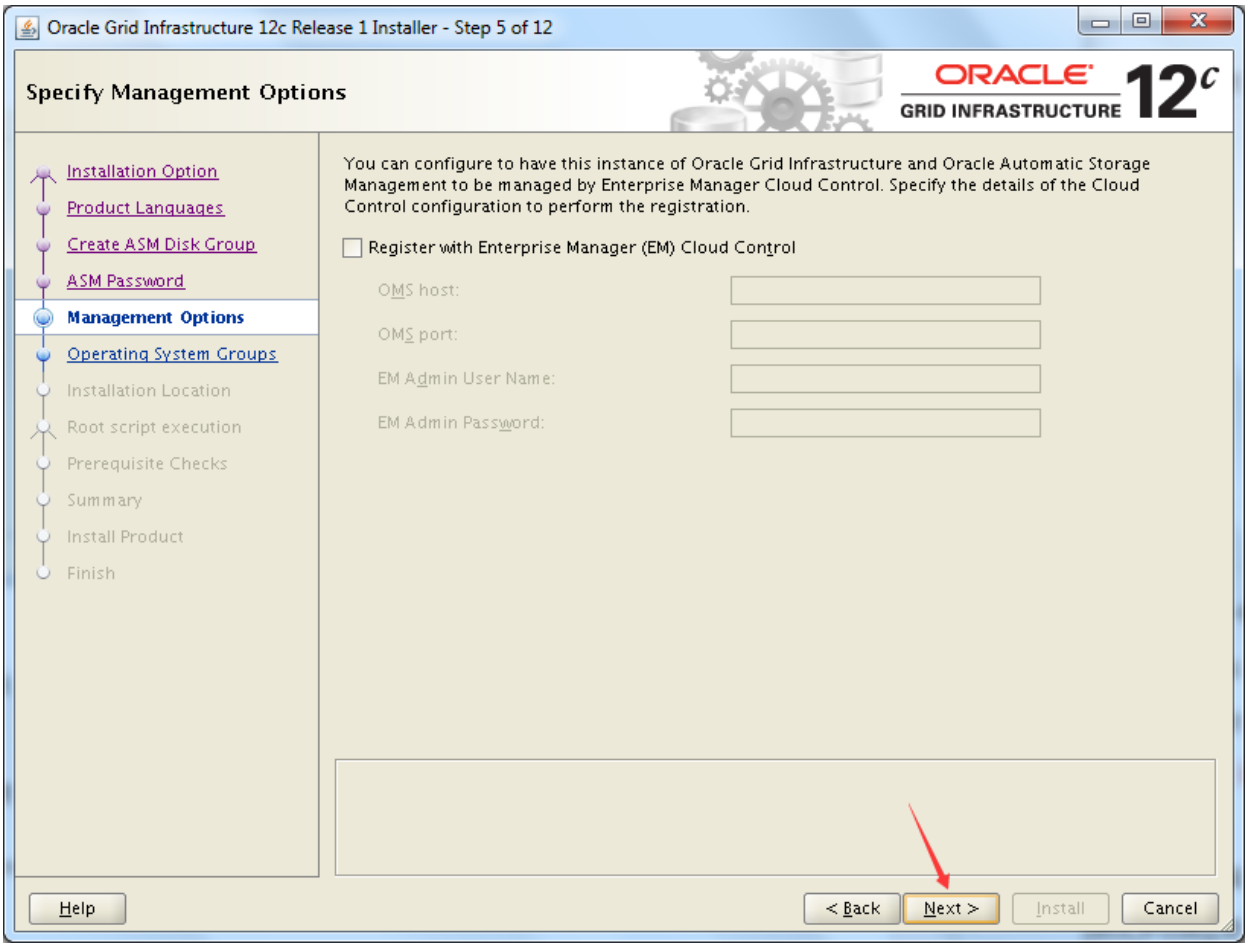

Oracle Grid Infrastructure 12c Release 1 Installer - Step 3 of 12
Create ASM Disk Group
ORACLE
GRID INFRASTRUCTURE
12c
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Management Options
Operating System Groups
Installation Location
Root script execution
Prerequisite Checks
Summary
Install Product
Finish
Select Disk Group characteristics and select disks
Disk group name
DATA
Redundancy
High
Normal
External
Allocation Unit Size
1
MB
Add Disks
Change Disk Discovery Path
Changing the Disk Discovery Path will affect ALL Disk Groups
Disk Discovery Path:
/dev/asm-disk*
OK
Cancel
Size (in MB)
Status
Change Discovery Path...
Help
< Back
Next >
Install
Cancel


Oracle Grid Infrastructure 12c Release 1 Installer - Step 3 of 12
Create ASM Disk Group
ORACLE GRID INFRASTRUCTURE 12c
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Management Options
Operating System Groups
Installation Location
Root script execution
Prerequisite Checks
Summary
Install Product
Finish
Select Disk Group characteristics and select disks
Disk group name DATA
Redundancy High Normal External
Allocation Unit Size 1 MB
Add Disks
Candidate Disks All Disks
Disk Path Size (in MB) Status
/dev/asm-disk1 5114 Candidate
/dev/asm-disk2 5114 Candidate
/dev/asm-disk3 5114 Candidate
/dev/asm-disk4 5114 Candidate
Change Discovery Path...
Help
< Back Next > Install Cancel

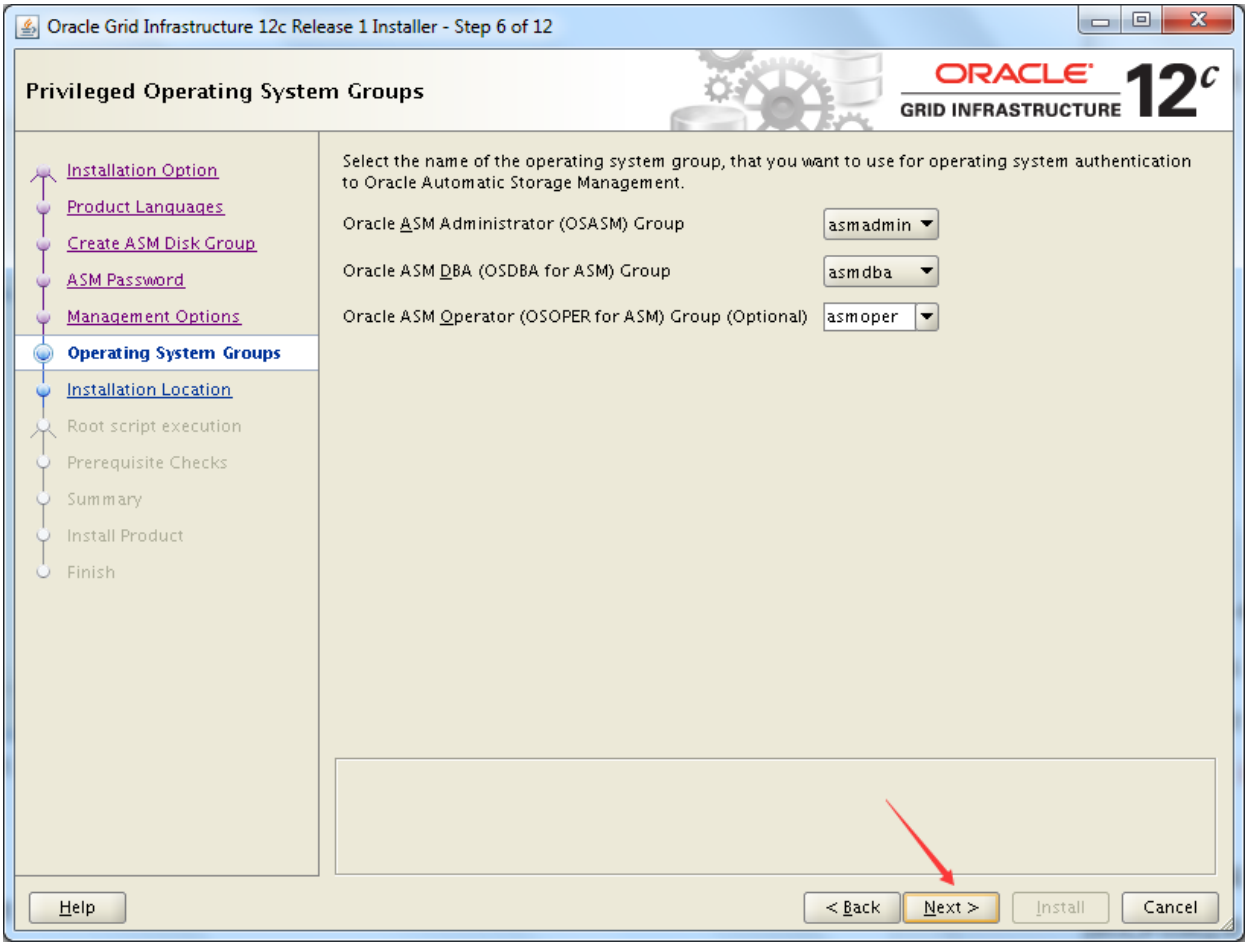
4）指定ASM密码；


Oracle Grid Infrastructure 12c Release 1 Installer - Step 4 of 12
Specify ASM Password
ORACLE GRID INFRASTRUCTURE 12c
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Management Options
Operating System Groups
Installation Location
Root script execution
Prerequisite Checks
Summary
Install Product
Finish
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
ASMSNMP
Use same passwords for these accounts
Specify Password: ••••••••••
Confirm Password: ••••••••••
Help
< Back Next > Install Cancel

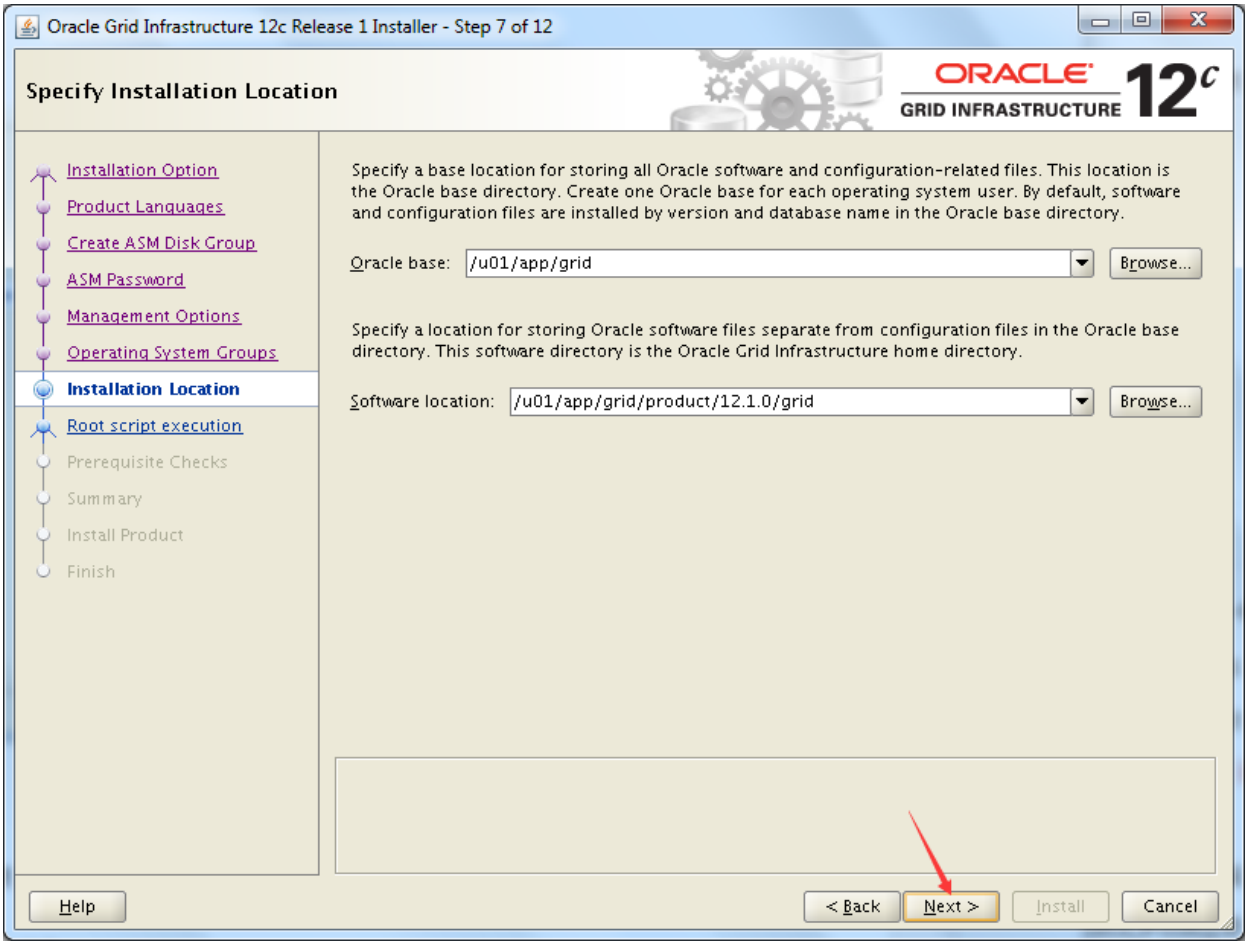
5）指定管理选项；



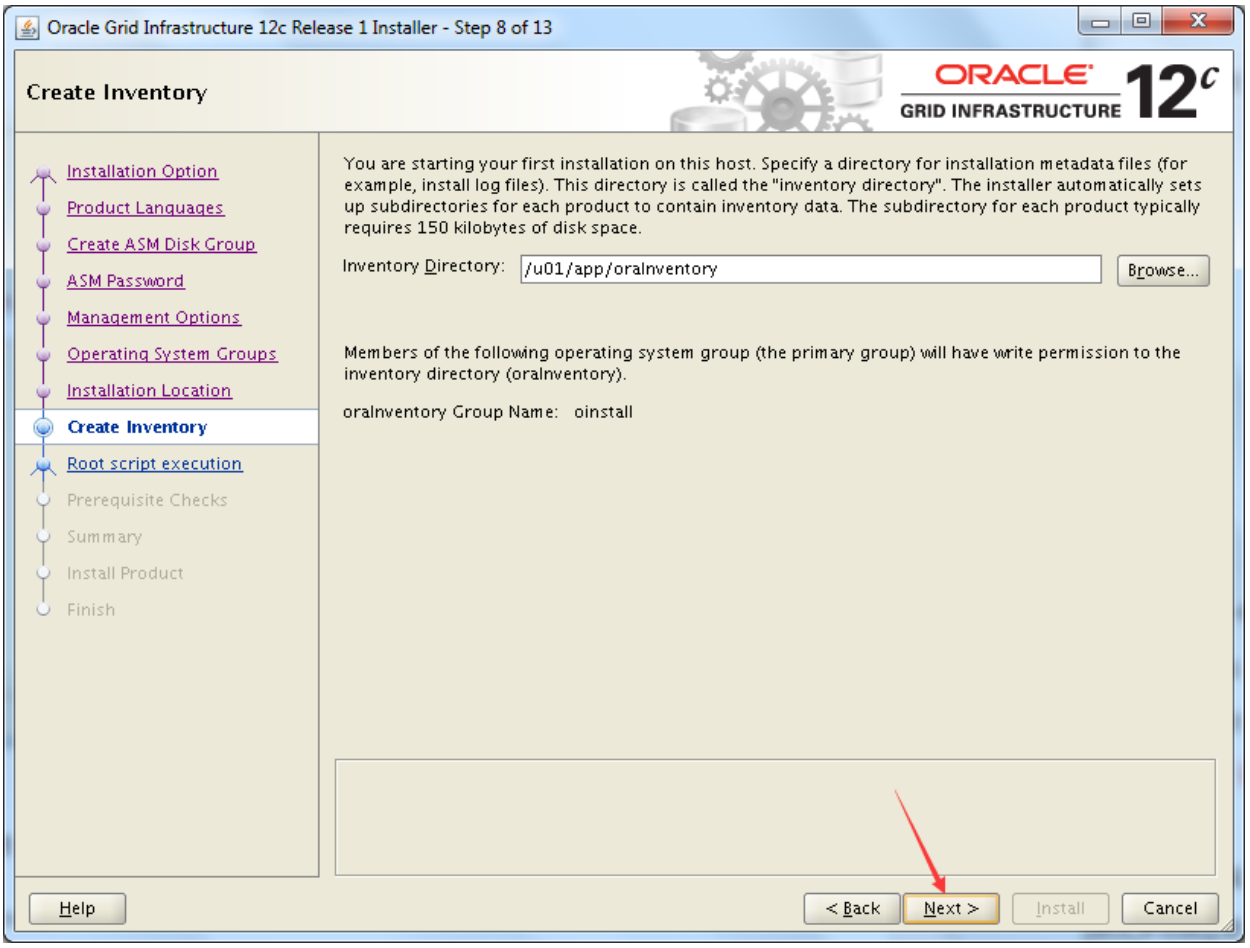
6）授权的操作系统组；


Oracle Grid Infrastructure 12c Release 1 Installer - Step 6 of 12
Privileged Operating System Groups
ORACLE GRID INFRASTRUCTURE 12c
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Management Options
Operating System Groups
Installation Location
Root script execution
Prerequisite Checks
Summary
Install Product
Finish
Select the name of the operating system group, that you want to use for operating system authentication to Oracle Automatic Storage Management.
Oracle ASM Administrator (OSASM) Group
asmadmin
Oracle ASM DBA (OSDBA for ASM) Group
asmdba
Oracle ASM Operator (OSOPER for ASM) Group (Optional)
asmoper
Help
< Back
Next >
Install
Cancel

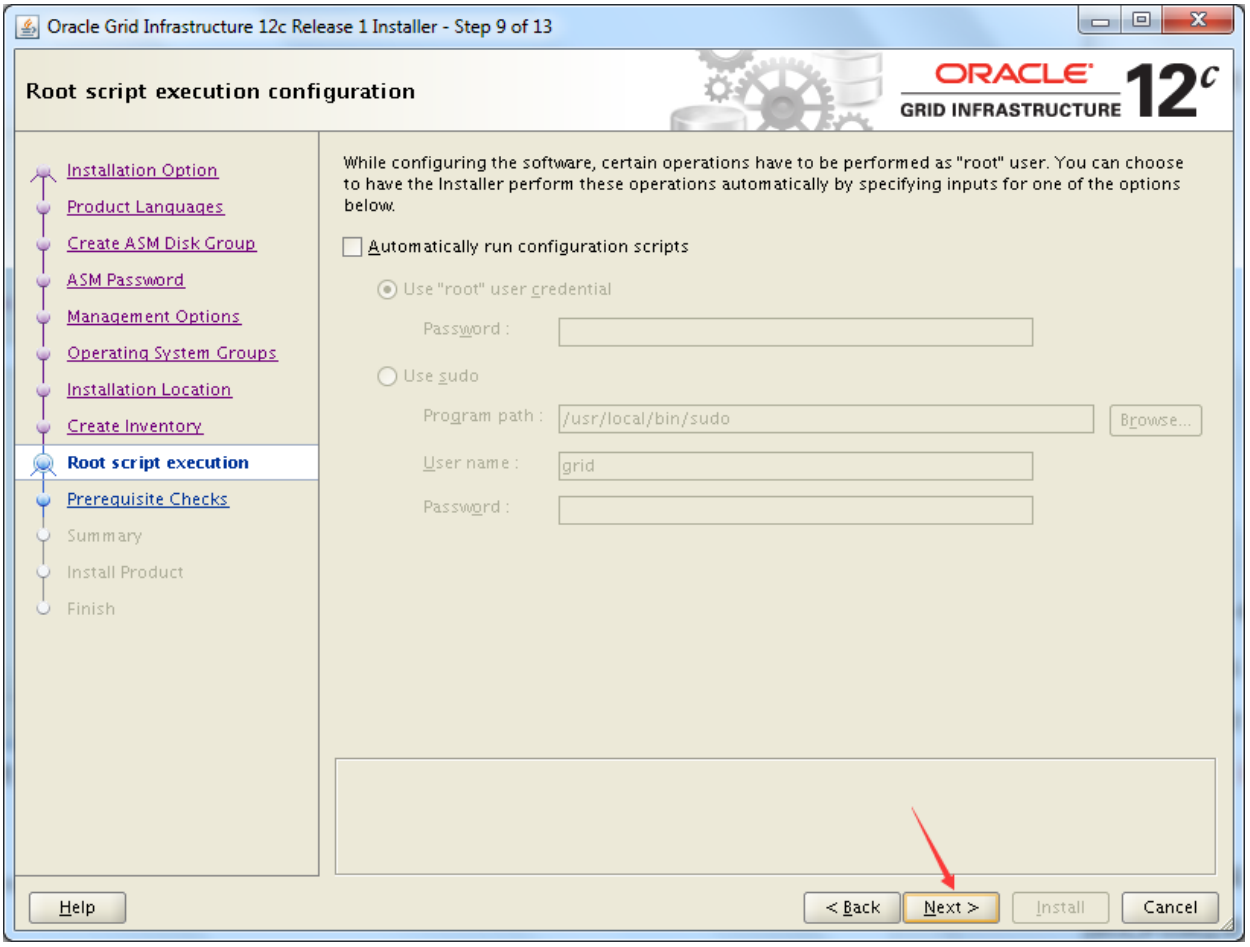
7）指定安装位置；


Oracle Grid Infrastructure 12c Release 1 Installer - Step 7 of 12
Specify Installation Location
ORACLE GRID INFRASTRUCTURE 12c
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Management Options
Operating System Groups
Installation Location
Root script execution
Prerequisite Checks
Summary
Install Product
Finish
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:
/u01/app/grid
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:
/u01/app/grid/product/12.1.0/grid
Browse...
Help
< Back
Next >
Install
Cancel

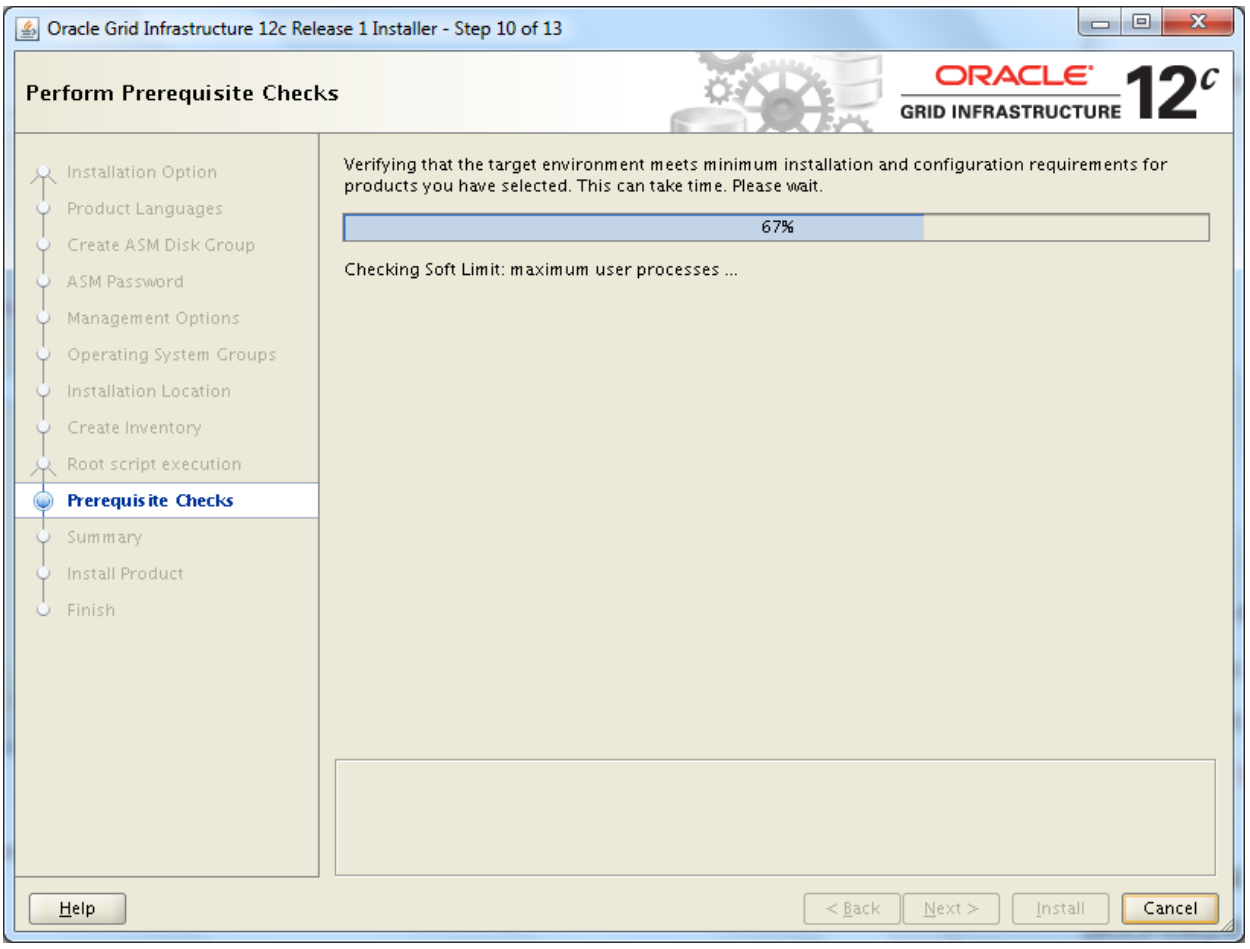
8）创建安装库；



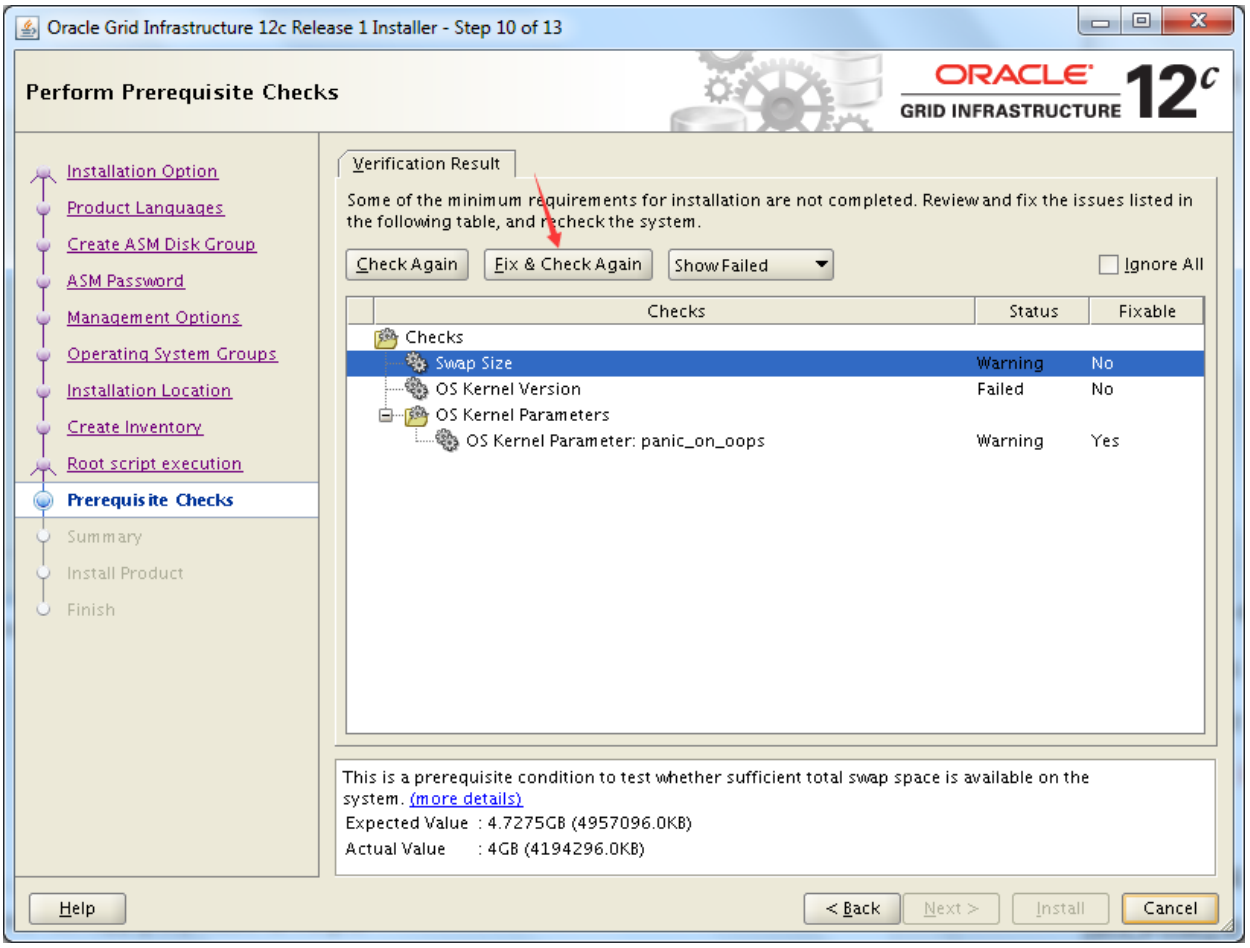
9）Root脚本执行配置；


Oracle Grid Infrastructure 12c Release 1 Installer - Step 9 of 13
Root script execution configuration
ORACLE GRID INFRASTRUCTURE 12c
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Management Options
Operating System Groups
Installation Location
Create Inventory
Root script execution
Prerequisite Checks
Summary
Install Product
Finish
While configuring the software, certain operations have to be performed as "root" user. You can choose to have the Installer perform these operations automatically by specifying inputs for one of the options below.
Automatically run configuration scripts
Use "root" user credential
Password :
Use sudo
Program path :
/usr/local/bin/sudo
Browse...
User name :
grid
Password :
Help
< Back
Next >
Install
Cancel

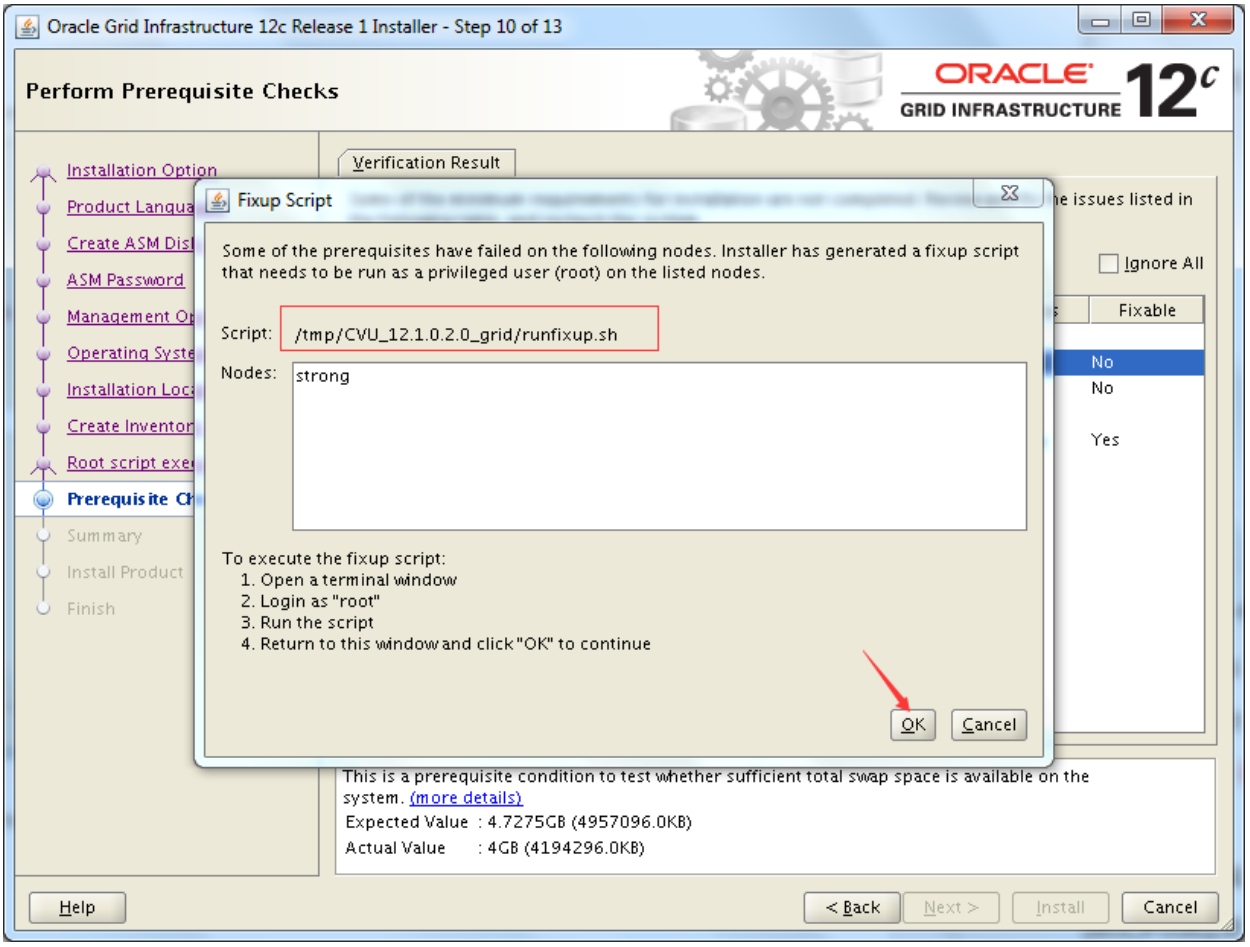
10）执行检查；


Oracle Grid Infrastructure 12c Release 1 Installer - Step 10 of 13
Perform Prerequisite Checks
ORACLE GRID INFRASTRUCTURE 12c
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Management Options
Operating System Groups
Installation Location
Create Inventory
Root script execution
Prerequisite Checks
Summary
Install Product
Finish
Verifying that the target environment meets minimum installation and configuration requirements for products you have selected. This can take time. Please wait.
67%
Checking Soft Limit: maximum user processes ...
Help
< Back
Next >
Install
Cancel

出现检查不通过，点击Fix&Check Again；

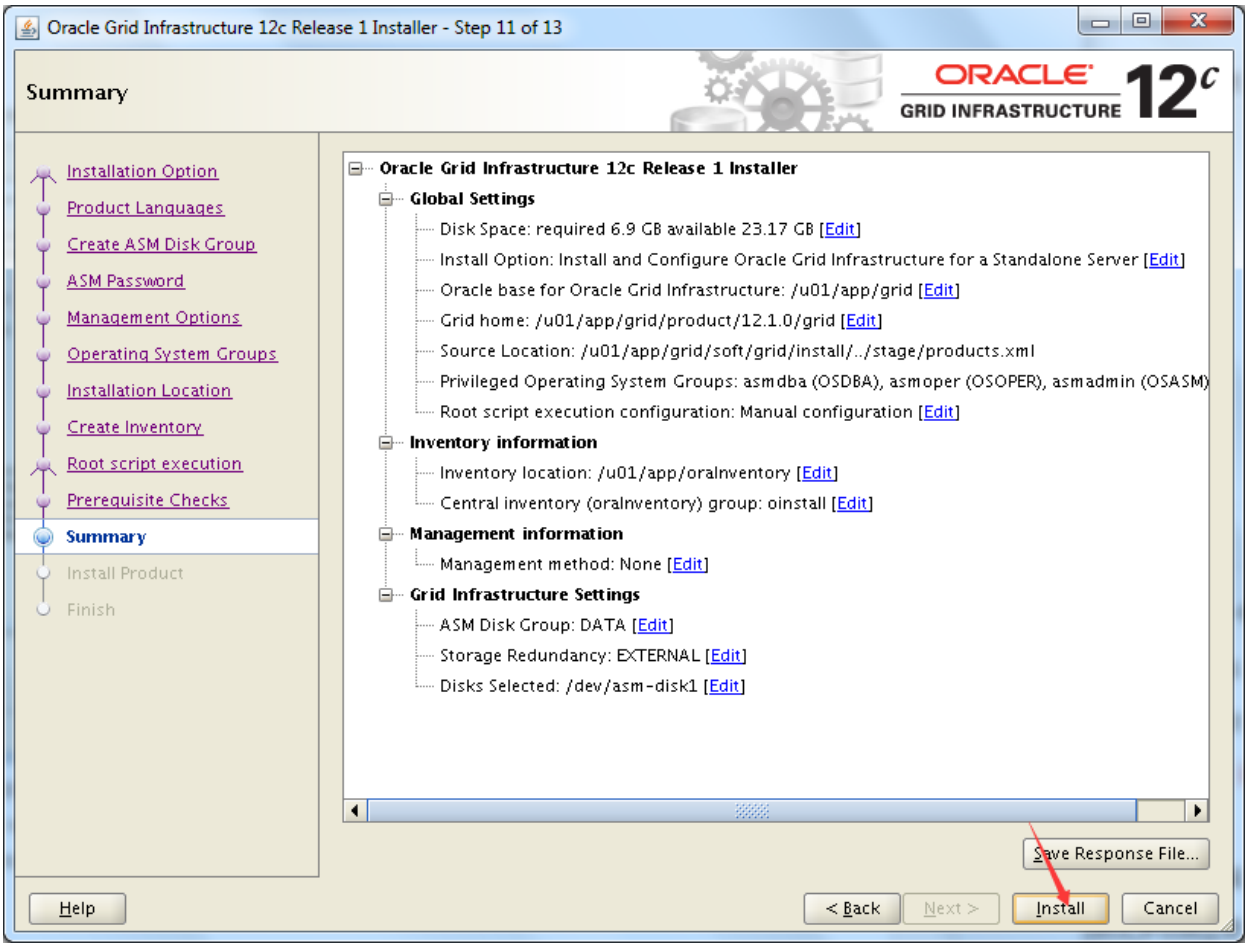


Root下执行修复脚本；

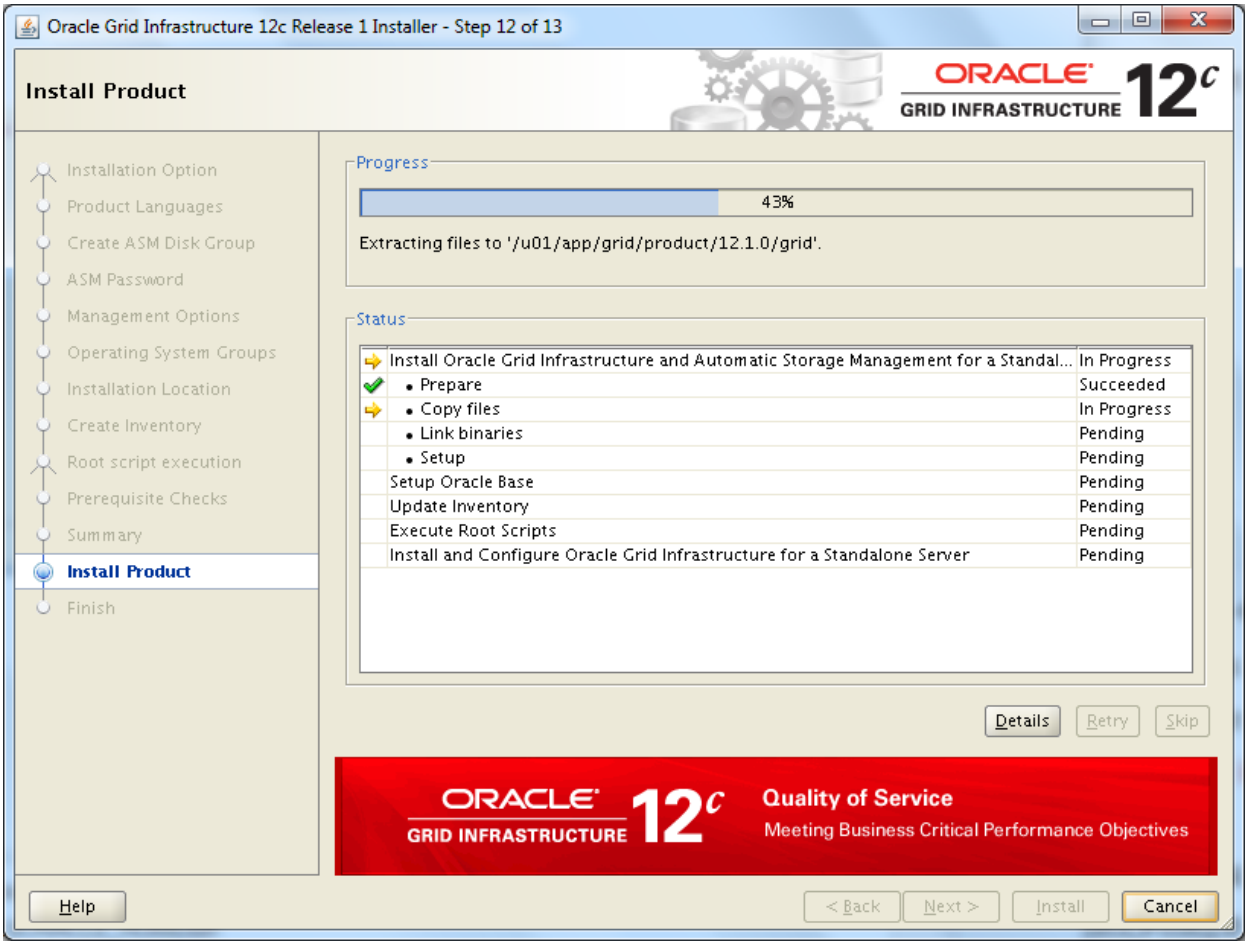



```
[root@strong ~]# /tmp/CVU_12.1.0.2.0_grid/runfixup.sh
All Fix-up operations were completed successfully.
```

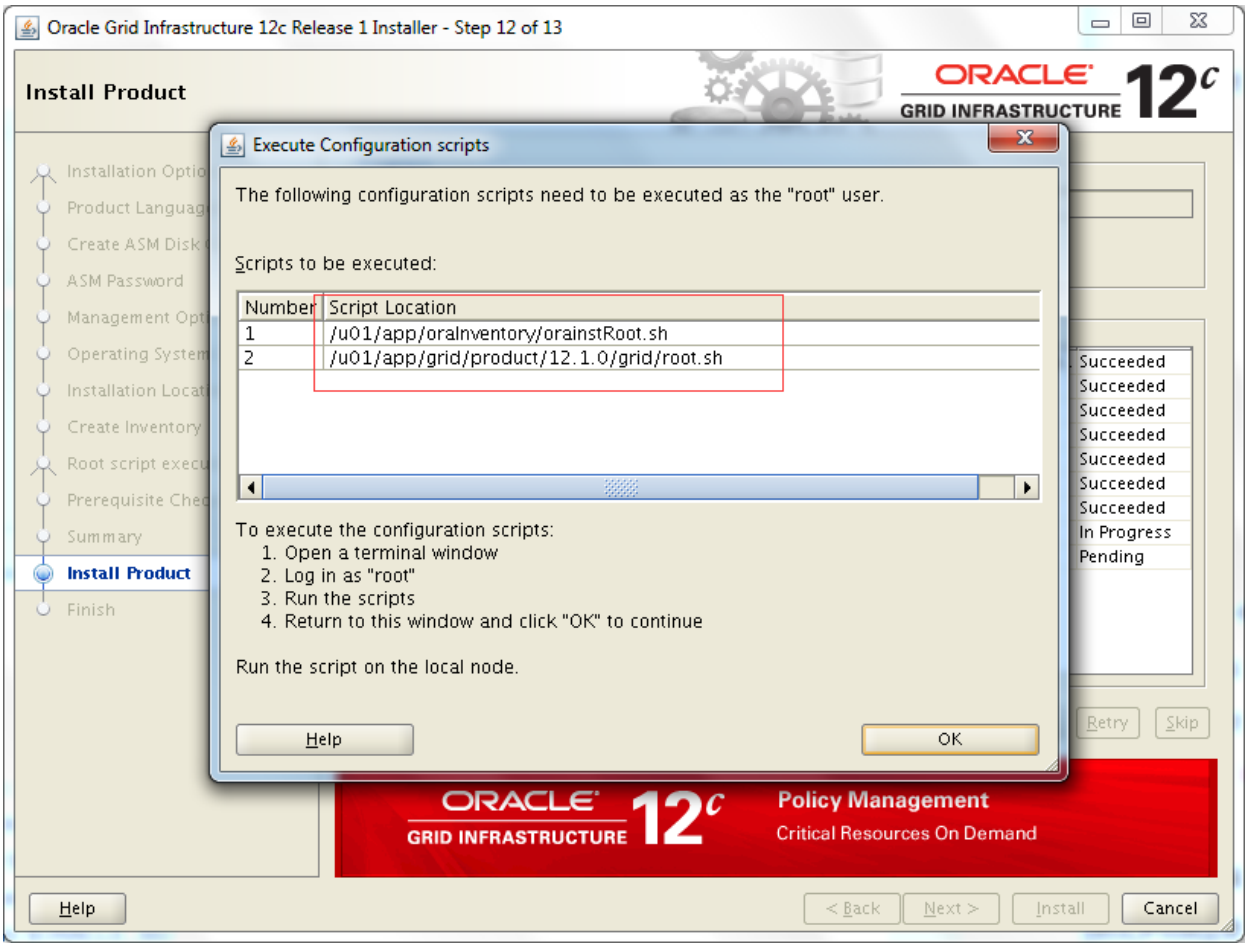
11）检查通过，点击Install；


Oracle Grid Infrastructure 12c Release 1 Installer - Step 11 of 13
Summary
ORACLE GRID INFRASTRUCTURE 12c
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Management Options
Operating System Groups
Installation Location
Create Inventory
Root script execution
Prerequisite Checks
Summary
Install Product
Finish
Oracle Grid Infrastructure 12c Release 1 Installer
Global Settings
Disk Space: required 6.9 GB available 23.17 GB [Edit]
Install Option: Install and Configure Oracle Grid Infrastructure for a Standalone Server [Edit]
Oracle base for Oracle Grid Infrastructure: /u01/app/grid [Edit]
Grid home: /u01/app/grid/product/12.1.0/grid [Edit]
Source Location: /u01/app/grid/soft/grid/install/../stage/products.xml
Privileged Operating System Groups: asmdba (OSDBA), asmoper (OSOPER), asmadmin (OSASM)
Root script execution configuration: Manual configuration [Edit]
Inventory information
Inventory location: /u01/app/oraInventory [Edit]
Central inventory (oraInventory) group: oinstall [Edit]
Management information
Management method: None [Edit]
Grid Infrastructure Settings
ASM Disk Group: DATA [Edit]
Storage Redundancy: EXTERNAL [Edit]
Disks Selected: /dev/asm-disk1 [Edit]
Save Response File...
Help
< Back
Next >
Install
Cancel

12）安装产品；


Oracle Grid Infrastructure 12c Release 1 Installer - Step 12 of 13
Install Product
ORACLE GRID INFRASTRUCTURE 12c
Installation Option
Product Languages
Create ASM Disk Group
ASM Password
Management Options
Operating System Groups
Installation Location
Create Inventory
Root script execution
Prerequisite Checks
Summary
Install Product
Finish
Progress
43%
Extracting files to '/u01/app/grid/product/12.1.0/grid'.
Status
Install Oracle Grid Infrastructure and Automatic Storage Management for a Standal... In Progress
• Prepare Succeeded
• Copy files In Progress
• Link binaries Pending
• Setup Pending
Setup Oracle Base Pending
Update Inventory Pending
Execute Root Scripts Pending
Install and Configure Oracle Grid Infrastructure for a Standalone Server Pending
Details
Retry
Skip
ORACLE GRID INFRASTRUCTURE 12c
Quality of Service
Meeting Business Critical Performance Objectives
Help
< Back
Next >
Install
Cancel

13）执行Root脚本；



[root@strong ~]# /u01/app/oraInventory/orainstRoot.sh

Changing permissions of /u01/app/oraInventory.

Adding read,write permissions for group.

Removing read,write,execute permissions for world.

Changing groupname of /u01/app/oraInventory to oinstall.

The execution of the script is complete.

[root@strong ~]# /u01/app/grid/product/12.1.0/grid/root.sh

Performing root user operation.

The following environment variables are set as:

ORACLE_OWNER= grid

ORACLE_HOME= /u01/app/grid/product/12.1.0/grid

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

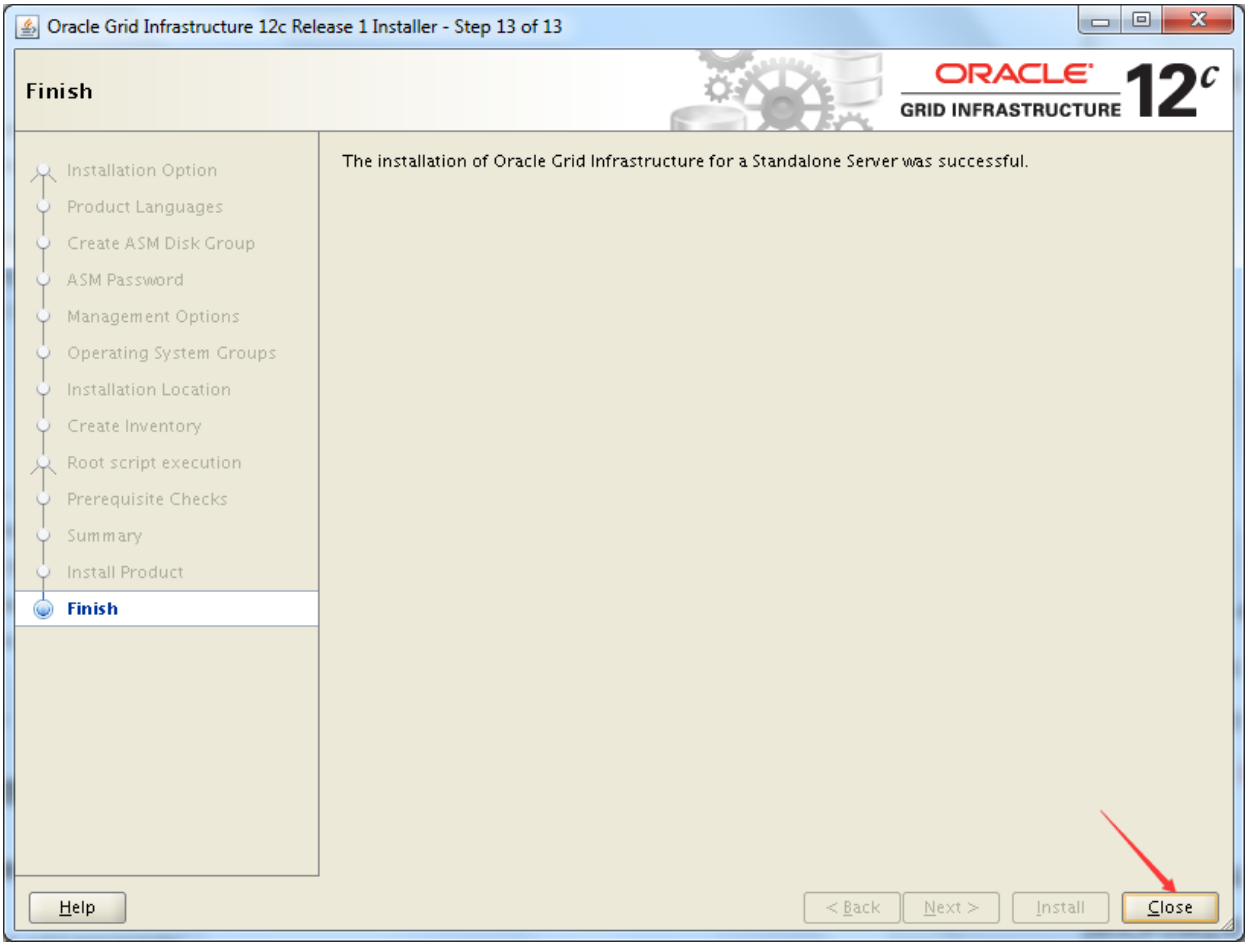
Copying dbhome to /usr/local/bin ...

Copying oraenv to /usr/local/bin ...

Copying coraenv to /usr/local/bin ...

Creating /etc/oratab file...
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/grid/product/12.1.0/grid/crs/install/crsconfig_params
LOCAL ADD MODE
Creating OCR keys for user 'grid', 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 strong successfully pinned.
2018/08/11 16:54:37 CLSRSC-330: Adding Clusterware entries to file 'oracle-ohasd.conf'

strong 2018/08/11 16:55:10
/u01/app/grid/product/12.1.0/grid/cdata/strong/backup_20180811_165510.olr 0
CRS-2791: Starting shutdown of Oracle High Availability Services-managed resources on 'strong'
CRS-2673: Attempting to stop 'ora.evmd' on 'strong'
CRS-2677: Stop of 'ora.evmd' on 'strong' succeeded
CRS-2793: Shutdown of Oracle High Availability Services-managed resources on 'strong' has completed
CRS-4133: Oracle High Availability Services has been stopped.
CRS-4123: Oracle High Availability Services has been started.
2018/08/11 16:57:38 CLSRSC-327: Successfully configured Oracle Restart for a standalone server
14）安装完成；



15）完善环境变量；

[grid@strong ~]$ vim .bash_profile（在该文件增加以下内容）

export ORACLE_HOME=/u01/app/grid/product/12.1.0/grid

export PATH=$PATH:$ORACLE_HOME/bin

[grid@strong ~]$ . .bash_profile

[grid@strong ~]$ echo $ORACLE_SID

+ASM

至此，ASM安装完成。

5 安装Oracle数据库软件

5.1 上传并解压Oracle数据库软件

[oracle@strong ~]$ cd /u01/app/oracle/

[oracle@strong oracle]$ mkdir soft

[oracle@strong oracle]$ cd soft/

[oracle@strong soft]$ ll -h

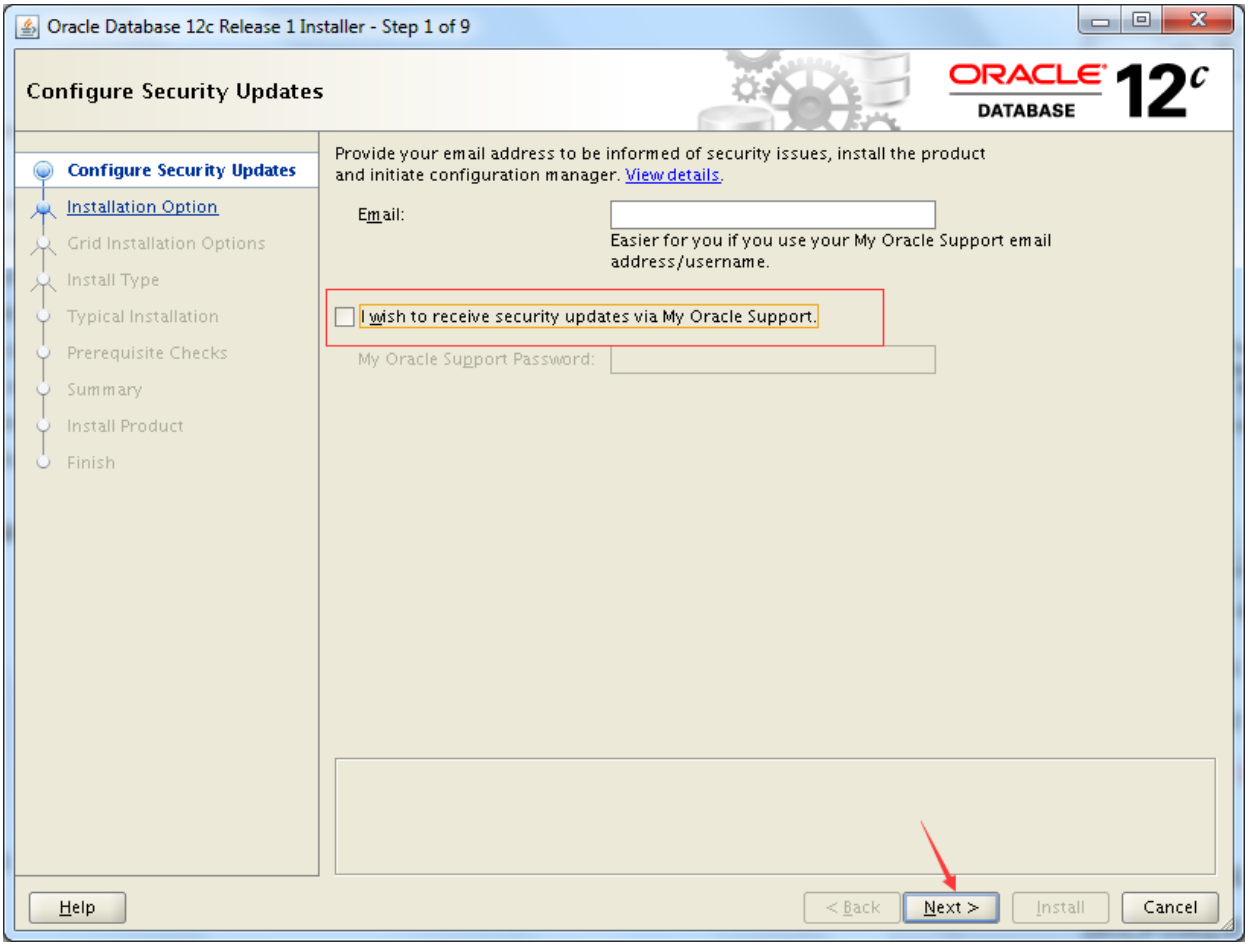
```
total 2.6G
-rw-r--r-- 1 oracle oinstall 1.6G Aug 11 17:07 linuxamd64_12102_database_1of2.zip
-rw-r--r-- 1 oracle oinstall 968M Aug 11 17:07
linuxamd64_12102_database_2of2.zip
[oracle@strong soft]$ unzip linuxamd64_12102_database_1of2.zip
[oracle@strong soft]$ unzip linuxamd64_12102_database_2of2.zip
```

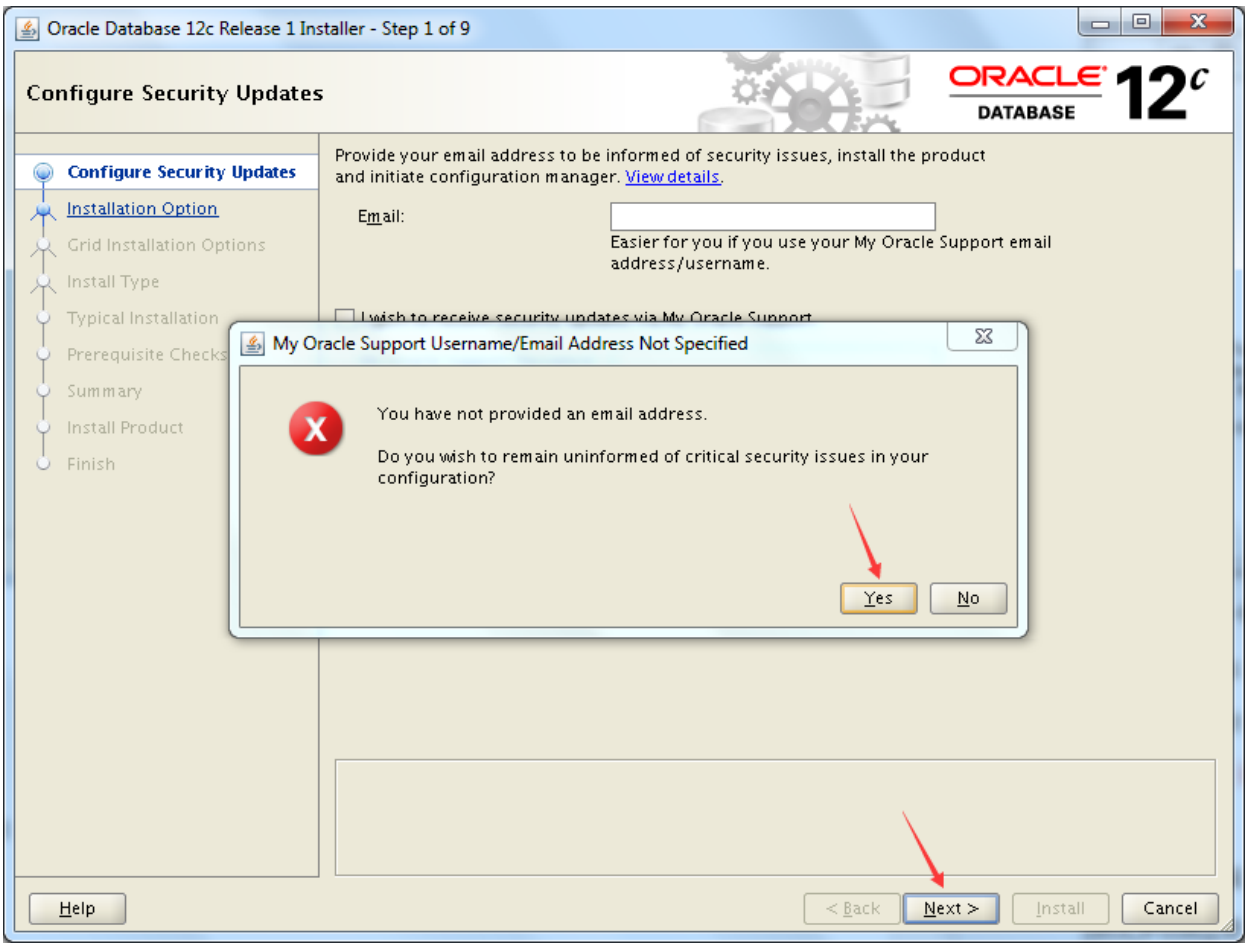
5.2 进入软件目录，启动安装程序

```
[oracle@strong soft]$ cd database/
[oracle@strong database]$ ll -h
total 36K
drwxr-xr-x  4 oracle oinstall 4.0K Aug 11 17:10 install
drwxrwxr-x  2 oracle oinstall 4.0K Jul  7  2014 response
drwxr-xr-x  2 oracle oinstall 4.0K Jul  7  2014 rpm
-rwxr-xr-x  1 oracle oinstall 8.4K Jul  7  2014 runInstaller
drwxrwxr-x  2 oracle oinstall 4.0K Jul  7  2014 sshsetup
drwxr-xr-x 14 oracle oinstall 4.0K Jul  7  2014 stage
-rwxr-xr-x  1 oracle oinstall  500 Feb  7  2013 welcome.html
[oracle@strong database]$ ./runInstaller
```

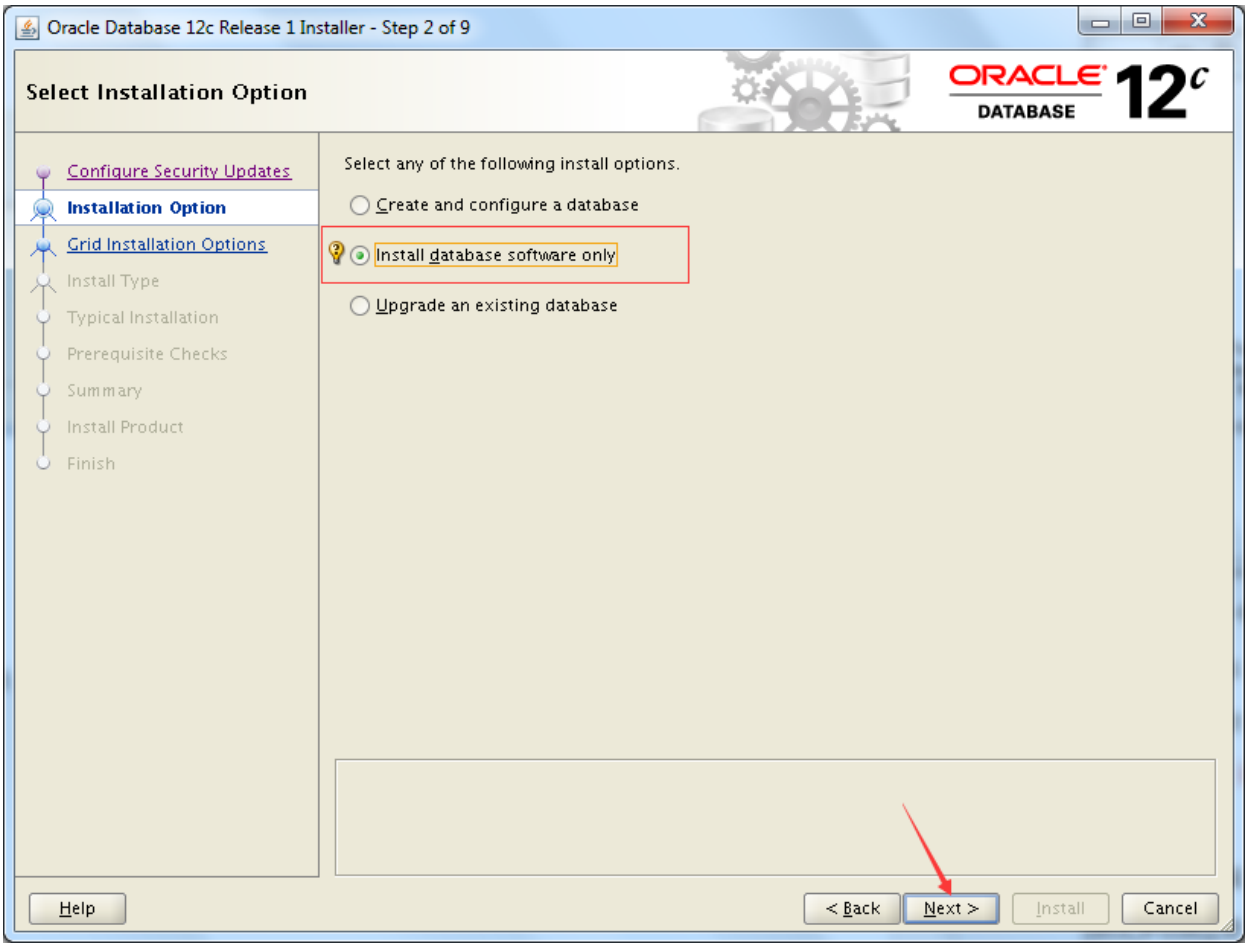
5.3 Oracle数据库软件安装

1）配置安全更新；

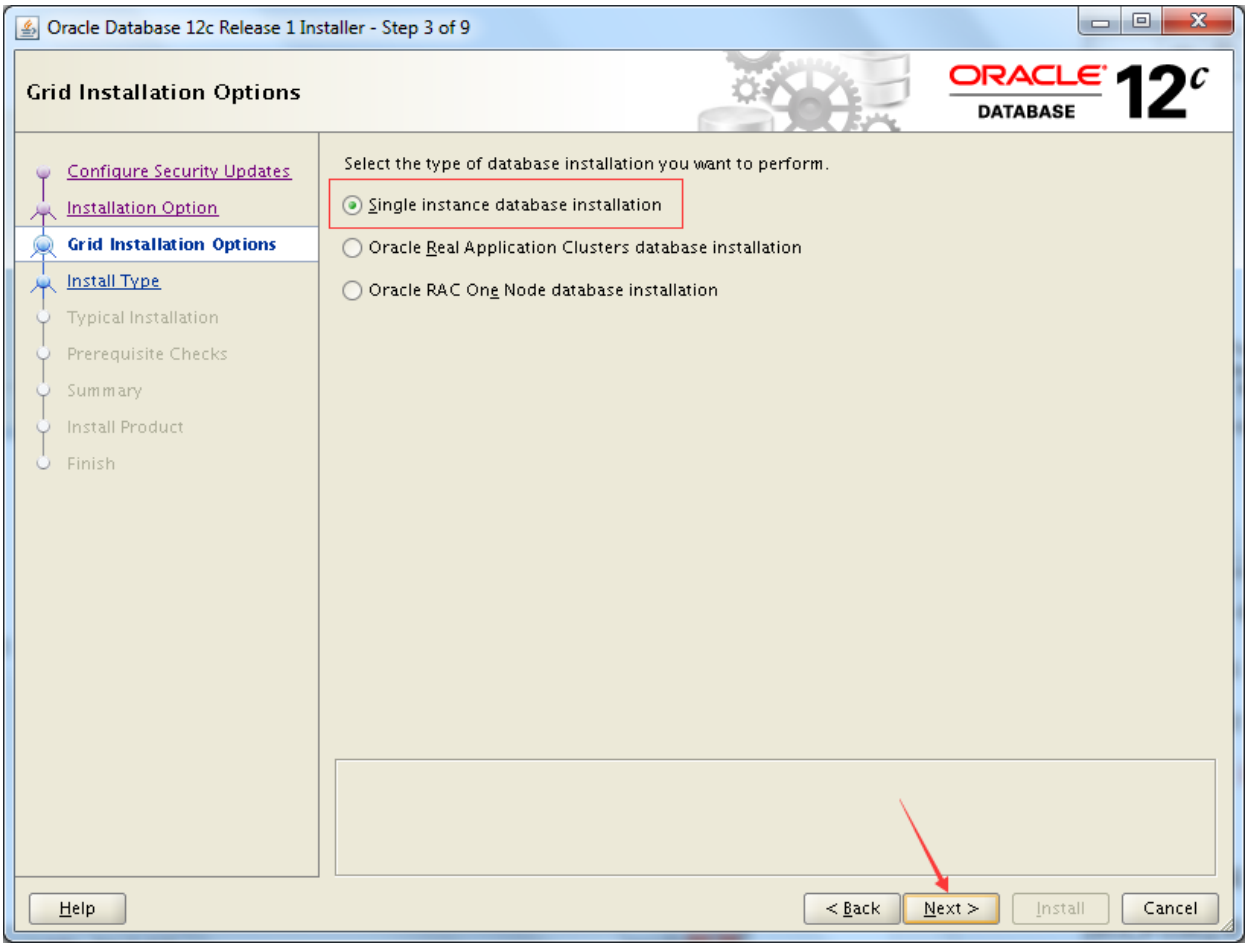

Oracle Database 12c Release 1 Installer - Step 1 of 9
Configure Security Updates
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Install Type
Typical Installation
Prerequisite Checks
Summary
Install Product
Finish
Provide your email address to be informed of security issues, install the product and initiate configuration manager. View details.
Email:
Easier for you if you use your My Oracle Support email address/username.
I wish to receive security updates via My Oracle Support.
My Oracle Support Password:
Help
< Back
Next >
Install
Cancel


Oracle Database 12c Release 1 Installer - Step 1 of 9
Configure Security Updates
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Install Type
Typical Installation
Prerequisite Checks
Summary
Install Product
Finish
Provide your email address to be informed of security issues, install the product and initiate configuration manager. View details.
Email:
Easier for you if you use your My Oracle Support email address/username.
My Oracle Support Username/Email Address Not Specified
You have not provided an email address.
Do you wish to remain uninformed of critical security issues in your configuration?
Yes
No
Help
< Back
Next >
Install
Cancel

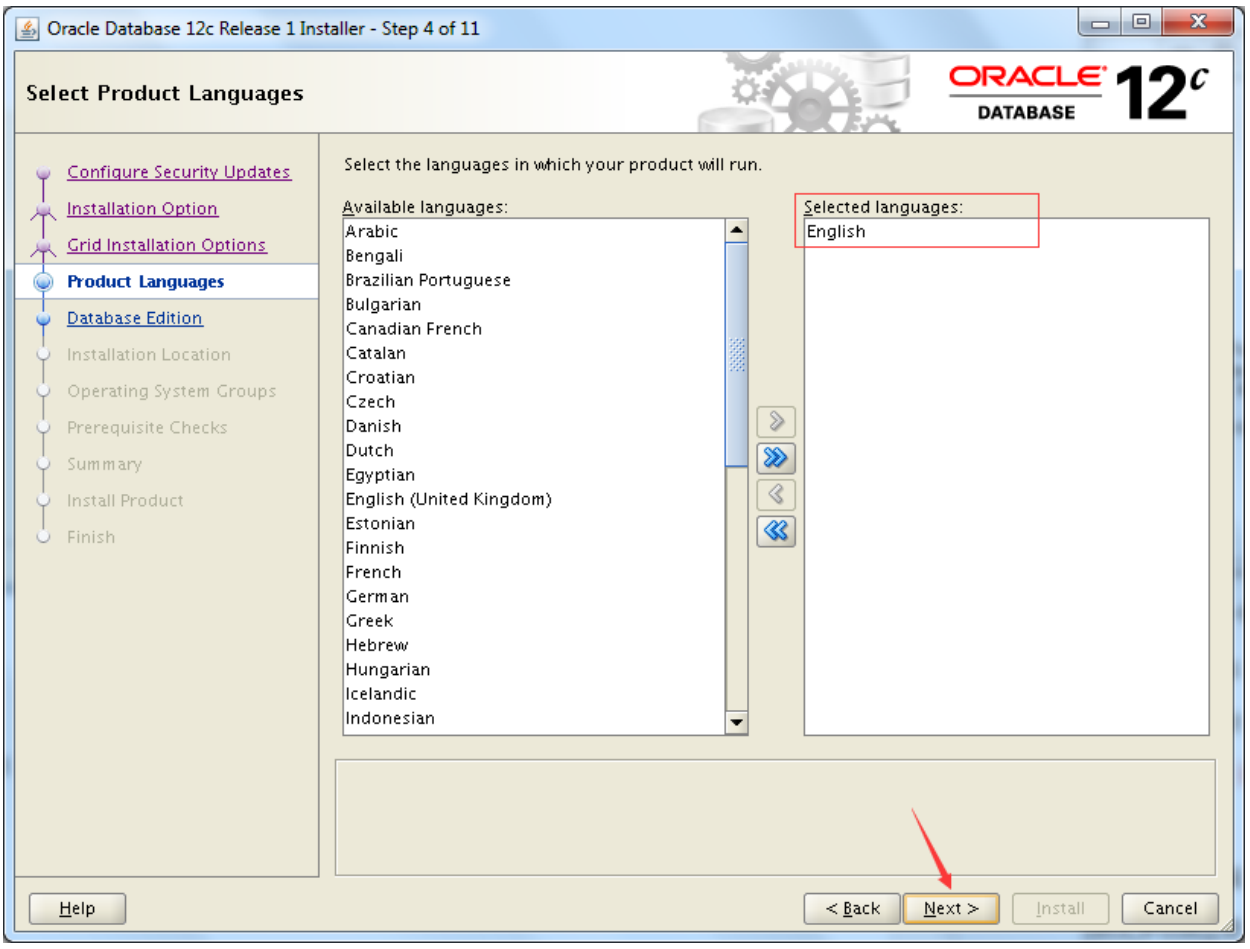
2）选择安装选项；



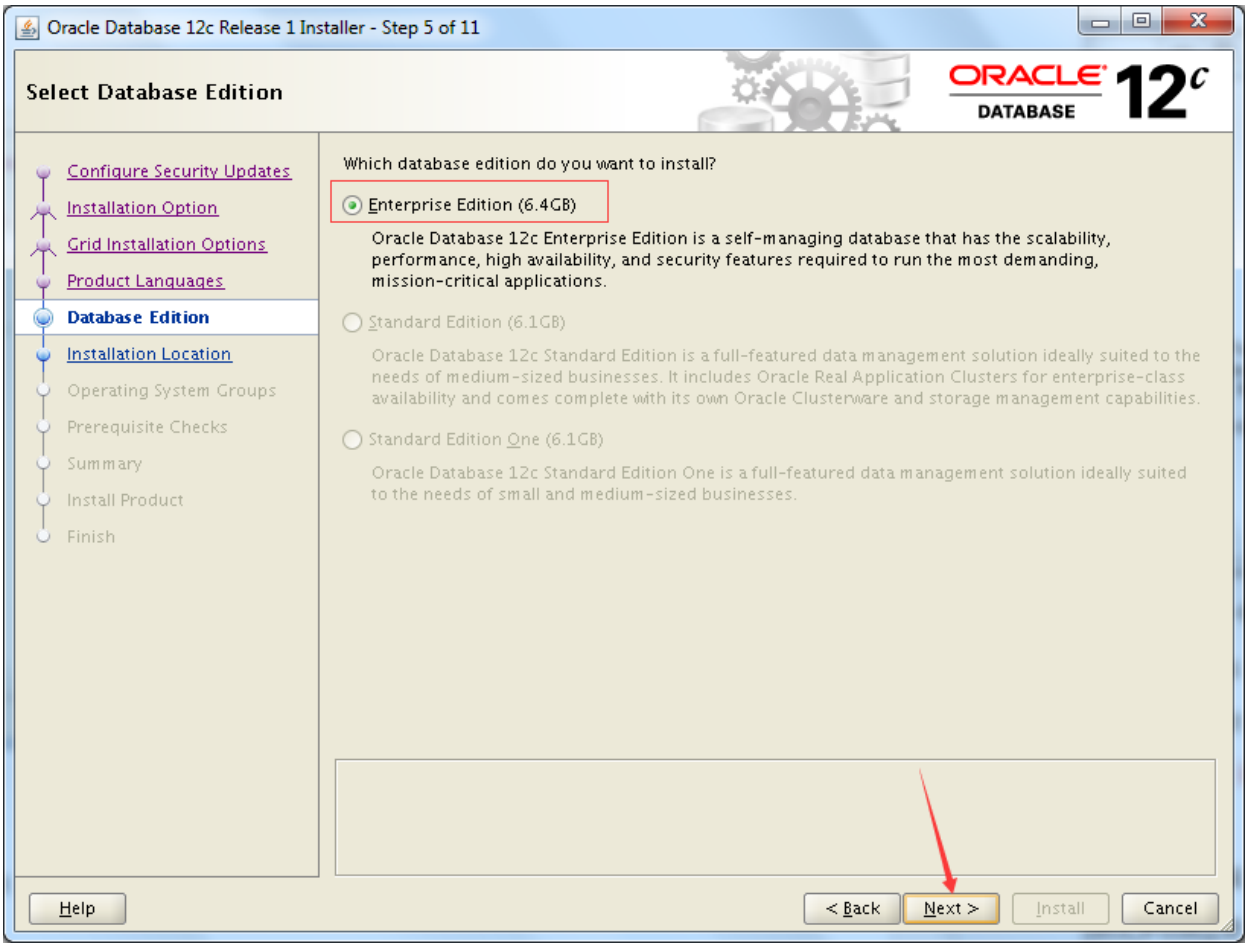
3）Grid配置选项；


Oracle Database 12c Release 1 Installer - Step 3 of 9
Grid Installation Options
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Install Type
Typical Installation
Prerequisite Checks
Summary
Install Product
Finish
Select the type of database installation you want to perform.
Single instance database installation
Oracle Real Application Clusters database installation
Oracle RAC One Node database installation
Help
< Back
Next >
Install
Cancel

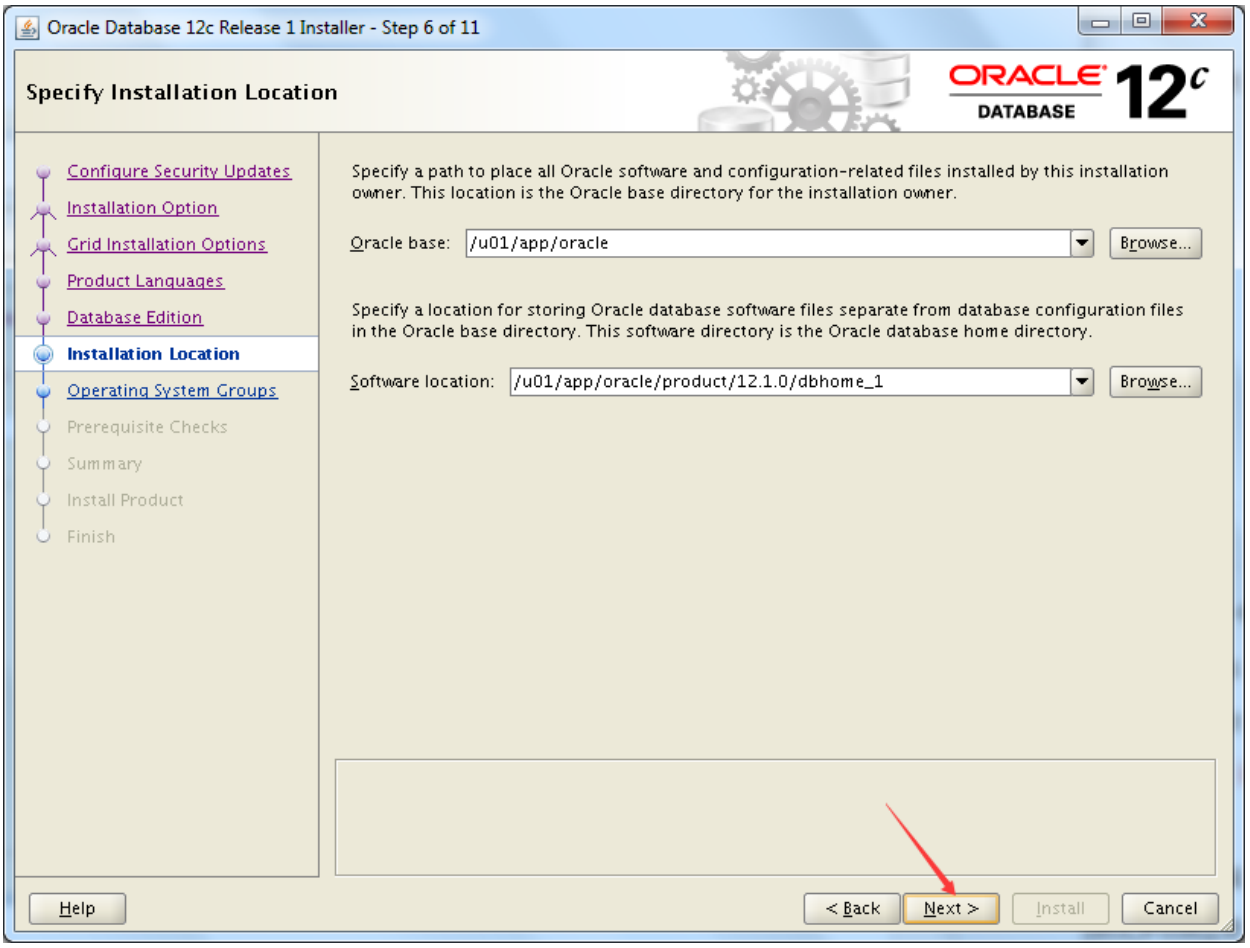
4）选择产品语言；


Oracle Database 12c Release 1 Installer - Step 4 of 11
Select Product Languages
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Product Languages
Database Edition
Installation Location
Operating System Groups
Prerequisite Checks
Summary
Install Product
Finish
Select the languages in which your product will run.
Available languages:
Arabic
Bengali
Brazilian Portuguese
Bulgarian
Canadian French
Catalan
Croatian
Czech
Danish
Dutch
Egyptian
English (United Kingdom)
Estonian
Finnish
French
German
Greek
Hebrew
Hungarian
Icelandic
Indonesian
Selected languages:
English
Help
< Back
Next >
Install
Cancel

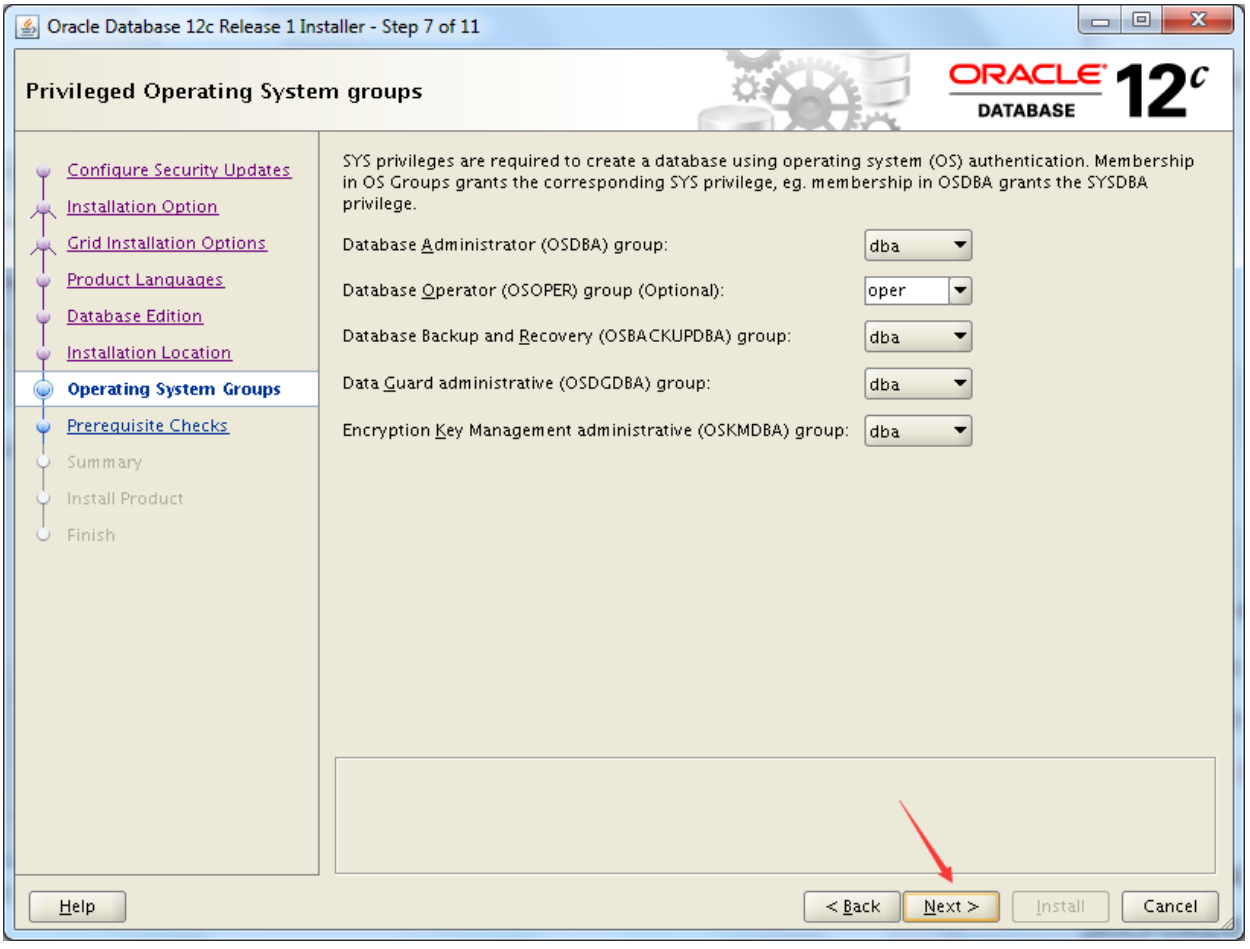
5）选择数据库版本；



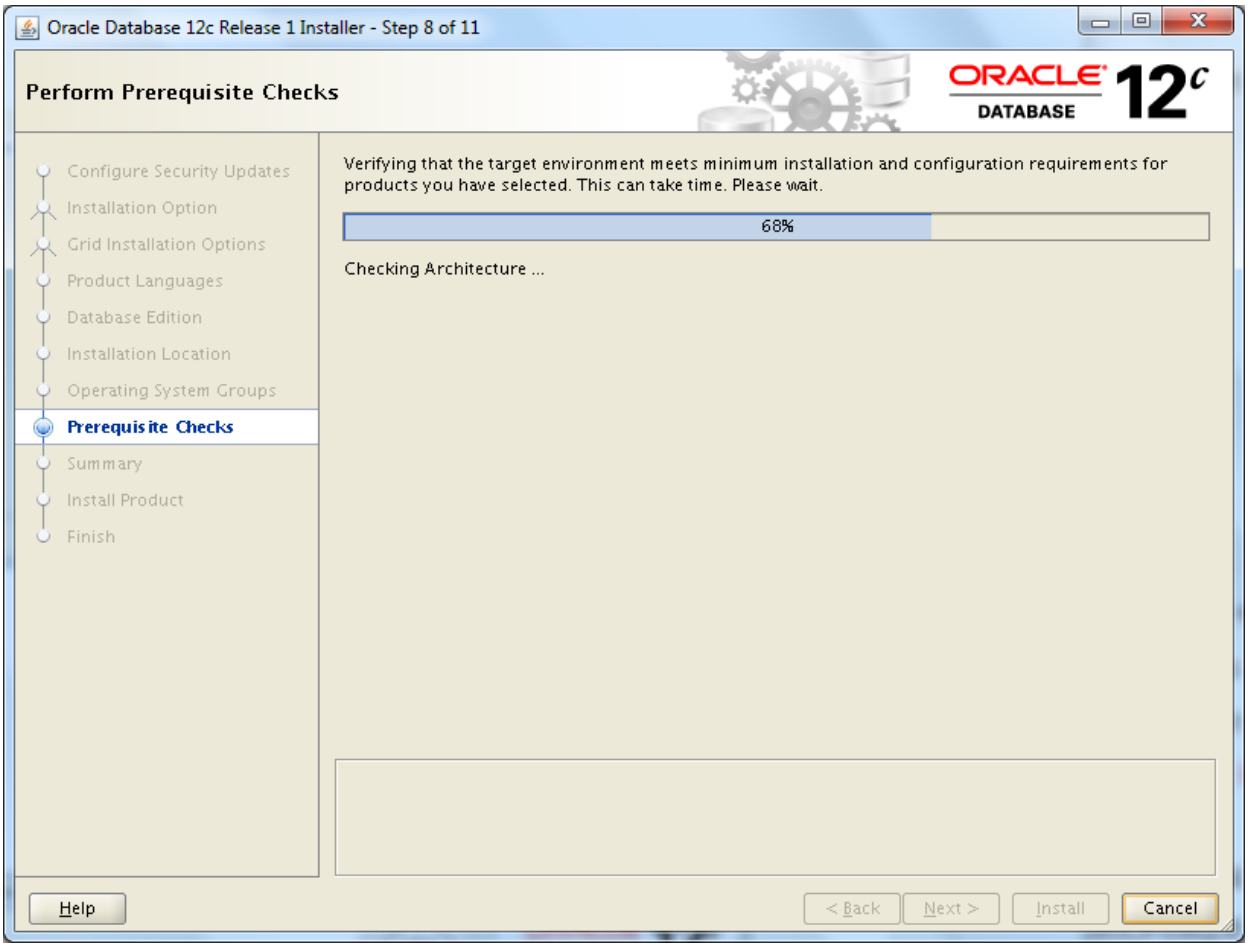
6）指定安装位置；


Oracle Database 12c Release 1 Installer - Step 6 of 11
Specify Installation Location
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Product Languages
Database Edition
Installation Location
Operating System Groups
Prerequisite Checks
Summary
Install Product
Finish
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/12.1.0/dbhome_1
Browse...
Help
< Back
Next >
Install
Cancel

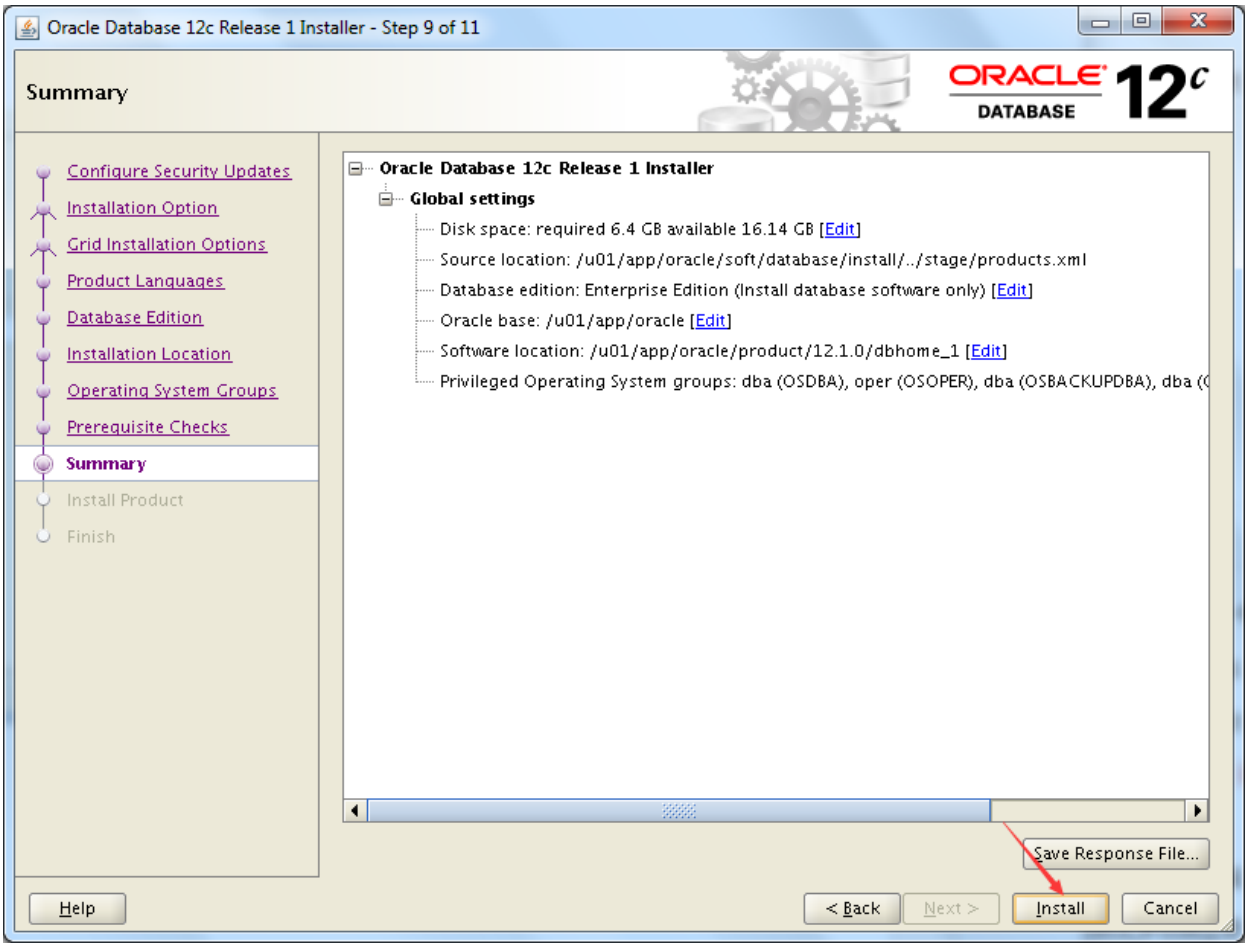
7）授权的操作系统组；


Oracle Database 12c Release 1 Installer - Step 7 of 11
Privileged Operating System groups
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Product Languages
Database Edition
Installation Location
Operating System Groups
Prerequisite Checks
Summary
Install Product
Finish
SYS privileges are required to create a database using operating system (OS) authentication. Membership in OS Groups grants the corresponding SYS privilege, eg. membership in OSDBA grants the SYSDBA privilege.
Database Administrator (OSDBA) group: dba
Database Operator (OSOPER) group (Optional): oper
Database Backup and Recovery (OSBACKUPDBA) group: dba
Data Guard administrative (OSDGDBA) group: dba
Encryption Key Management administrative (OSKMDBA) group: dba
Help
< Back
Next >
Install
Cancel

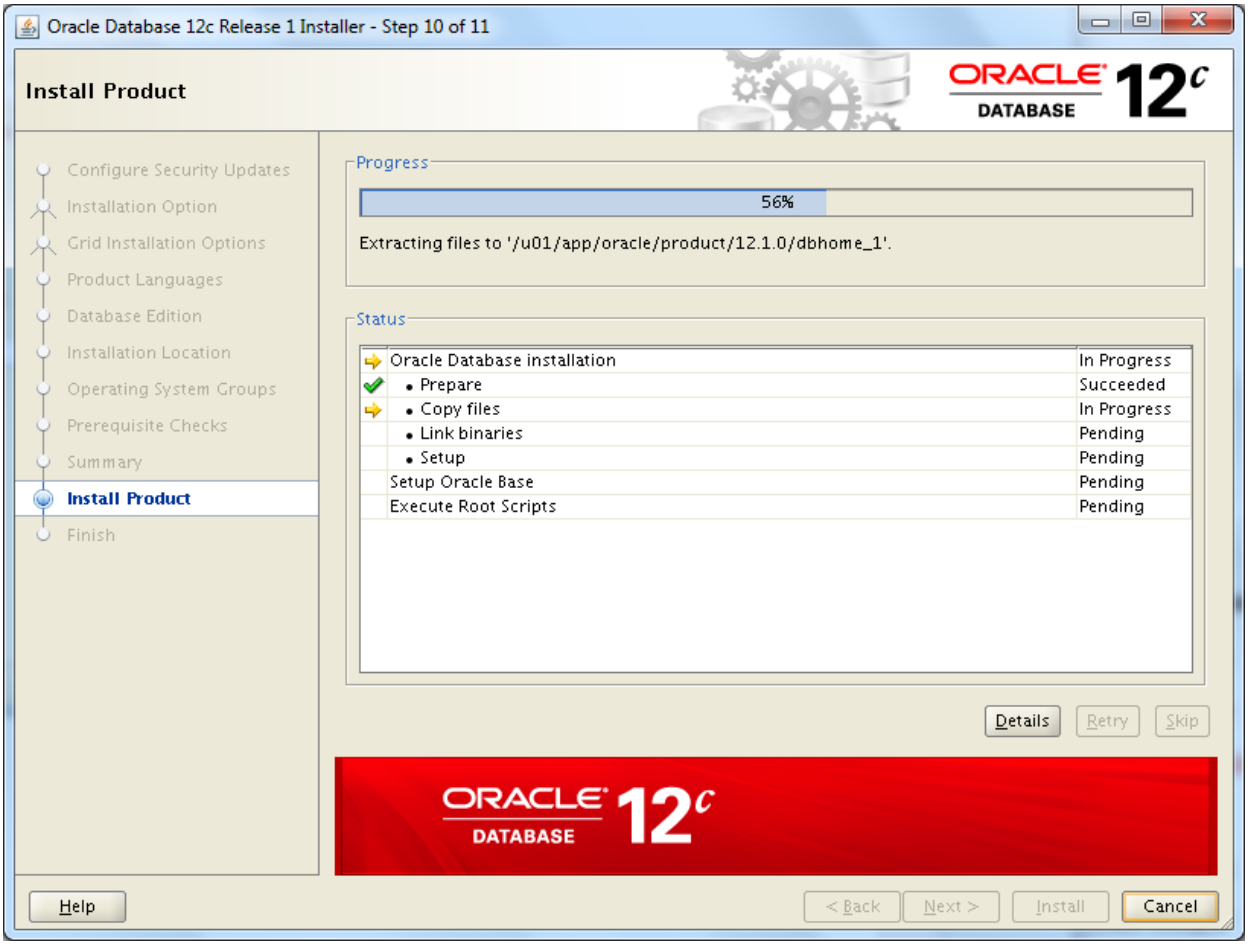
8）先决条件检查；



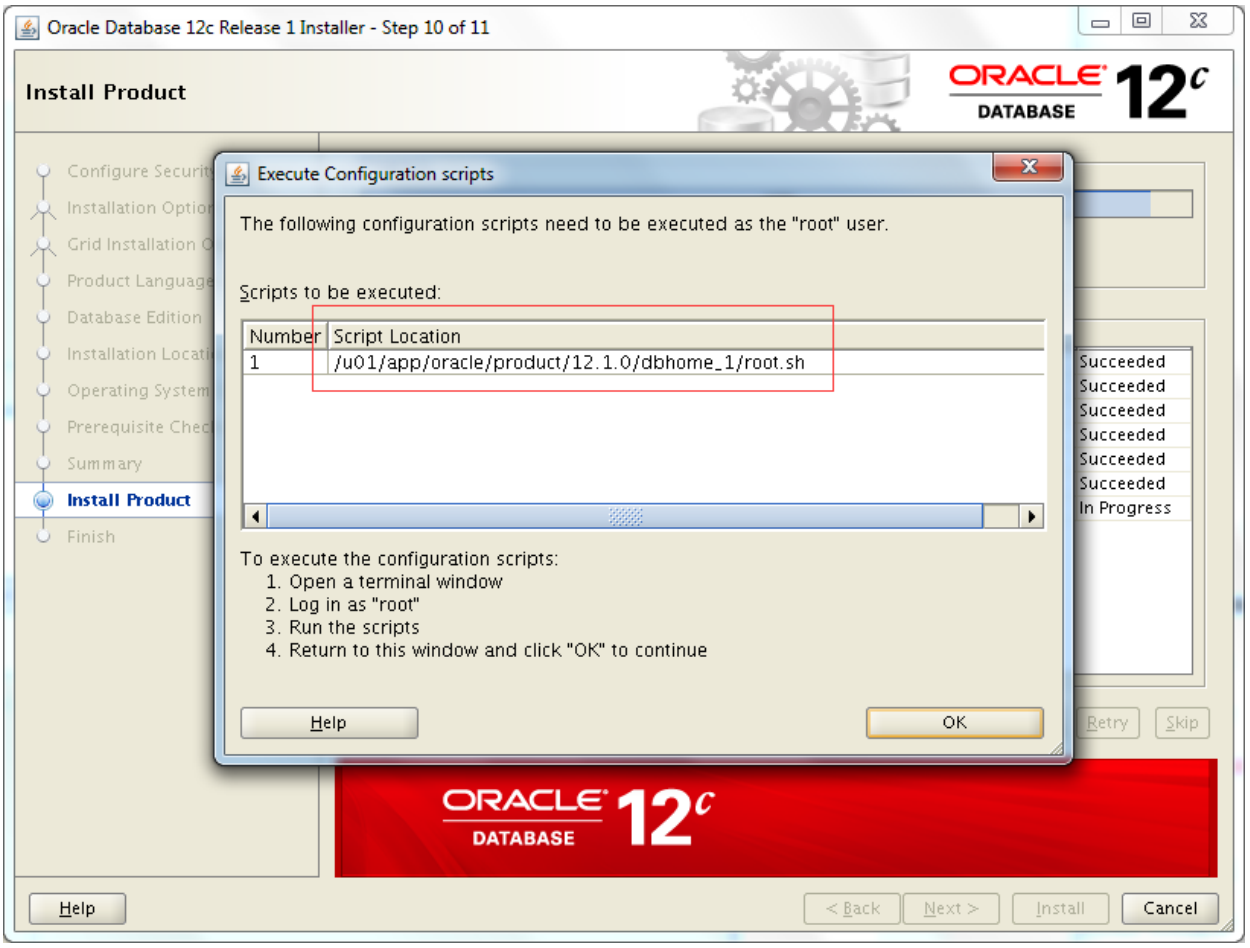
9）检查通过；


Oracle Database 12c Release 1 Installer - Step 9 of 11
Summary
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Product Languages
Database Edition
Installation Location
Operating System Groups
Prerequisite Checks
Summary
Install Product
Finish
Oracle Database 12c Release 1 Installer
Global settings
Disk space: required 6.4 GB available 16.14 GB [Edit]
Source location: /u01/app/oracle/soft/database/install/../stage/products.xml
Database edition: Enterprise Edition (Install database software only) [Edit]
Oracle base: /u01/app/oracle [Edit]
Software location: /u01/app/oracle/product/12.1.0/dbhome_1 [Edit]
Privileged Operating System groups: dba (OSDBA), oper (OSOPER), dba (OSBACKUPDBA), dba (
Save Response File...
Help
< Back
Next >
Install
Cancel

10）安装产品；


Oracle Database 12c Release 1 Installer - Step 10 of 11
Install Product
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Product Languages
Database Edition
Installation Location
Operating System Groups
Prerequisite Checks
Summary
Install Product
Finish
Progress
56%
Extracting files to '/u01/app/oracle/product/12.1.0/dbhome_1'.
Status
Oracle Database installation In Progress
Prepare Succeeded
Copy files In Progress
Link binaries Pending
Setup Pending
Setup Oracle Base Pending
Execute Root Scripts Pending
Details
Retry
Skip
ORACLE DATABASE 12c
Help
< Back
Next >
Install
Cancel

11）执行Root脚本；

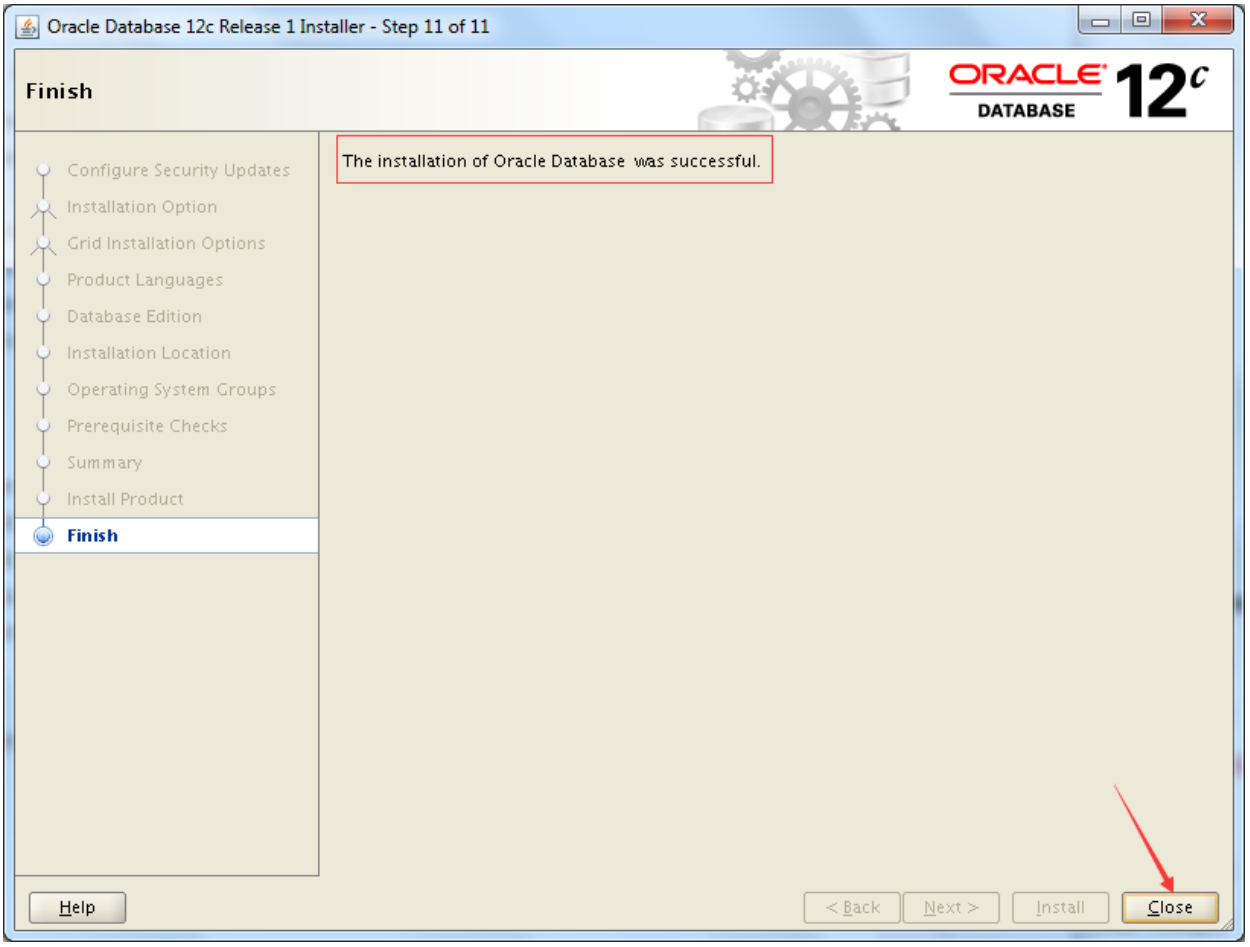


[root@strong ~]# /u01/app/oracle/product/12.1.0/dbhome_1/root.sh
Performing root user operation.

The following environment variables are set as:
ORACLE_OWNER= oracle
ORACLE_HOME= /u01/app/oracle/product/12.1.0/dbhome_1

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.
12）安装完成；



13）完善环境变量；

[oracle@strong ~]$ vim .bash_profile（在该文件增加如下内容）

export ORACLE_HOME=/u01/app/oracle/product/12.1.0/dbhome_1

export PATH=$PATH:$ORACLE_HOME/bin

[oracle@strong ~]$ . .bash_profile

[oracle@strong ~]$ echo $ORACLE_SID

orcl

至此，Oracle数据库软件安装完成。

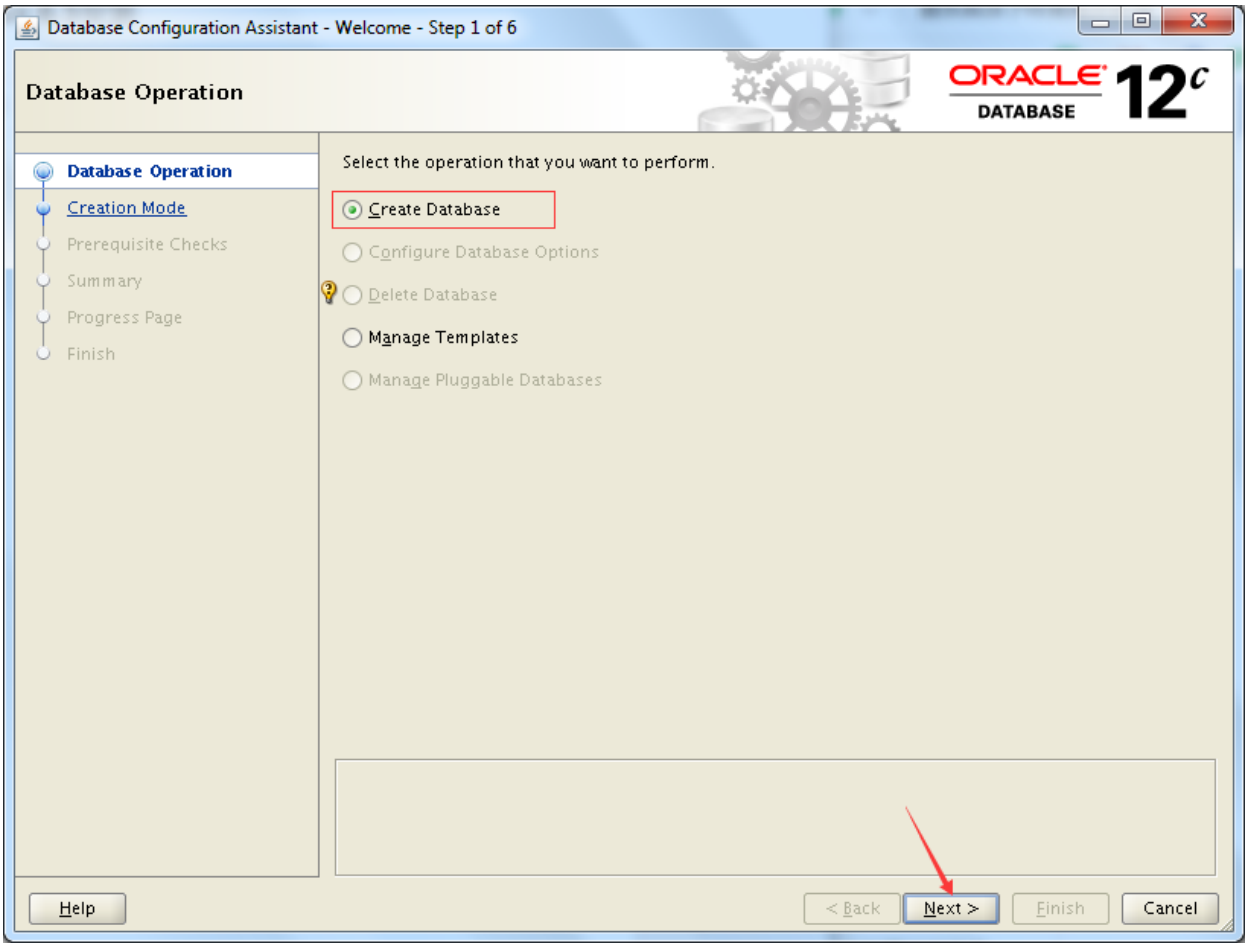
6 创建数据库

6.1 命令行启动dbca

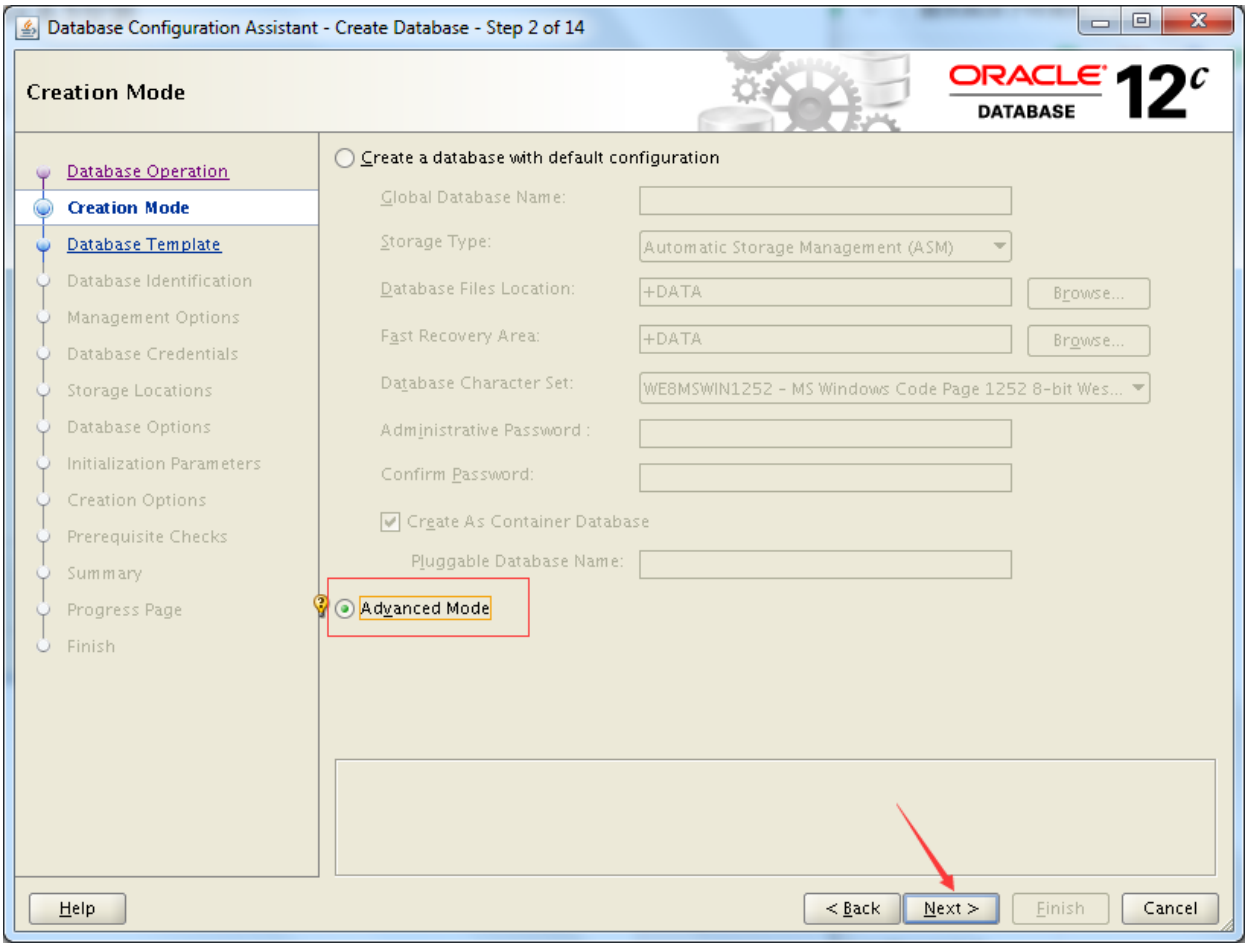
[oracle@strong ~]$ dbca

6.2 创建数据库

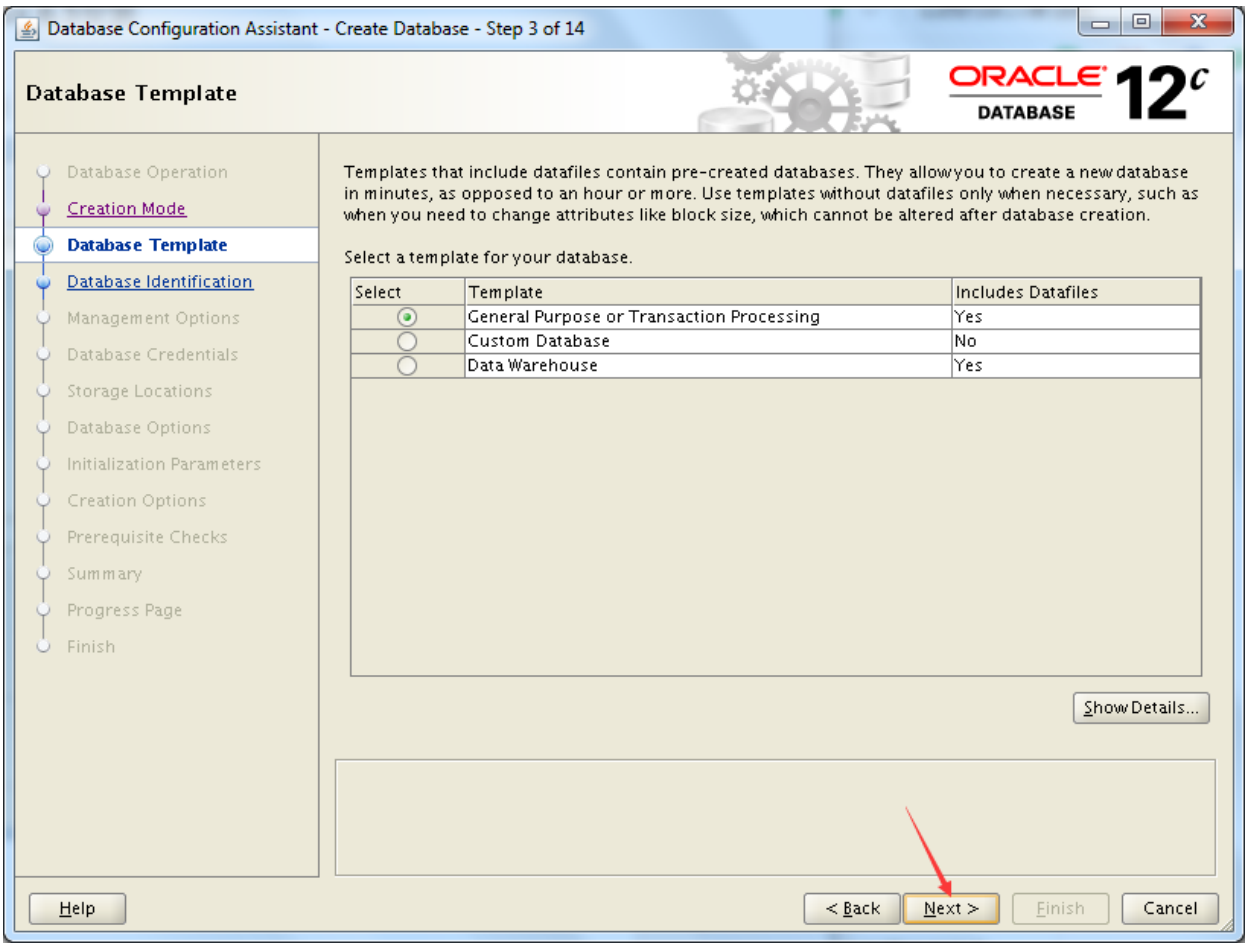
1）数据库操作



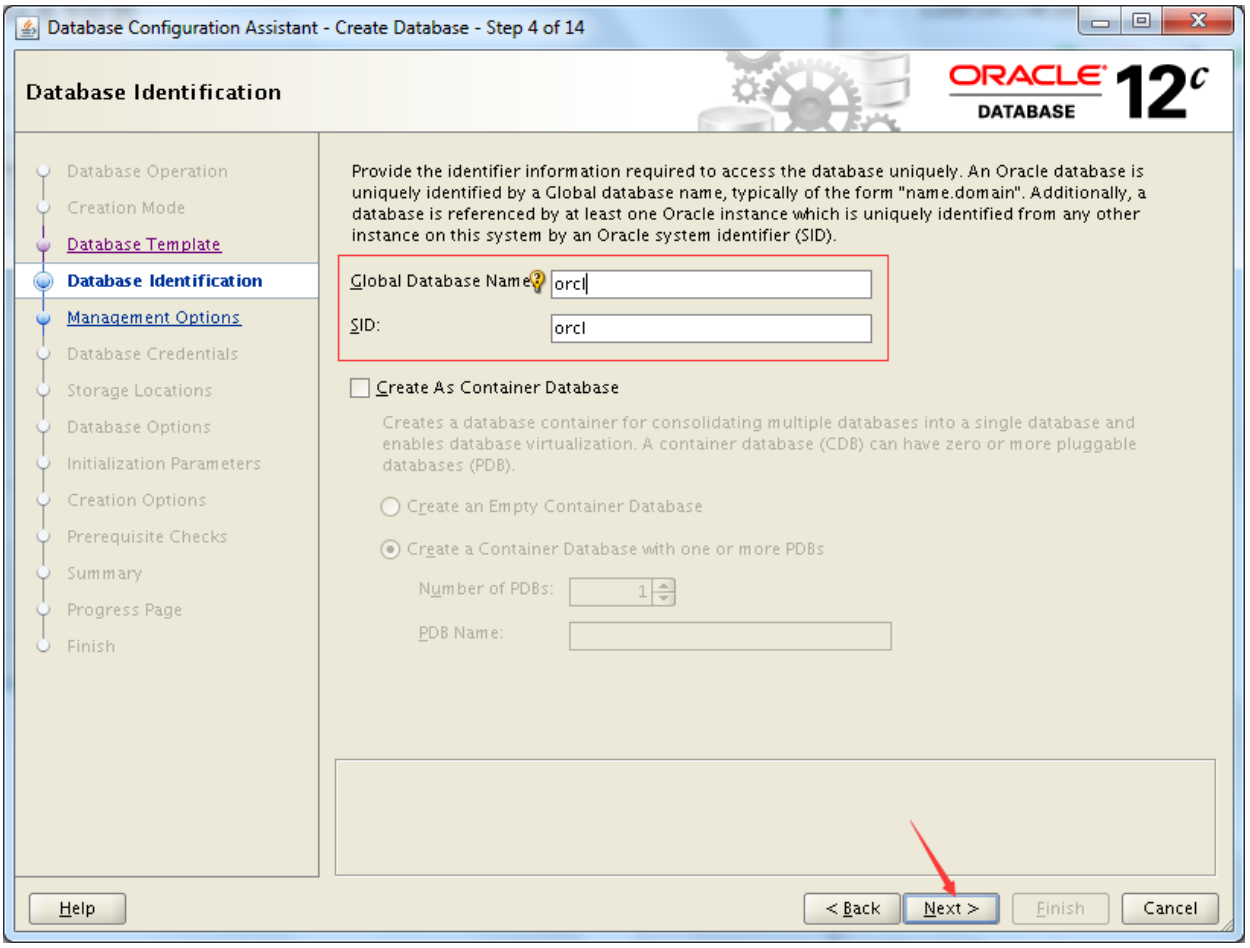
2）创建模式


Database Configuration Assistant - Create Database - Step 2 of 14
Creation Mode
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Create a database with default configuration
Global Database Name:
Storage Type:
Automatic Storage Management (ASM)
Database Files Location:
+DATA
Browse...
Fast Recovery Area:
+DATA
Browse...
Database Character Set:
WE8MSWIN1252 - MS Windows Code Page 1252 8-bit Wes...
Administrative Password :
Confirm Password:
Create As Container Database
Pluggable Database Name:
Advanced Mode
Help
< Back
Next >
Finish
Cancel

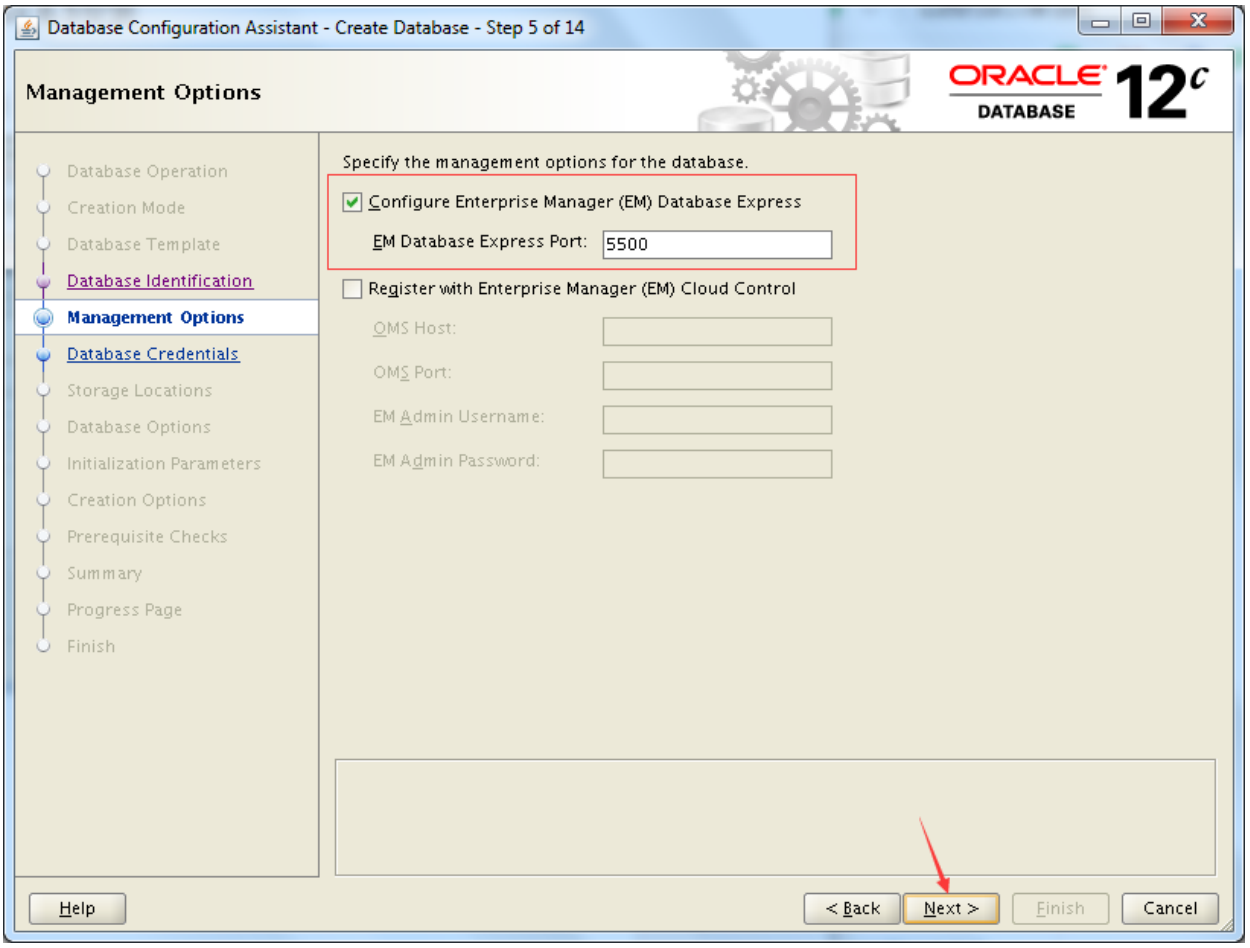
3）数据库模板


Database Configuration Assistant - Create Database - Step 3 of 14
Database Template
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Templates that include datafiles contain pre-created databases. They allow you to create a new database in minutes, as opposed to an hour or more. Use templates without datafiles only when necessary, such as when you need to change attributes like block size, which cannot be altered after database creation.
Select a template for your database.
Select
Template
Includes Datafiles
General Purpose or Transaction Processing
Yes
Custom Database
No
Data Warehouse
Yes
Show Details...
Help
< Back
Next >
Finish
Cancel

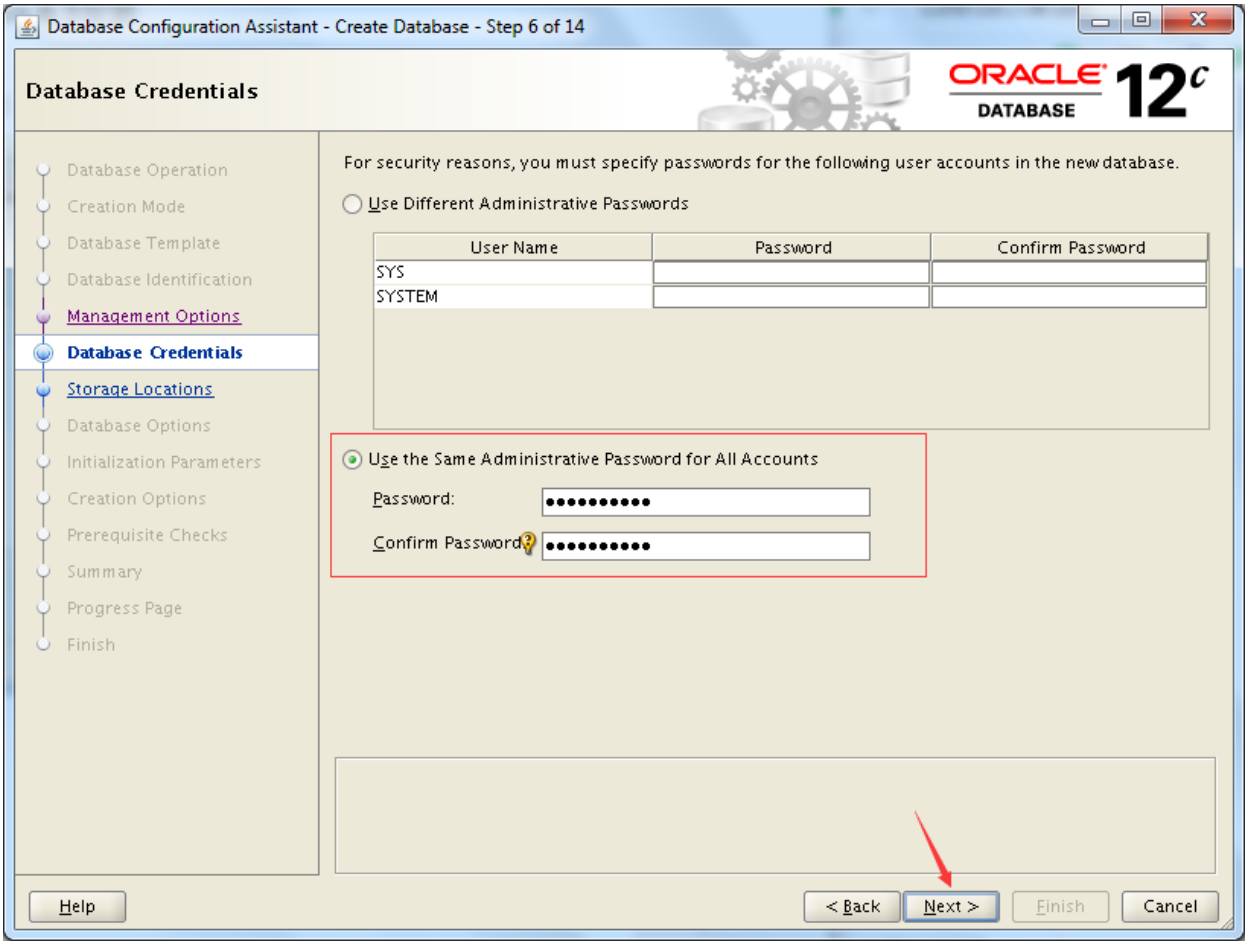
4）数据库识别符



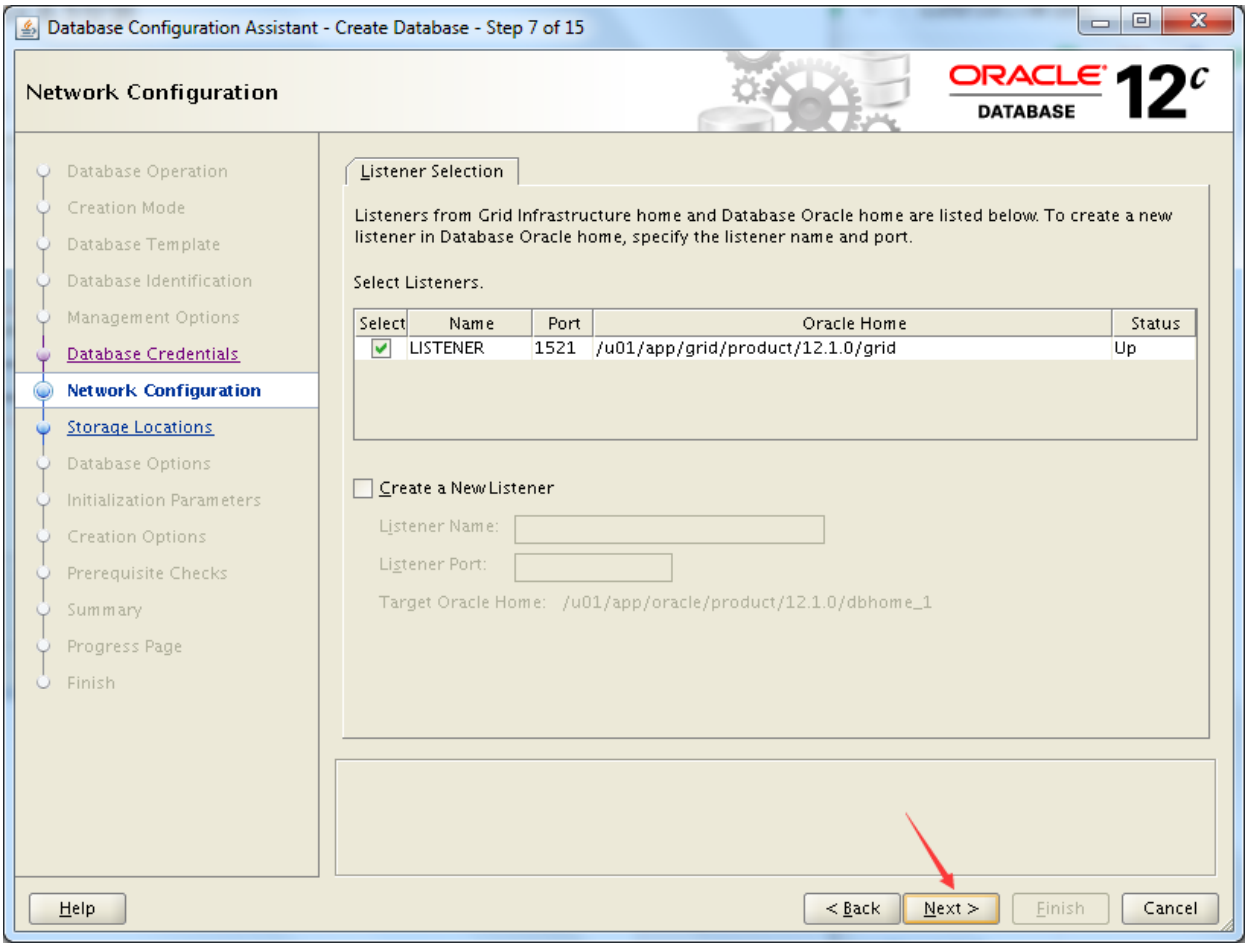
5）管理选项


Database Configuration Assistant - Create Database - Step 5 of 14
Management Options
ORACLE 12c DATABASE
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Specify the management options for the database.
Configure Enterprise Manager (EM) Database Express
EM Database Express Port: 5500
Register with Enterprise Manager (EM) Cloud Control
OMS Host:
OMS Port:
EM Admin Username:
EM Admin Password:
Help
< Back
Next >
Finish
Cancel

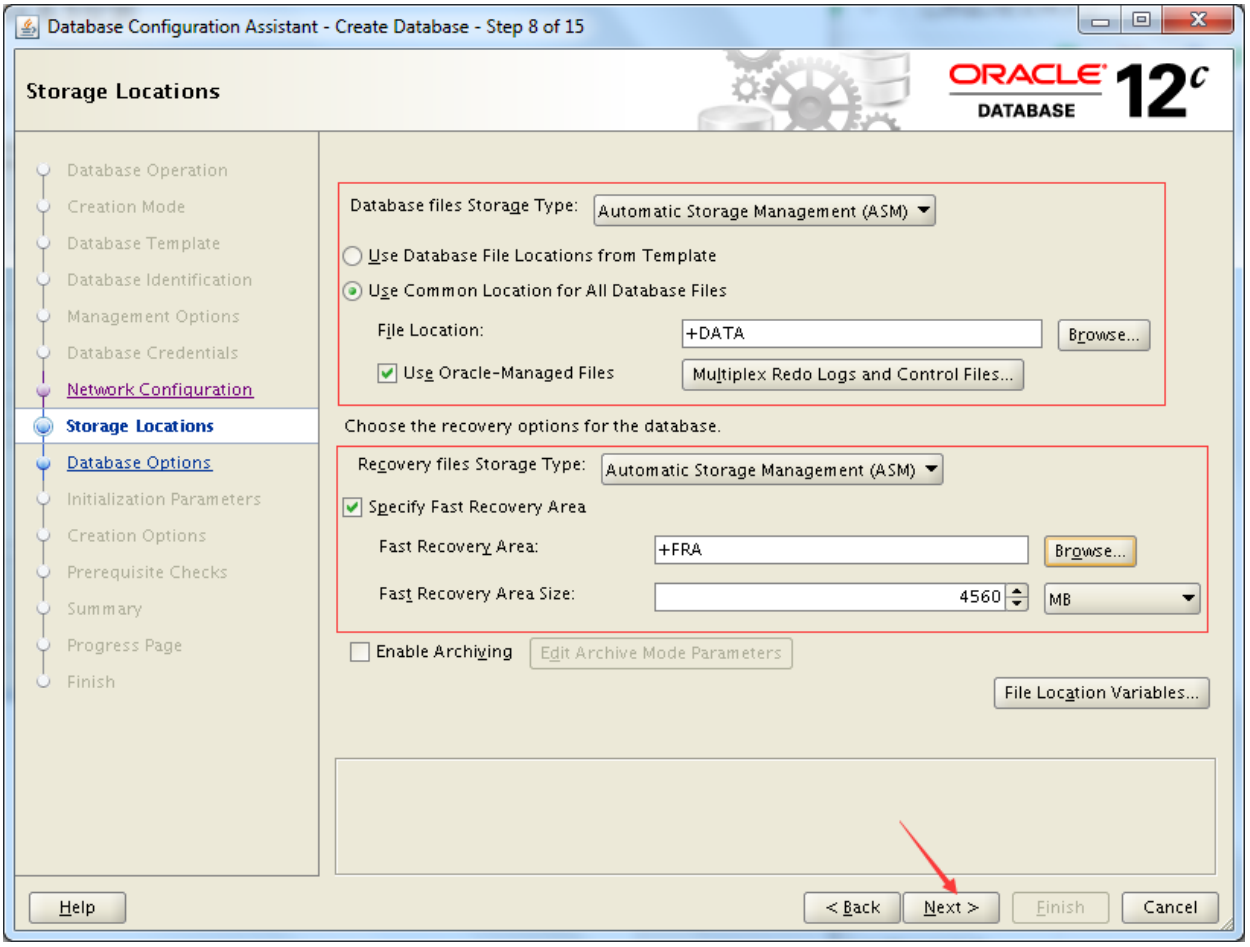
6）数据库密码设置


Database Configuration Assistant - Create Database - Step 6 of 14
Database Credentials
ORACLE 12c DATABASE
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
For security reasons, you must specify passwords for the following user accounts in the new database.
Use Different Administrative Passwords
User Name
Password
Confirm Password
SYS
SYSTEM
Use the Same Administrative Password for All Accounts
Password:
Confirm Password:
Help
< Back
Next >
Finish
Cancel

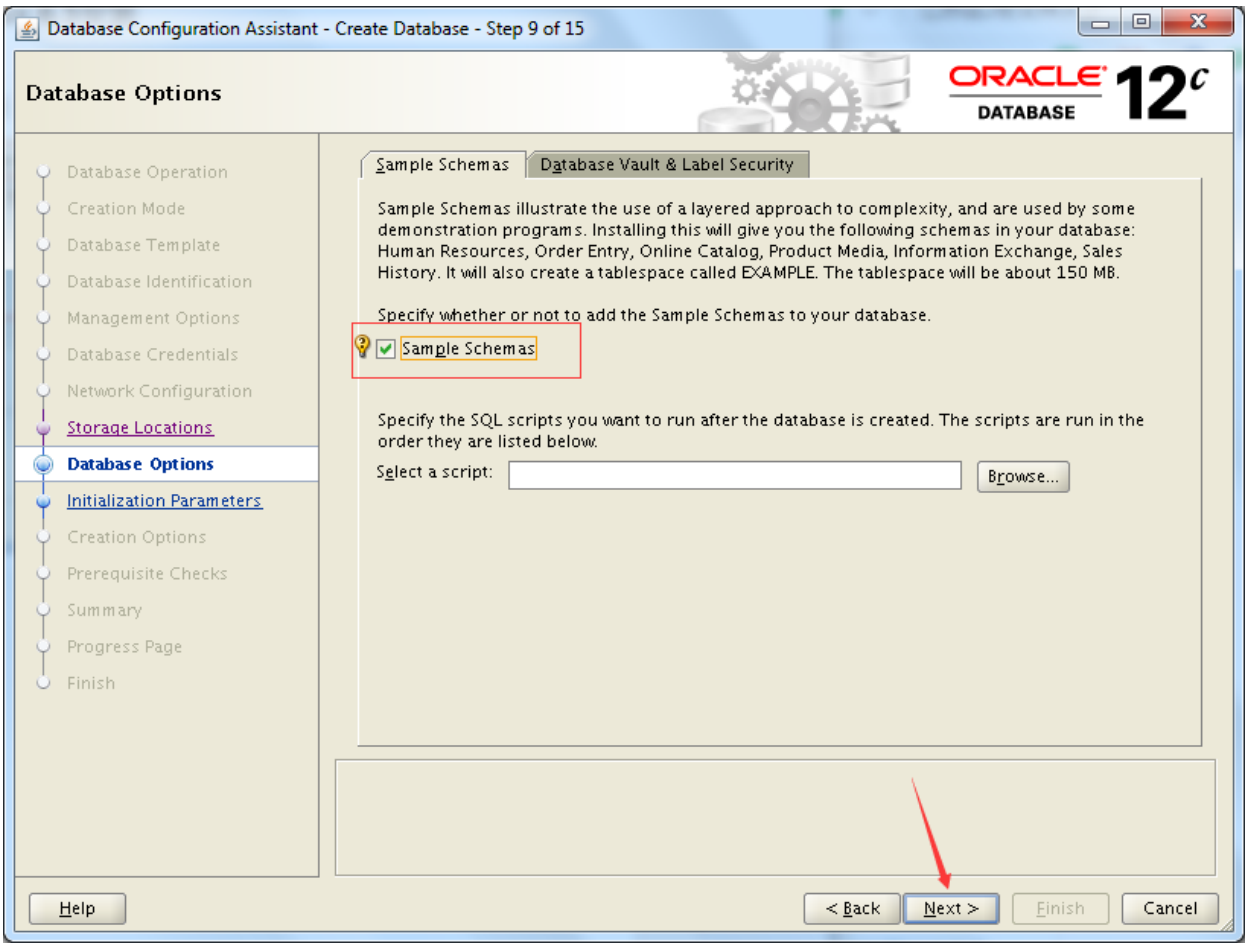
7）网络配置


Database Configuration Assistant - Create Database - Step 7 of 15
Network Configuration
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Listener Selection
Listeners from Grid Infrastructure home and Database Oracle home are listed below. To create a new listener in Database Oracle home, specify the listener name and port.
Select Listeners.
Select
Name
Port
Oracle Home
Status
LISTENER
1521
/u01/app/grid/product/12.1.0/grid
Up
Create a New Listener
Listener Name:
Listener Port:
Target Oracle Home: /u01/app/oracle/product/12.1.0/dbhome_1
Help
< Back
Next >
Finish
Cancel

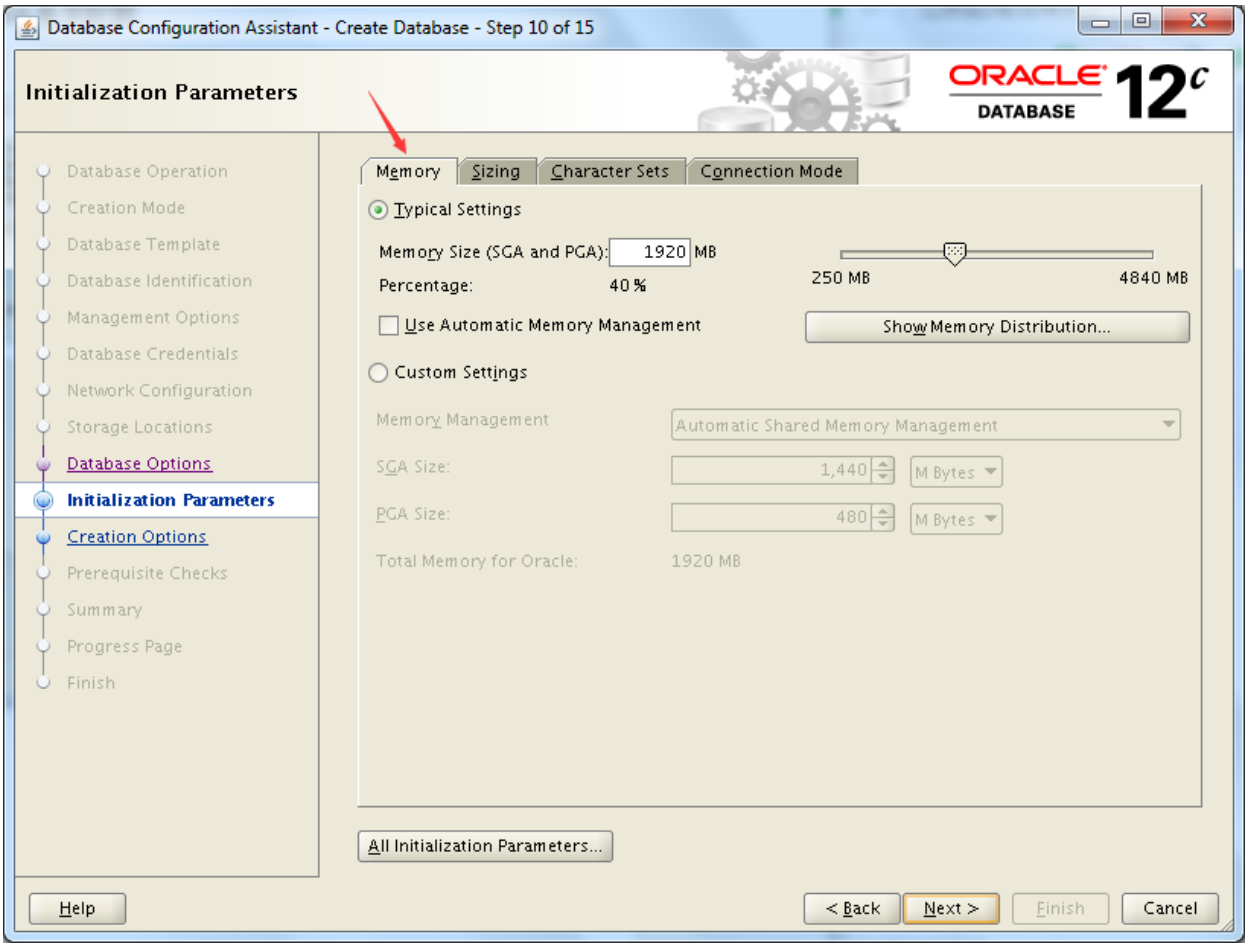
8）存储位置


Database Configuration Assistant - Create Database - Step 8 of 15
Storage Locations
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Database files Storage Type: Automatic Storage Management (ASM)
Use Database File Locations from Template
Use Common Location for All Database Files
File Location: +DATA
Browse...
Use Oracle-Managed Files
Multiplex Redo Logs and Control Files...
Choose the recovery options for the database.
Recovery files Storage Type: Automatic Storage Management (ASM)
Specify Fast Recovery Area
Fast Recovery Area: +FRA
Browse...
Fast Recovery Area Size: 4560 MB
Enable Archiving
Edit Archive Mode Parameters
File Location Variables...
Help
< Back
Next >
Finish
Cancel

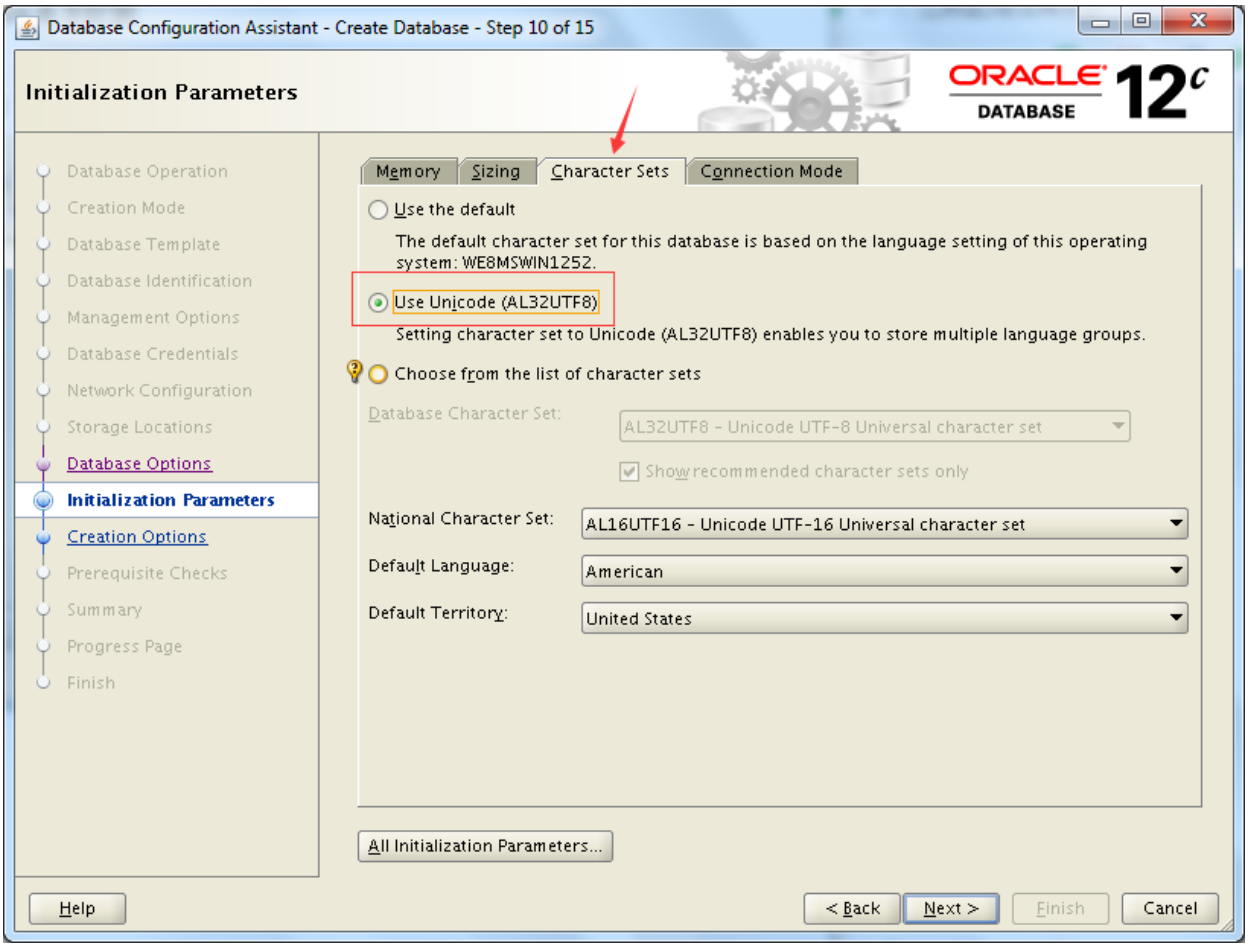
9）数据库选项


Database Configuration Assistant - Create Database - Step 9 of 15
Database Options
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Sample Schemas
Database Vault & Label Security
Sample Schemas illustrate the use of a layered approach to complexity, and are used by some demonstration programs. Installing this will give you the following schemas in your database: Human Resources, Order Entry, Online Catalog, Product Media, Information Exchange, Sales History. It will also create a tablespace called EXAMPLE. The tablespace will be about 150 MB.
Specify whether or not to add the Sample Schemas to your database.
Sample Schemas
Specify the SQL scripts you want to run after the database is created. The scripts are run in the order they are listed below.
Select a script:
Browse...
Help
< Back
Next >
Finish
Cancel

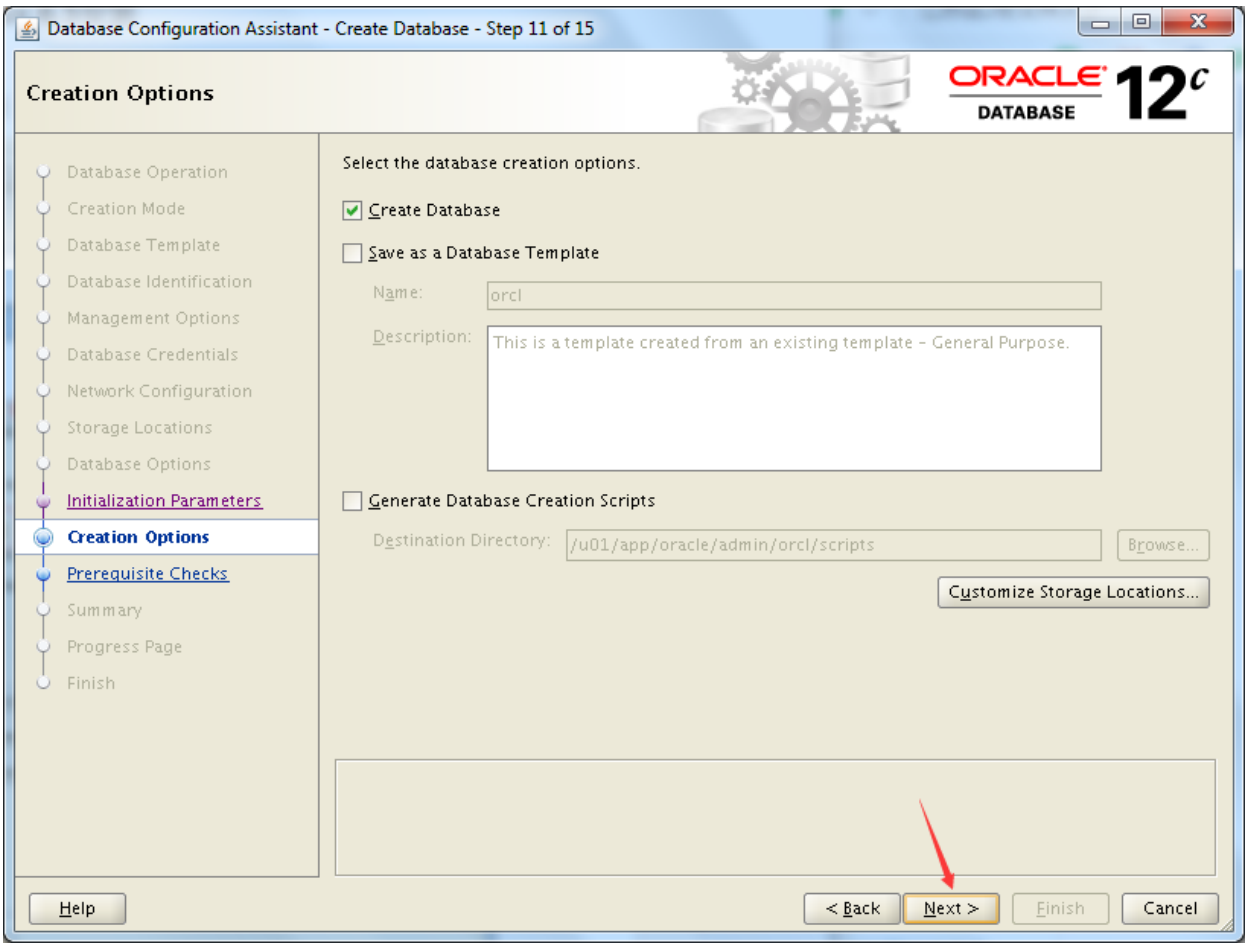
10）初始化参数内存设置



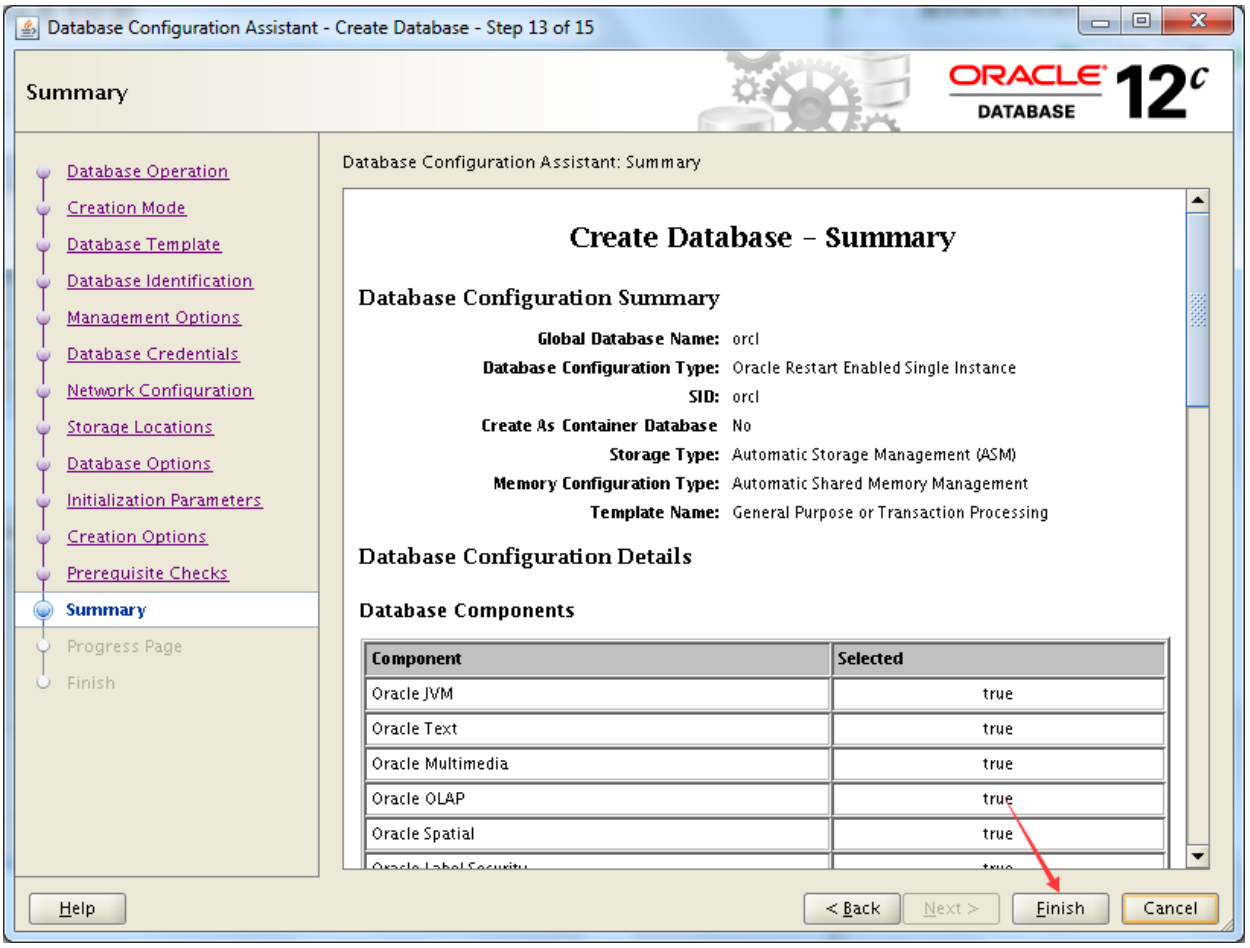
字符集选择


Database Configuration Assistant - Create Database - Step 10 of 15
Initialization Parameters
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Memory
Sizing
Character Sets
Connection Mode
Use the default
The default character set for this database is based on the language setting of this operating system: WE8MSWIN1252.
Use Unicode (AL32UTF8)
Setting character set to Unicode (AL32UTF8) enables you to store multiple language groups.
Choose from the list of character sets
Database Character Set:
AL32UTF8 - Unicode UTF-8 Universal character set
Show recommended character sets only
National Character Set:
AL16UTF16 - Unicode UTF-16 Universal character set
Default Language:
American
Default Territory:
United States
All Initialization Parameters...
Help
< Back
Next >
Finish
Cancel

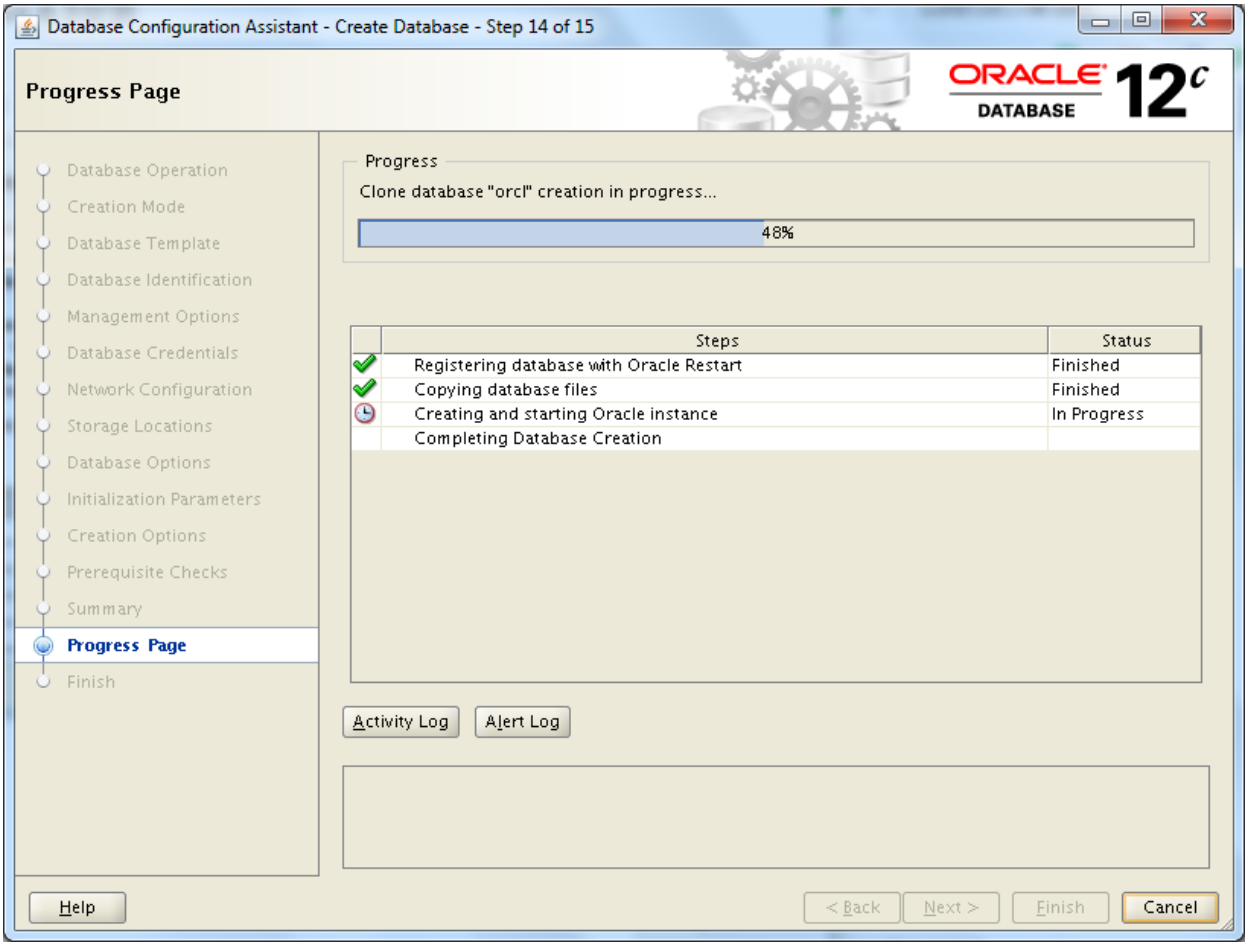
11）创建选项


Database Configuration Assistant - Create Database - Step 11 of 15
Creation Options
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Select the database creation options.
Create Database
Save as a Database Template
Name:
orcl
Description:
This is a template created from an existing template - General Purpose.
Generate Database Creation Scripts
Destination Directory:
/u01/app/oracle/admin/orcl/scripts
Browse...
Customize Storage Locations...
Help
< Back
Next >
Finish
Cancel

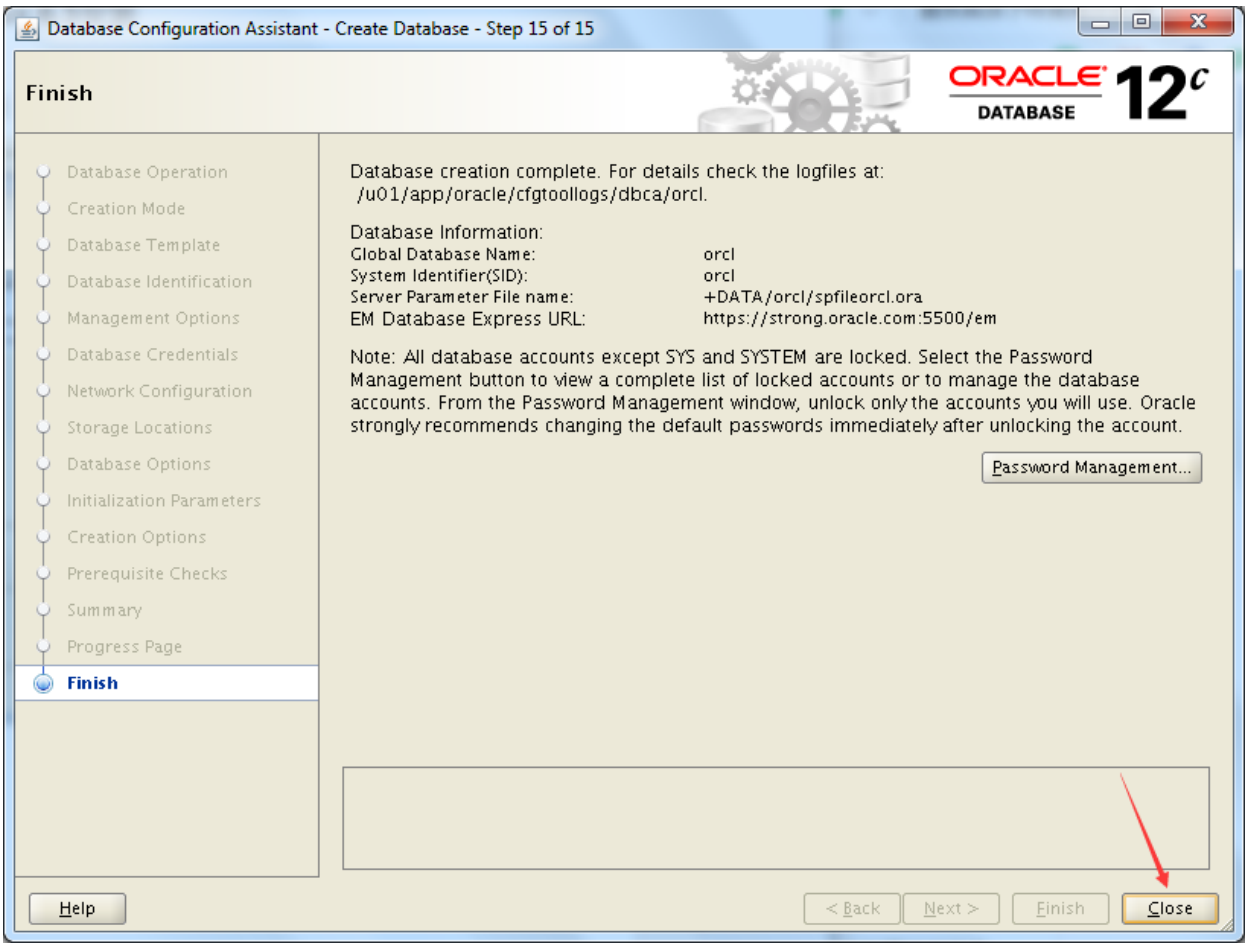
12）先决条件检查完毕出现概要页



13）安装进度页


Database Configuration Assistant - Create Database - Step 14 of 15
Progress Page
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Progress
Clone database "orcl" creation in progress...
48%
Steps
Status
Registering database with Oracle Restart
Finished
Copying database files
Finished
Creating and starting Oracle instance
In Progress
Completing Database Creation
Activity Log
Alert Log
Help
< Back
Next >
Finish
Cancel

14）完成安装


Database Configuration Assistant - Create Database - Step 15 of 15
Finish
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Database creation complete. For details check the logfiles at:
/u01/app/oracle/cfgtoollogs/dbca/orcl.
Database Information:
Global Database Name: orcl
System Identifier(SID): orcl
Server Parameter File name: +DATA/orcl/spfileorcl.ora
EM Database Express URL: https://strong.oracle.com:5500/em
Note: All database accounts except SYS and SYSTEM are locked. Select the Password Management button to view a complete list of locked accounts or to manage the database accounts. From the Password Management window, unlock only the accounts you will use. Oracle strongly recommends changing the default passwords immediately after unlocking the account.
Password Management...
Help
< Back
Next >
Finish
Close

15）查看数据库状态

```
[oracle@strong ~]$ sqlplus /nolog

SQL*Plus: Release 12.1.0.2.0 Production on Sat Aug 11 18:18:08 2018

Copyright (c) 1982, 2014, Oracle.  All rights reserved.

SQL> conn / as sysdba
Connected.
SQL> select instance_name,status from v$instance;

INSTANCE_NAME    STATUS
---------------- ------------
orcl             OPEN
```

至此，整个Oracle ASM + Oracle 12c环境搭建完成。