

Installing and Creating an Oracle Database 19c with ASM

Tutorial: Installing and Creating an Oracle Database 19c on Linux 7 with ASM

Tutorial Overview

In this tutorial, we will demonstrate the procedure to create an Oracle database 19c on Linux 7 with ASM.

In high level, you will perform the following:

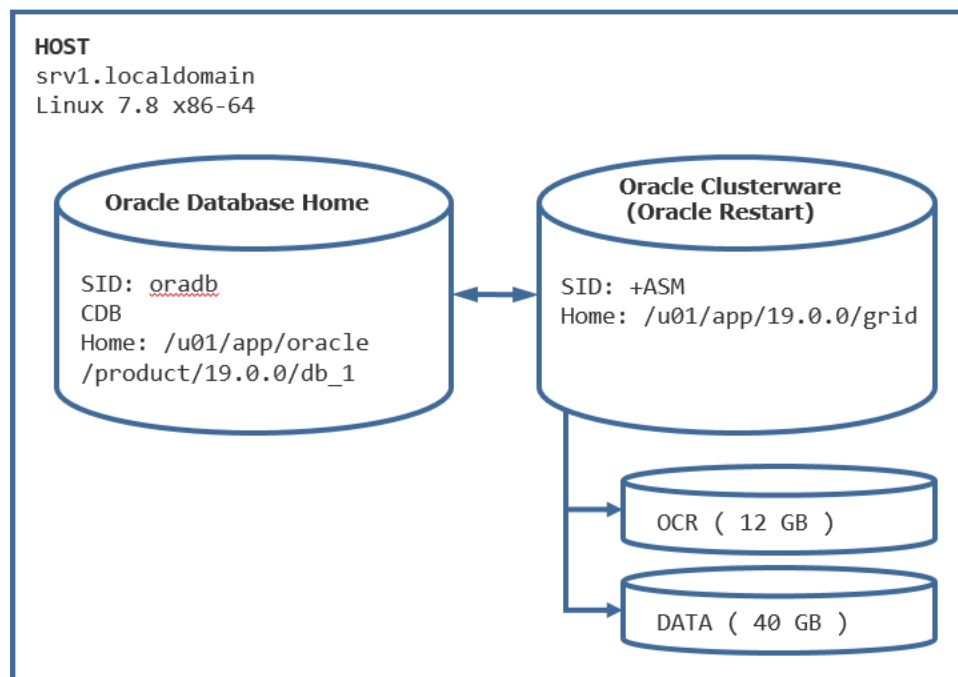
- Change the Settings of the Appliance srv1
- Create Virtual Hardisks (to be used by ASM)
- Make the machine IP address static
- Configure Putty to connect to srv1
- Set up the environment variables for the OS Accounts: grid and oracle
- Install ASM Packages and Create ASM disk volumes
- Change the kernel parameter values to the recommended values
- Install more packages
- Install Oracle Grid Infrastructure Software (Oracle Restart)
- Create ASM Disk Groups
- Install Oracle database software and create the sample database

Required Resources

- A PC with a free 8GB in its memory. This means the RAM memory in your PC should be at least 12GB.
- At least 50GB free disk space.
- The PC is connected to the Internet

Installation Architecture

The tutorial builds a system the same as the following architecture diagram:



Required Software and Packages

To implement this tutorial, you must have the following:

- Oracle VirtualBox, version 6. This tutorial was implemented on VirtualBox 6.0.22 for Windows. It can be obtained from the following link.
- Oracle Virtualbox appliance with a fresh installation of Oracle Linux 7.x. You can download a pre-built one with Oracle Linux 7.8 from here. Alternatively, you can create one from scratch. The procedure to create an VM machine with Linux 7.x is explained in many articles in the Internet. Just Google it!
- Oracle Grid Infrastructure 19c installation files for Linux x86-64. This can be downloaded from Oracle site. Search the Internet for “oracle grid infrastructure 19c download”. At the time of this writing, its link is here. This tutorial was implemented using Oracle Grid Infrastructure 19c (version 19.3).

Note: download the zip file, not the rpm file.

- Oracle Database 19c installation files for Linux x86-64. This can be downloaded from Oracle site. Search the Internet for “Oracle Database 19c installation files for Linux x86-64”. At the time of this writing, its link is here. This tutorial was implemented using Oracle Database 19c (version 19.3) for Linux x86-64.

Note: download the zip file, not the rpm file.

- Putty: which is a utility that provides a command line prompt to connect to a Linux server from Windows.

Tutorial Steps

1. Login as root in the Putty session.
2. Run cmd:
#> adduser oracle
#> passwd oracle
3. Install oracle-database-preinstallation-checklist for 19c
a. Example: yum install -y oracle-database-preinstall-19c
4. Setting up Environment Variables for OS Accounts: grid and oracle
a. In the Putty session, switch current user to oracle and make a backup copy of the current bash profile file:
su - oracle
mv ~/.bash_profile ~/.bash_profile_bkp
vi ~/.bash_profile
b. Add the following to it.

```
# .bash_profile
# OS User: oracle
# Application: Oracle Database Software Owner
# Version: Oracle 19c
# -----
# Get the aliases and functions
if [ -f ~/.bashrc ]; then
. ~/.bashrc
fi
```

```
export ORACLE_BASE=/u01/app/oracle/
```

```

export ORACLE_SID=sipl
export ORACLE_HOME=$ORACLE_BASE/product/19.0.0/db_1
export NLS_DATE_FORMAT="DD-MON-YYYY HH24:MI:SS"
export TNS_ADMIN=$ORACLE_HOME/network/admin
export
PATH=${PATH}:/usr/bin:/sbin:/usr/local/bin:$ORACLE_HOME/bin
export TEMP=/tmp
export TMPDIR=/tmp
export ORACLE_TERM=xterm
export DISPLAY=192.168.30.98:0.0 # PLEASE CHANGE THE
VALUE OF DISPLAY VARIABLE AS PER YOUR ENVIRONMENT
umask 022

```

5. Switch current user back to root then run the following code to create required groups, grid user and modify the accounts.

```

su -
groupadd asmadmin
groupadd oinstall
groupadd asmdba
usermod -g oinstall oracle
usermod -a -G asmdba oracle
usermod -g oinstall -G asmadmin,asmdba grid
passwd grid

```

6. Create Oracle Clusterware home directories:

```

mkdir -p /u01/app/oracle//product/19.0.0/db_1
mkdir -p /u01/app/grid/19.0.0/grid
chown -R grid:oinstall /u01
chown -R oracle:oinstall /u01/app/oracle
chmod -R 775 /u01

```

7. Switch to grid user and modify its bash profile as follows:

```

su - grid
mv ~/.bash_profile ~/.bash_profile_bkp
vi ~/.bash_profile

# .bash_profile
# OS User: oracle
# Application: Oracle Database Software Owner
# Version: Oracle 19c
# -----
# Get the aliases and functions
if [ -f ~/.bashrc ]; then
. ~/.bashrc
fi

export ORACLE_BASE=/u01/app/grid

```

```

export ORACLE_SID=+ASM
export ORACLE_HOME=$ORACLE_BASE/19.0.0/grid
export NLS_DATE_FORMAT="DD-MON-YYYY HH24:MI:SS"
export TNS_ADMIN=$ORACLE_HOME/network/admin
export
PATH=${PATH}:/usr/bin:/sbin:/usr/local/bin:$ORACLE_HOME/bin
export TEMP=/tmp
export TMPDIR=/tmp
export ORACLE_TERM=xterm
export DISPLAY=192.168.30.98:0.0 # PLEASE CHANGE THE
VALUE OF DISPLAY VARIABLE AS PER YOUR ENVIRONMENT
umask 022

```

8. In the following steps, you will install ASM packages then create ASM disk volumes.

- a. Change the current user to root user
su -

- b. Install Oracle ASMLib package
yum install oracleasm-support
the following command will take a few minutes to finish:

```
yum install kmod-oracleasm
```

- c. Configure and load the ASM kernel module. # Respond to the command as illustrated by the code in red color.
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 []: **grid**
Default group to own the driver interface []: **oinstall**
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

9. Load the oracleasm kernel module:
/usr/sbin/oracleasm init

10. List the disks as seen by the OS. You should see the disks created in the VirtualBox and attached to the appliance.
fdisk -l | grep "Disk /dev/sd"

11. Use fdisk to create partitions in the disk so that there is only one partition that represents the entire disk
Steps not shown.

12. Verify that the partitions are created.

```
fdisk -l | grep "/dev/s"
```

```
Disk /dev/sda: 107.4 GB, 107374182400 bytes, 209715200 sectors
/dev/sda1 *      2048   1050623   524288   83 Linux
/dev/sda2      1050624   53479423   26214400   83 Linux
/dev/sda3      53479424   70256639   8388608   82 Linux swap / Solaris
/dev/sda4      70256640   209715199   69729280   5 Extended
/dev/sda5      70258688   209715199   69728256   83 Linux
```

```
Disk /dev/sdb: 17.2 GB, 17179869184 bytes, 33554432 sectors
```

```
Disk /dev/sdc: 17.2 GB, 17179869184 bytes, 33554432 sectors
```

```
Disk /dev/sdd: 17.2 GB, 17179869184 bytes, 33554432 sectors
```

13. Create the ASM disks

```
oracleasm createdisk OCRDISK1 /dev/sdb1
oracleasm createdisk DATADISK1 /dev/sdc1
oracleasm listdisks
```

14. Changing Kernel Parameter Values: In the following step, you will change the kernel parameter values to the values recommended by Oracle. Create the following file then add the code that follows to it.

```
vi /etc/sysctl.d/97-oracle-database-sysctl.conf
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
```

15. Change the current values of the kernel parameters:

```
sbin/sysctl --system
```

16. Install More Packages

```
yum install ksh
yum install libaio-devel.x86_64
```

17. reboot the server

18. Installing Oracle Grid Infrastructure Software (Oracle Restart) In the following steps, you will install Oracle Grid Infrastructure software in srv1. The installation procedure automatically creates and start the Clusterware services. Copy the Oracle Grid Infrastructure software installation file to the

staging folder. At the time of this writing, the installation file name downloaded from Oracle site is LINUX.X64_193000_grid_home.zip. Extract the installation file into the Oracle Grid Infrastructure software home directory

```
su - grid
unzip /root/LINUX.X64_193000_grid_home.zip -d $ORACLE_HOME
```

19. Install the cvuqdisk in srv1 as root. The package cvuqdisk must be installed before installing the Clusterware software. EXIT to return back to the root shell:

```
exit
cd /u01/app/grid/19.0.0/grid/cv/rpm/
CVUQDISK_GRP=oinstall; export CVUQDISK_GRP
rpm -iv cvuqdisk-1.0.10-1.rpm
```

20. Login server as grid. Open a terminal window, change the current directory to the Grid Infrastructure software home directory and run the gridSetup.sh script.

```
cd $ORACLE_HOME
./gridSetup.sh
```

21. Respond to the Installer windows as follows:

Window	Action
Configuration Option	Select the following option: "Configure Oracle Grid Infrastructure for a Standalone Server (Oracle Restart)"
Create ASM Disk Group	1. Click on Change Discovery Path button 2. Enter the Discovery Path as follows: /dev/oracleasm/disks/ 3. Fill in the fields as follows: Disk Group Name: OCRDISK Redundancy: External Select Disks: OCRDISK1
ASM Password	Enter the password
Management Option	Make sure the Checkbox is unselected
Operating System Groups	Make sure the following are the selected values: OSASM: asmadmin OSDBA: asmdba
Installation Location	Oracle Base and Oracle Grid Home should automatically point to the values of their corresponding variables. Note: Observe the grid home is not under the Oracle grid base home.

Create Inventory	It should automatically point to /u01/app/orainventory
Root Script Execution	Mark the checkbox "Automatically run configuration scripts" and enter the root password
Prerequisite Checks	All the Prerequisite Checks should pass except the memory. It complains the available memory is 7.5. We can ignore this warning. Select Ignore All checkbox then click on Next button. Click Yes on the confirmation dialog box. Note: If you see other warnings, you have to resolve them before you proceed.
Install Product	When the installation reaches to nearly 11%, it will display a confirmation message. Click on Yes button

Once the installation is complete.

22. Check CRS services status:

su - grid

crsctl status resource -t

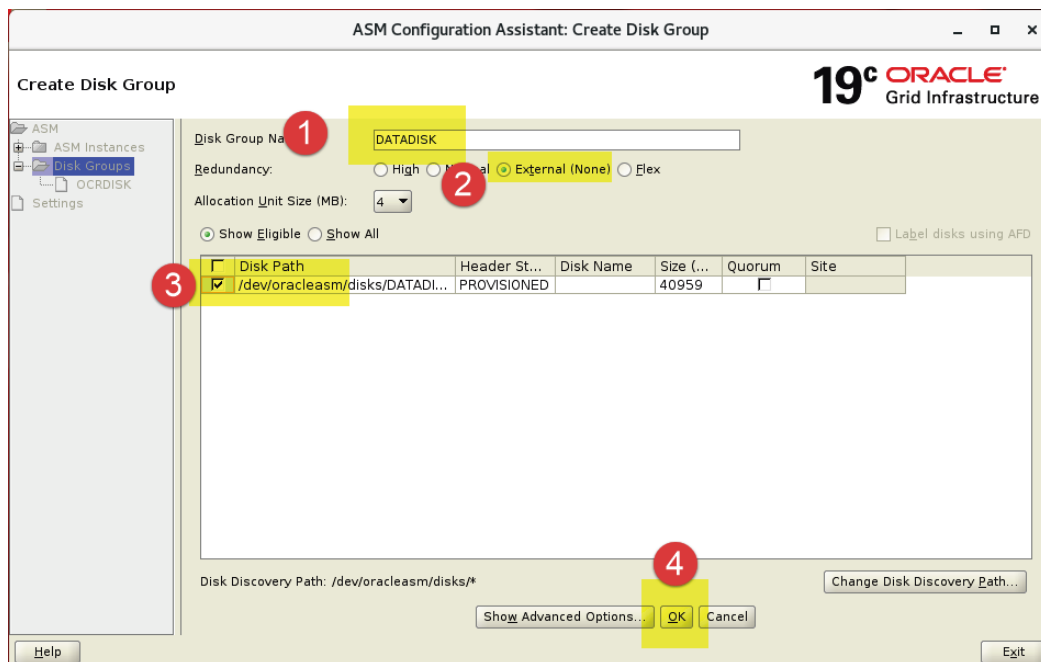
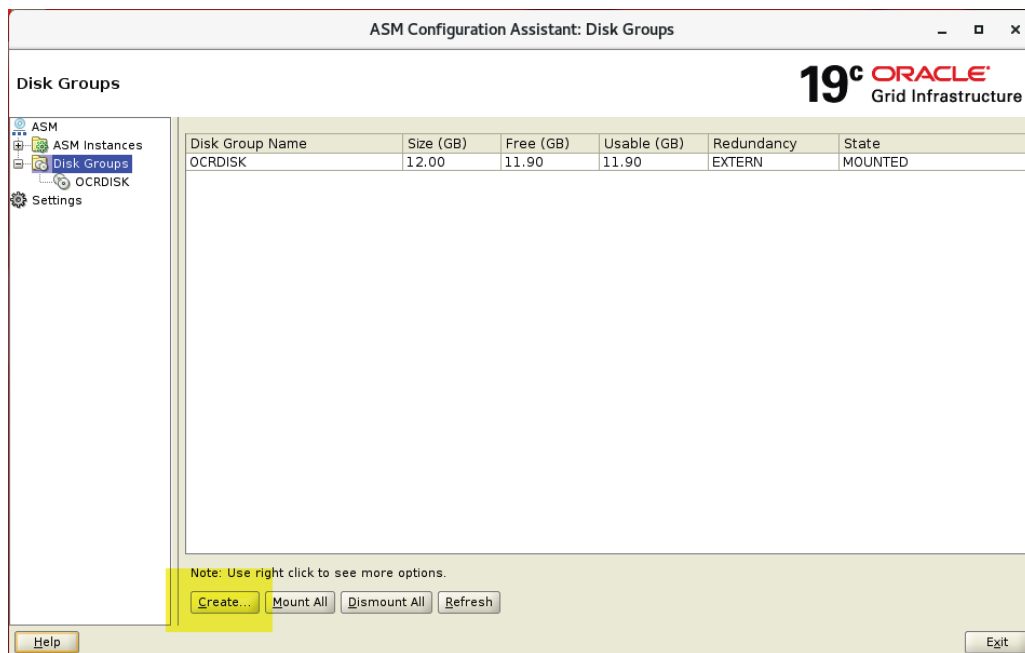
if you do ps -ef | grep pmon, you should see one process for +ASM

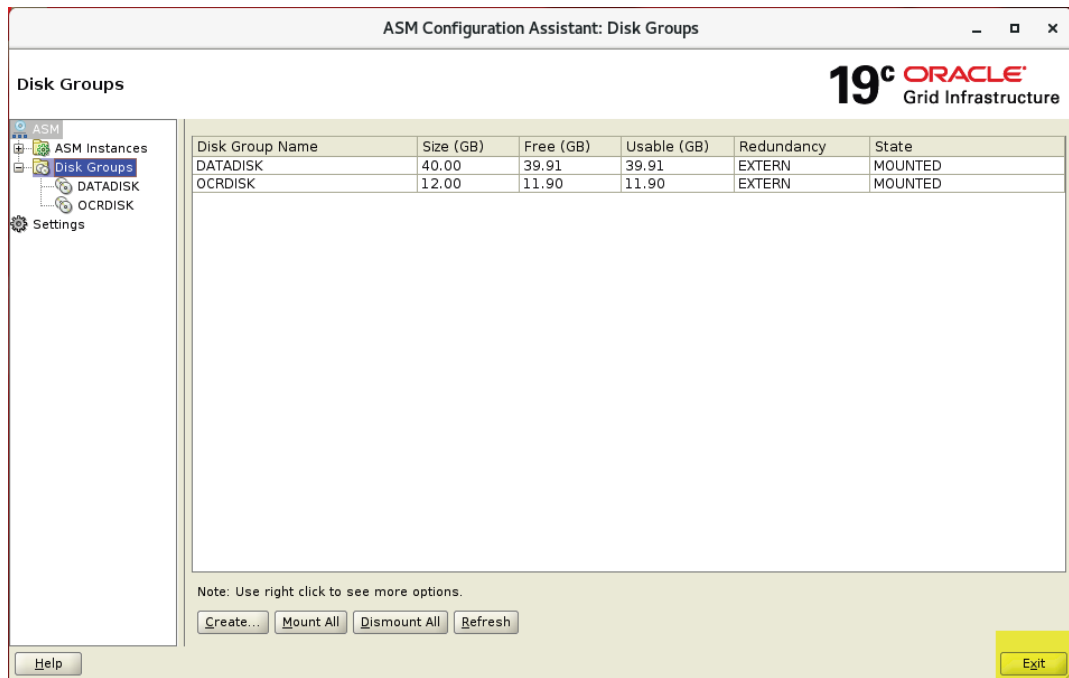
SID.

23. Creating ASM Disk Groups: In the following steps, you will create the Diskgroup that will be used by Oracle database to store its datafiles.

- a. Note: In real life scenario, we might create more than one disk group. For example, one for the data files and one for the FRA.
- b. Login as grid user and initiate ASM Configuration Assistant
asmca

24. Create the disk group DATADISK by responding to the Assistant as follows:





Installing Oracle Database Software and Creating the Database

1. Copy the Oracle database software installation file to the staging folder. (/root/LINUX.X64_193000_db_home.zip) At the time of this writing, the installation file name downloaded from Oracle site is LINUX.X64_193000_db_home.zip
2. Login as oracle user or su to oracle and unzip the software in ORACLE_HOME

su - oracle

unzip /media/sf_staging/LINUX.X64_193000_db_home.zip -d \$ORACLE_HOME

3. cd to the Oracle database home directory and run the runInstaller script.

cd \$ORACLE_HOME
./runInstaller

4. Respond to the Installer windows as follows:

Window	Action
Configuration Option	Select the following option: "Create and Configure a single instance database."
System Class	Select the following option: "Server Class"
Database Edition	Select the following option:

	"Enterprise Edition"
Installation Location	Keep the default value
Configuration Type	Select the following option: General Purpose
Database Identifiers	Global Database Name: sipl Oracle SID: sipl Turn-off container database / Pluggable Database Name:
Configuration Options	Do not mark the AMM checkbox. Memory: 5120 MB Character set: Use Unicode (AL32UTF8) Sample Schemas: (optional) Mark the checkbox "Install sample schema in the database"
Database Storage	Make sure ASM is selected
Management Options	Make sure the checkbox is not marked.
Recovery Option	Mark the checkbox Enable Recovery Make sure ASM is selected
ASM Diskgroup	Select DATADISK
Schema Password	Set passwords for the accounts
Operating System Groups	Select the "oinstall" group for all the options, except the OSOPER keep it blank.
Root Script Execution	Mark the checkbox "Automatically run configuration scripts" and enter the root password
Prerequisite Checks	All the Prerequisite Checks should pass.
Summary	Click on Install button
Install Product	When the installation reaches to nearly 12%, it will display a confirmation message. Click on Yes button.
Finish	click on Close button

- After the installation and database creation are finished, verify the database is up and running by logging to it as sysdba
sqlplus / as sysdba. Check the status of the database (can be run as oracle or as grid)
srvctl status database -d oradb
- Check if a connection entry to oradb is added to the tnsnames.ora file

The tnsnames.ora file was not even created.
ls \$TNS_ADMIN/tnsnames.ora

7. In case the installation fails while database schema creation. Then to recover from this failure
 - a. Login to database as
sqlplus / as sysdba
create PFILE='\$ORACLE_HOME/dbs/initsipl.ora' from memory;
 - b. Come out from SQL prompt and check that pfile is created.
 - c. In case PFILE is not created, create a SPFILE using similar syntax.
 - d. Shutdown the database
 - e. Restart the database
8. Now we need to enable the database in grid/clustware. To check if the configuration is captured correctly run cmd
 - a. Login as grid or su – grid
srvctl status database -d sipl
 - b. If you get output as database is not up / down, check configuration status by running
srvctl config database -db sipl
 - c. If the configuration information is correct
srvctl enable database -db sipl
 - d. Now start the database using srvctl
srvctl start database -db sipl
 - e. Now check status
srvctl status database -db sipl
9. Final check, if you reboot the machine, then after reboot completes, both ASM and sipl instances should get restarted automatically.
10. To check the datafiles names created for the instance
Login as oracle or su - oracle
sqlplus / as sysdba
sql> select file_name,tablespace_name from dba_data_files;

To find ASM Diskgroup and Disks status

```
set lines 132
col name format a14
col PATH format a33
select
GROUP_NUMBER,NAME,STATE,TYPE,TOTAL_MB,FREE_MB,VOTING_FILES from v$asm_diskgroup;
```

GROUP_NUMBER	NAME	STATE	TYPE	TOTAL_MB	FREE_MB	V
1	DATADISK	CONNECTED	EXTERN	20476	17224	N
2	OCRDISK	MOUNTED	EXTERN	20476	20376	N

```
select
GROUP_NUMBER,DISK_NUMBER,MOUNT_STATUS,HEADER_STATUS,MODE_STATUS,STATE,VOTING_FILE,name,path from v$asm_disk;
```

```
GROUP_NUMBER DISK_NUMBER MOUNT_S HEADER_STATU MODE_ST
STATE V NAME PATH
```

```
-----
```

```

1      0 CACHED MEMBER    ONLINE NORMAL  N
DATADISK_0000 /dev/oracleasm/disks/DATADISK1

2      0 CACHED MEMBER    ONLINE NORMAL  N
OCRDISK_0000 /dev/oracleasm/disks/OCRDISK1

0      0 CLOSED PROVISIONED ONLINE NORMAL  N
/dev/oracleasm/disks/DATADISK2
```

DEINSTALLATION Checklist

- su – oracle
 - Shutdown all running instances. Shutdown abort is also fine as we are destroying the setup.
 - cd \$ORACLE_HOME/deinstall
 - ./deinstall
Follow instructions of deinstall
 - Confirm that all oracle instances are down
-
- su – grid
 - cd \$ORACLE_HOME/deinstall
 - ./deinstall
Follow instructions of deinstall
 - Please note that during de-installation of GRID s/w it will ask you to run a script as ROOT, in a separate window. Do not press ENTER before completing this step.
 - Use cmd “Oracleasm deletedisk” to clean all disks used in the previous setup.
-
- yum erase oracleasm-support kmod-oracleasm oracle-databsae-preinstall-19c cvuqdisk

- `cd /tmp/`
- `/bin/rm -r /tmp/Ora* /tmp/Gri* /tmp/Inst* /tmp/CVU* /tmp/deinst*`
- `/bin/rm /etc/orainst.doc /etc/oratab`
- Run `blkid` and confirm that disks used by oracleasm are having dos-partition label.