Tutorial Target	**Installing Oracle Database 12c R1 on Linux 6 with ASM**
Version / Date	1.0 / Feb-2016
Required Software and Packages	• **Oracle VirtualBox** software, version 5. This tutorial was implemented on VirtualBox 5.0.12 for Windows which can be downloaded from Oracle web site. I made a copy of it here. • **Oracle Virtualbox VM appliance** which has a fresh installation of Oracle Linux 6.7 (seed VM). o The procedure to create it from scratch is documented here, or can be watched at Youtube here. o Alternatively, you can download a pre-built one from here. • **Oracle Grid Infrastructure 12c R1** installation files. This can be downloaded from Oracle site. Search for a page titled "Oracle Grid Infrastructure Downloads". At the time of this writing, its link is here. This tutorial was implemented using Oracle Grid Infrastructure 12c Release 1 (12.1.0.2). • **Oracle Database 12c R1** installation files • **WinSCP** utility: to copy the files to and from the Oracle VM box • **Xming** : to display the GUI windows in your hosting Windows PC. Just look for its download page, download it, and install it using Full Installation option. It is straight forward. • **Putty** : which provides a command line prompt to connect to a Linux server from Windows
Required Hardware	• Memory to run the VM machine: 4 GB • Expected storage space needed to hold the VM appliance: 40 GB
Editor	Ahmed Baraka (www.ahmedbaraka.com)

Tutorial Target and Description

This tutorial describes the hands-on practical procedure to install Oracle Database 12c R1 on a Linux server (Oracle Linux 6.7).

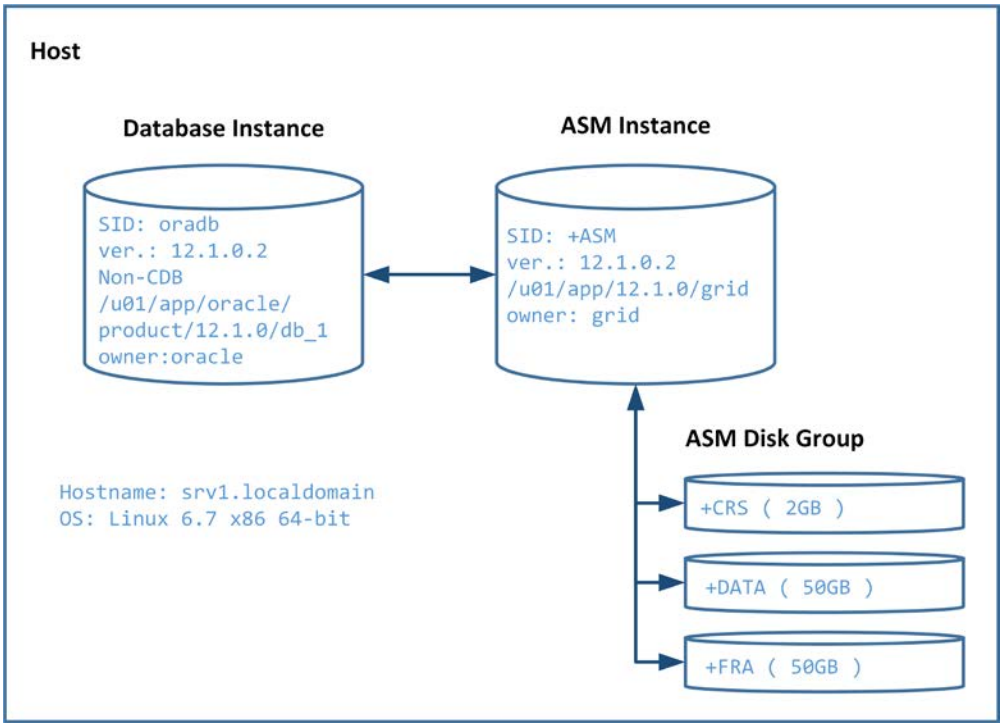
Tutorial Procedure Plan

1. Clone the Oracle Linux pre-built VM appliance from a seed
2. Create virtual hard disks for ASM
3. Alter network configuration and hostname
4. Set up environment variables for OS accounts: grid and oracle
5. Install Oracle ASM packages
6. Create ASM disk volumes
7. Install Oracle Grid Infrastructure software
8. Create ASM disk groups
9. Install Oracle database software
10. Create an Oracle database

Note: Download the required software and packages before you start implementing the tutorial.

Installation Architecture

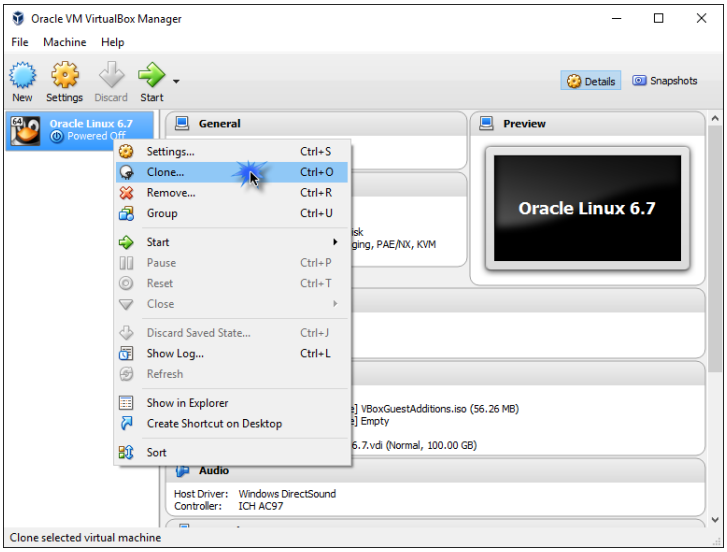
The tutorial builds a system with the following architecture diagram:

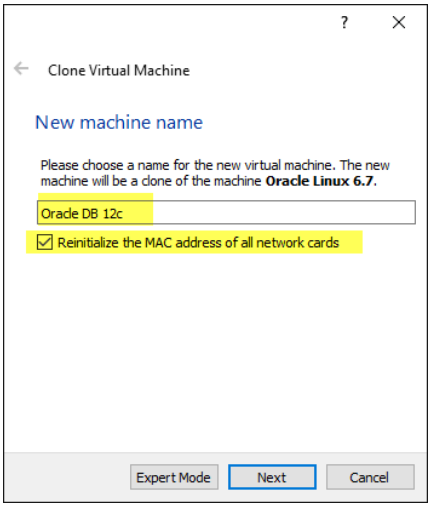


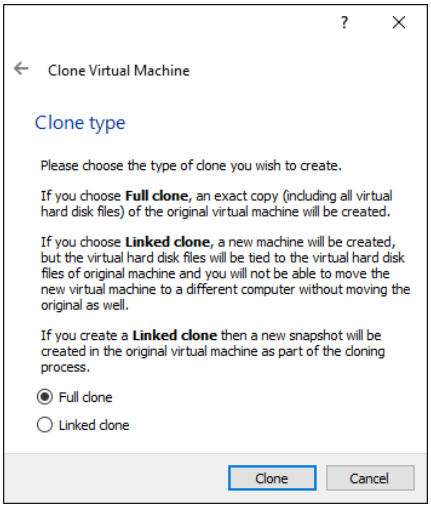
Tutorial Procedure

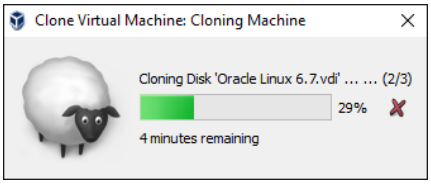
1. Clone the Oracle Linux pre-built VM appliance from a seed

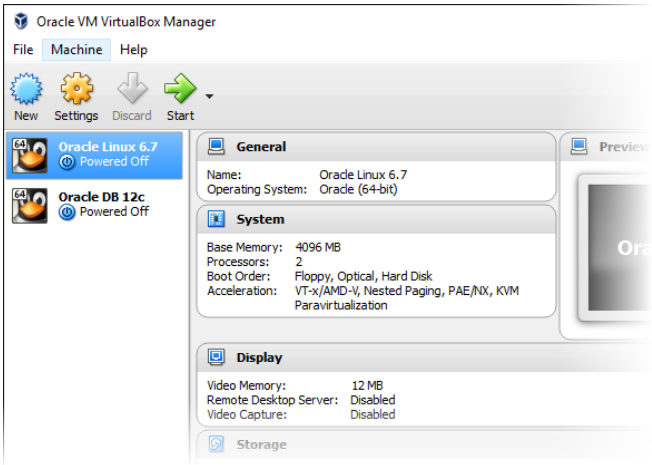
Make sure you have enough free disk space to clone the appliance





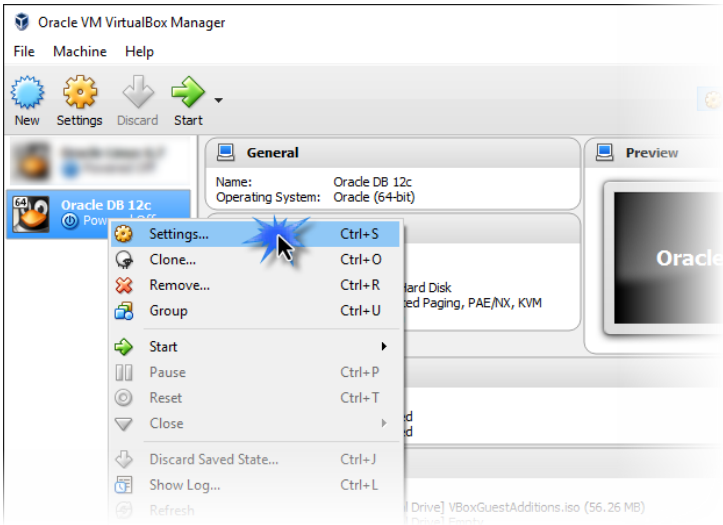


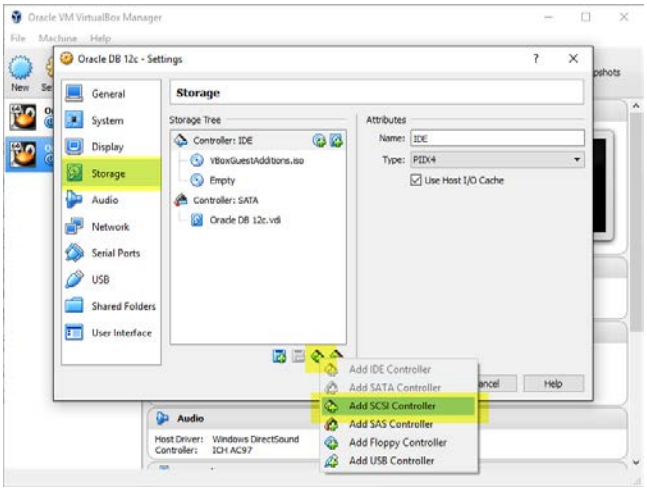

Clone Virtual Machine: Cloning Machine
Cloning Disk 'Oracle Linux 6.7.vdi' ... ... (2/3)
29%
4 minutes remaining

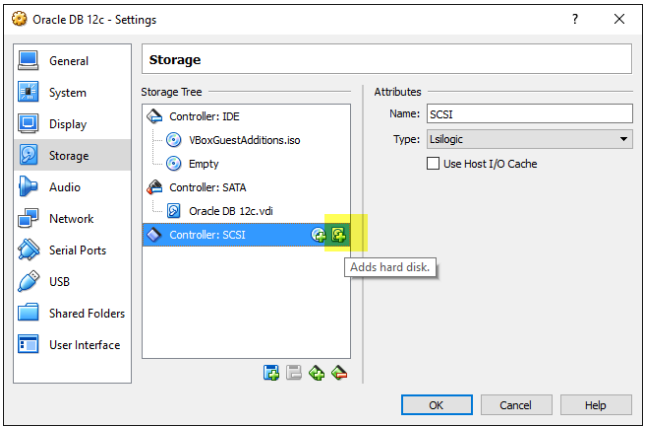

Oracle VM VirtualBox Manager
File
Machine
Help
New
Settings
Discard
Start
Oracle Linux 6.7
Powered Off
Oracle DB 12c
Powered Off
General
Name: Oracle Linux 6.7
Operating System: Oracle (64-bit)
System
Base Memory: 4096 MB
Processors: 2
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, PAE/NX, KVM
Paravirtualization
Display
Video Memory: 12 MB
Remote Desktop Server: Disabled
Video Capture: Disabled
Storage

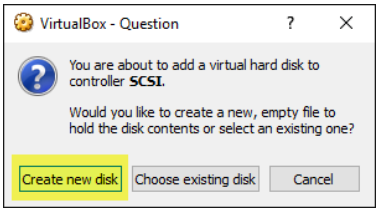
2. Create virtual hard disks for ASM

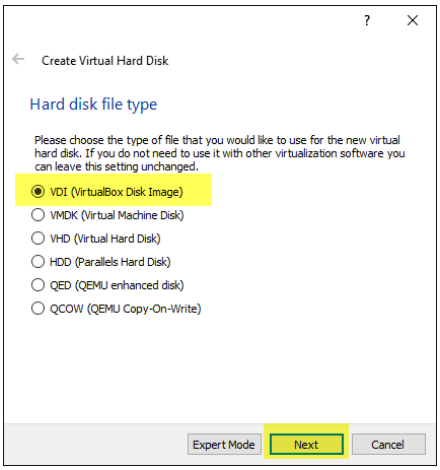
We create 3 virtual disks CRSDISK1 (2GB), DATADISK1(50GB) & FRADISK1(50GB).

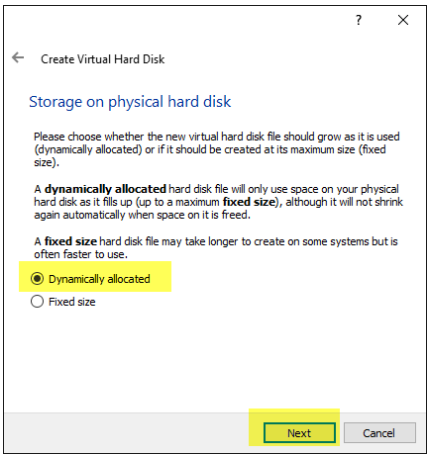


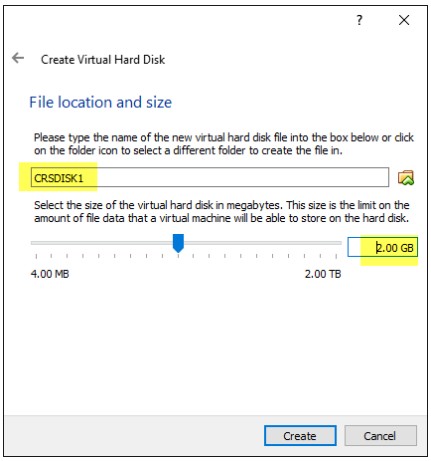




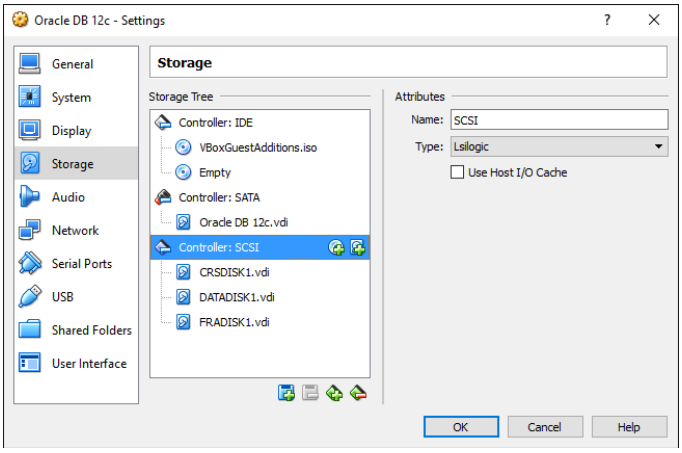


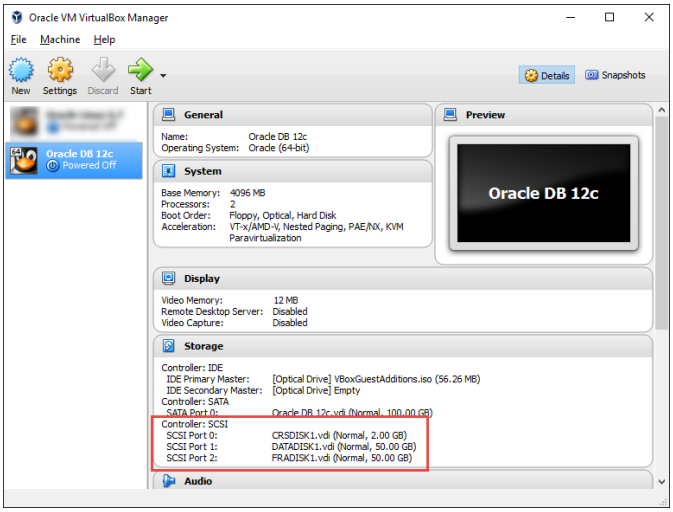




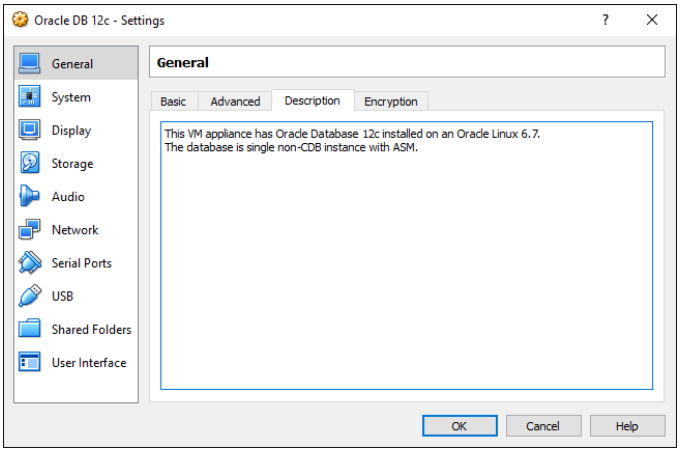


Repeat the procedure to create DATADISK1(50GB) & FRADISK1(50GB).





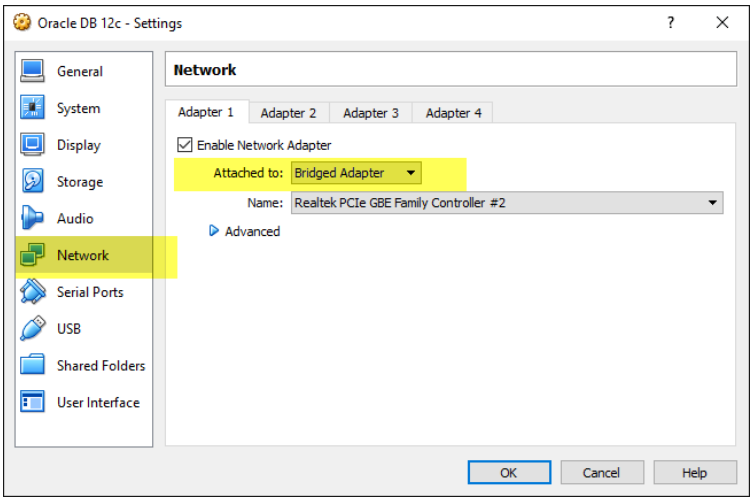
Optionally, edit the description of the VM appliance:



3. Alter network configuration and hostname

Make the Network Adapter Bridged:

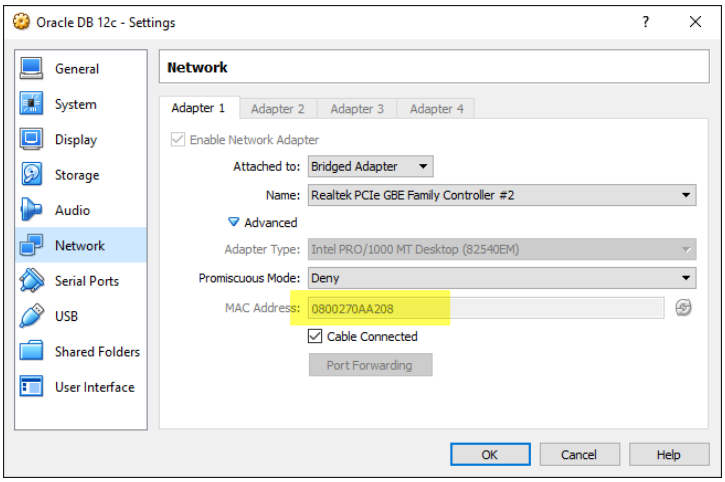
First, make sure the Network adapter in the appliance settings is attached to Bridged Adapter. This will make your VM appliance appears in your network as a separate host and will be assigned an IP address based on your network configuration. For more information, check out this documentation.



Fix the MAC Address of the eth0

When you make a clone of a VM appliance, the MAC address of the network card of the cloned appliance will be changed. This will make Linux add a new device “eth1” and the old one “eth0” will be inactive. You need to fix this.

Obtain the new MAC address from the Settings of the Clone appliance:

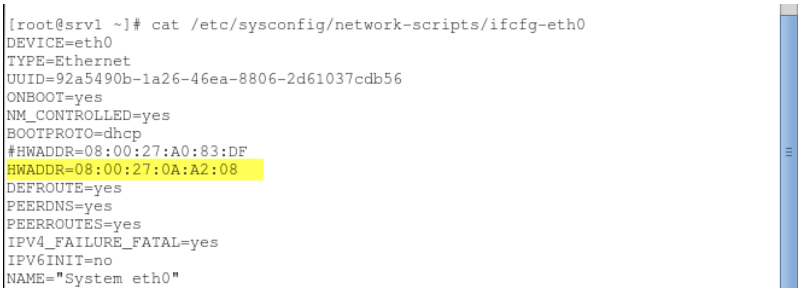


Startup the VM appliance and login as root.

Open a terminal window and edit the udev rule for network devices `/etc/udev/rules.d/70-persistent-net.rules`

Copy the new mac address to the line of your eth0 rule and delete the new rule for eth1.

Enter the new MAC address in the file `/etc/sysconfig/network-scripts/ifcfg-eth0` as well:



Reboot

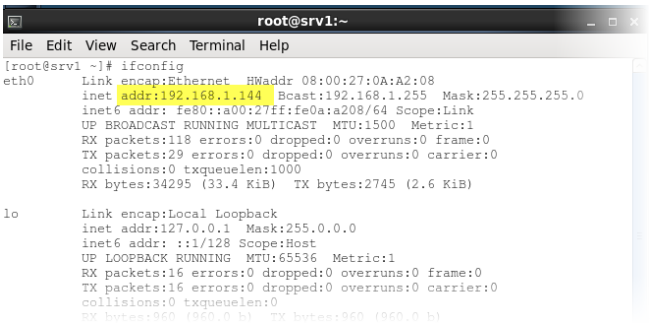
Perform the Network configuration

We need to set the DNS server in the VM appliance. Obtain the DNS sever IP address configured in your network.

Note: If you do not know the DNS IP address in your network, try the following command in the command prompt in the host machine

```
C:\>ipconfig /all | find "DNS"
..
   Connection-specific DNS Suffix  . :
   DNS Servers . . . . . . . . . . . : 192.168.1.1
..
```

Obtain the IP address assigned to the VM appliance and take a note of it.

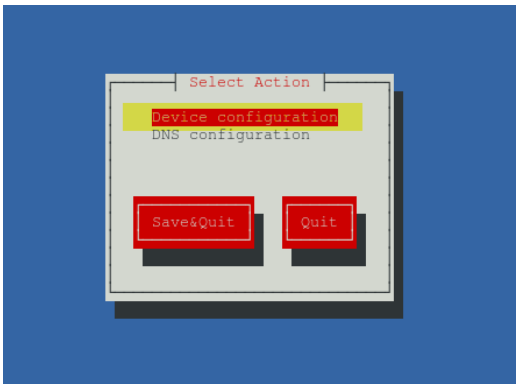


We are going to make this IP address a static IP address for this machine.

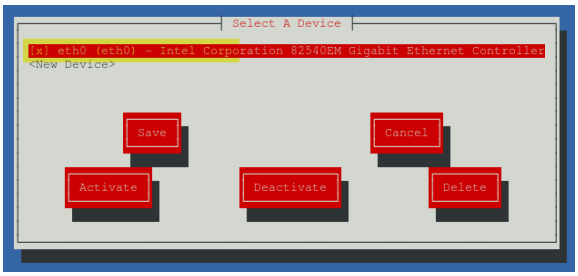
Login as root and open a terminal window.

Run `system-config-network` command

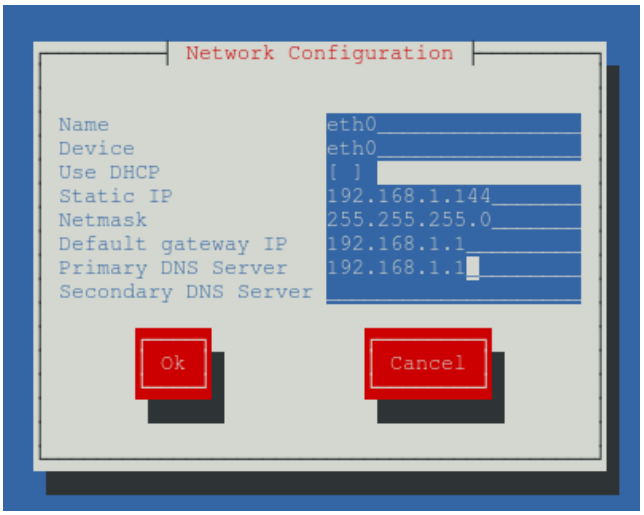
the utility window will open. Make sure the “Device Configuration” select and press ENTER

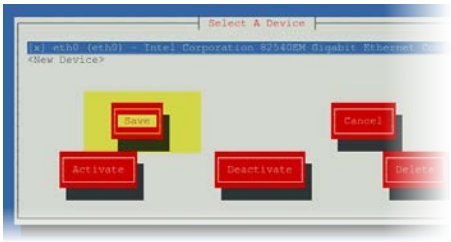


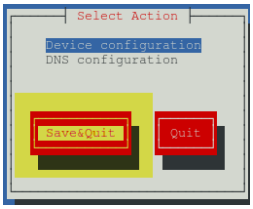
Select eth0 and press ENTER



Enter the IP address of the machine and DNS and Gateway IP addresses taken from the previous step:







Confirm the configuration modifications in `/etc/sysconfig/network-scripts/ifcfg-eth0` :

```
[root@srv1 ~]# cat /etc/sysconfig/network-scripts/ifcfg-eth0
DEVICE=eth0
TYPE=Ethernet
UUID=92a5490b-1a26-46ea-8806-2d61037cdb56
ONBOOT=yes
NM_CONTROLLED=yes
BOOTPROTO=none
#HWADDR=08:00:27:A0:83:DF
HWADDR=08:00:27:0a:a2:08
DEFROUTE=yes
PEERROUTES=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
NAME="System eth0"
DNS2=192.168.1.1
DNS1=192.168.1.1
USERCTL=no
IPADDR=192.168.1.144
NETMASK=255.255.255.0
GATEWAY=192.168.1.1
```

Update /etc/hosts file

```
vi /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
192.168.1.144 srv1.localdomain srv1
```

Test the changes:

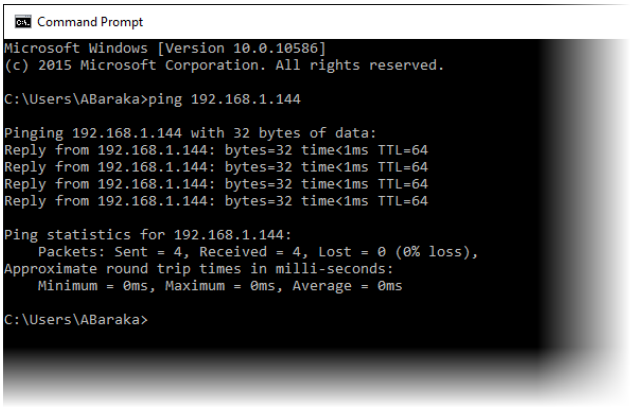
```
[root@srv1 ~]# ping srv1
PING srv1.localdomain (192.168.1.144) 56(84) bytes of data.
64 bytes from srv1.localdomain (192.168.1.144): icmp_seq=1 ttl=64 time=0.015 ms
64 bytes from srv1.localdomain (192.168.1.144): icmp_seq=2 ttl=64 time=0.024 ms
^C
```

Reboot!

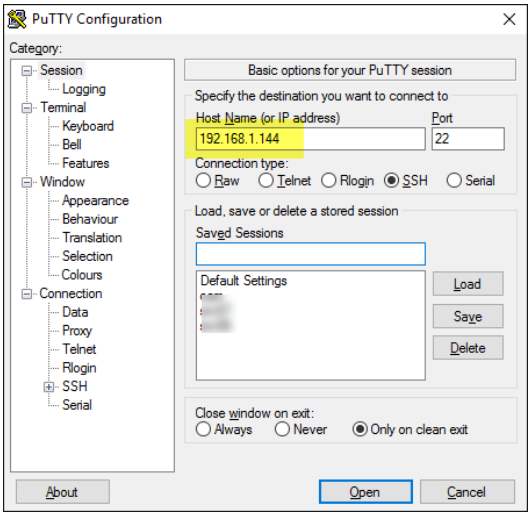
Connect to the VM appliance using Putty

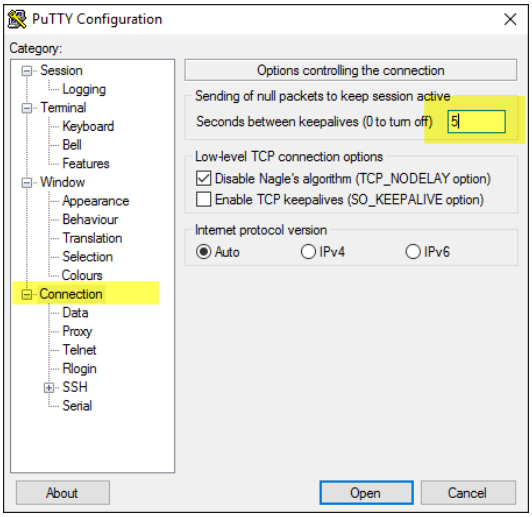
Putty is a nice utility which provides a command prompt from Windows client to connect to Linux server. Let's configure it here to connect to our VM appliance.

Ping the VM IP address from your host machine to make sure it is seen. It should see it.

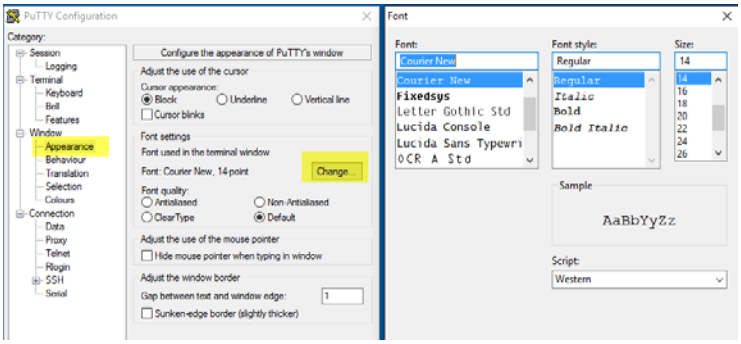


Start Putty and connect to the VM:

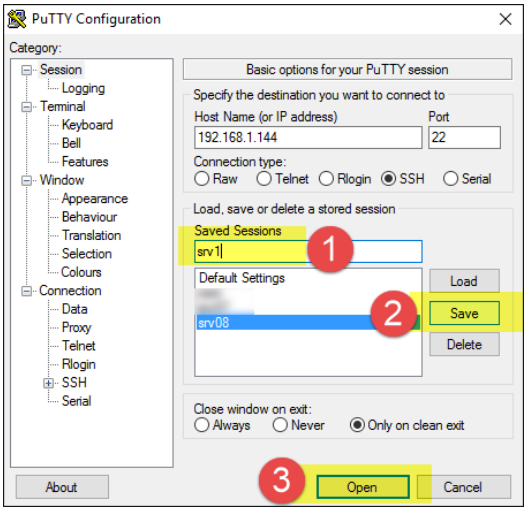


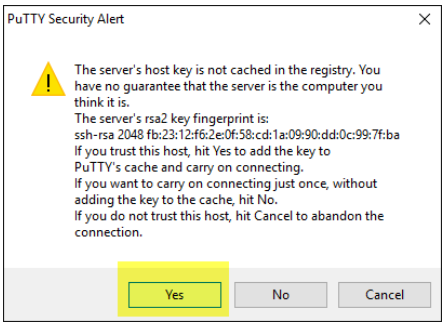


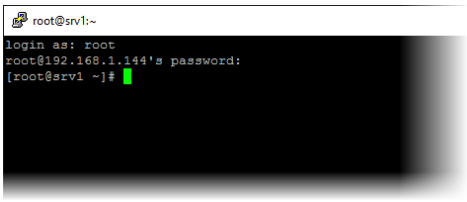
You can control the font in the command prompt as follow:



Save the configuration and connect:







4. Set up environment variables for OS accounts: grid and oracle

Open terminal window and as oracle make a backup copy of the bash profile file:

```
cp ~/.bash_profile ~/.bash_profile_bkp
```

Add the following to the file:

```
vi ~/.bash_profile
```

paste below code to /home/oracle/.bash_profile file

```
# .bash_profile

# ---------------------------------------------------
# .bash_profile
# ---------------------------------------------------
# OS User: oracle
# Application: Oracle Database Software Owner
# Version: Oracle 12c Release 1
# ---------------------------------------------------
# Get the aliases and functions
if [ -f ~/.bashrc ]; then
. ~/.bashrc
fi
# ---------------------------------------------------
# ORACLE_SID
# ---------------------------------------------------
# Specifies the Oracle system identifier (SID)
ORACLE_SID=oradb; export ORACLE_SID
# ---------------------------------------------------
# ORACLE_UNQNAME
# ---------------------------------------------------
# Set ORACLE_UNQNAME equal to the database unique name.
# ---------------------------------------------------
ORACLE_UNQNAME=oradb; export ORACLE_UNQNAME
# ---------------------------------------------------
# JAVA_HOME
# ---------------------------------------------------
JAVA_HOME=/usr/bin/java; export JAVA_HOME
# ---------------------------------------------------
# ORACLE_BASE
# ---------------------------------------------------
# Specifies the base of the Oracle directory structure
# for Optimal Flexible Architecture (OFA) compliant
# database software installations.
# ---------------------------------------------------
ORACLE_BASE=/u01/app/oracle; export ORACLE_BASE
# ---------------------------------------------------
# ORACLE_HOME
# ---------------------------------------------------
# Directory containing the Oracle Database software.
# ---------------------------------------------------
ORACLE_HOME=$ORACLE_BASE/product/12.1.0/db_1;
export ORACLE_HOME
# ---------------------------------------------------
# ORACLE_TERM
# ---------------------------------------------------
```

```
# Defines a terminal definition. If not set, it
# defaults to the value of your TERM environment
# variable. Used by all character mode products.
# ---------------------------------------------------
ORACLE_TERM=xterm; export ORACLE_TERM
# ---------------------------------------------------
# NLS_DATE_FORMAT
# ---------------------------------------------------
NLS_DATE_FORMAT="DD-MON-YYYY HH24:MI:SS"
export NLS_DATE_FORMAT
# ---------------------------------------------------
# TNS_ADMIN
# ---------------------------------------------------
# Specifies the directory containing the Oracle Net
# Services configuration files like listener.ora,
# tnsnames.ora, and sqlnet.ora.
# ---------------------------------------------------
TNS_ADMIN=$ORACLE_HOME/network/admin; export TNS_ADMIN
# ---------------------------------------------------
# PATH
# ---------------------------------------------------
# Used by the shell to locate executable programs;
# must include the $ORACLE_HOME/bin directory.
# ---------------------------------------------------
PATH=.:${JAVA_HOME}/bin:${PATH}:$HOME/bin:$ORACLE_HOME/bin
PATH=${PATH}:/usr/bin:/bin:/usr/local/bin
export PATH
# ---------------------------------------------------
# LD_LIBRARY_PATH
# ---------------------------------------------------
# Specifies the list of directories that the shared
# library loader searches to locate shared object
# libraries at runtime.
# ---------------------------------------------------
LD_LIBRARY_PATH=$ORACLE_HOME/lib
LD_LIBRARY_PATH=${LD_LIBRARY_PATH}:$ORACLE_HOME/oracm/lib
LD_LIBRARY_PATH=${LD_LIBRARY_PATH}:/lib:/usr/lib:/usr/local/lib
export LD_LIBRARY_PATH
# ---------------------------------------------------
# CLASSPATH
# ---------------------------------------------------
# Specifies the directory or list of directories that
# contain compiled Java classes.
# ---------------------------------------------------
CLASSPATH=$ORACLE_HOME/JRE
CLASSPATH=${CLASSPATH}:$ORACLE_HOME/jlib
CLASSPATH=${CLASSPATH}:$ORACLE_HOME/rdbms/jlib
CLASSPATH=${CLASSPATH}:$ORACLE_HOME/network/jlib
export CLASSPATH
# ---------------------------------------------------
# THREADS_FLAG
# ---------------------------------------------------
# All the tools in the JDK use green threads as a
# default. To specify that native threads should be
# used, set the THREADS_FLAG environment variable to
# "native". You can revert to the use of green
# threads by setting THREADS_FLAG to the value
```

```
# "green".
# -------------------------------------------------
THREADS_FLAG=native; export THREADS_FLAG
# -------------------------------------------------
# TEMP, TMP, and TMPDIR
# -------------------------------------------------
export TEMP=/tmp
export TMPDIR=/tmp
# -------------------------------------------------
# UMASK
# -------------------------------------------------
# Set the default file mode creation mask
# (umask) to 022 to ensure that the user performing
# the Oracle software installation creates files
# with 644 permissions.
# -------------------------------------------------
umask 022
```

Switch to root user and create grid user and assign it to its groups:

```
useradd -u 54323 -g oinstall -G dba grid
passwd grid
```

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

```
cp ~/.bash_profile ~/.bash_profile_bkp
vi ~/.bash_profile

# .bash_profile

# OS User: grid
# Application: Oracle Grid Infrastructure
# Version: Oracle 12c Release 1
# -------------------------------------------------
# Get the aliases and functions
if [ -f ~/.bashrc ]; then
. ~/.bashrc
fi
# -------------------------------------------------
# ORACLE_SID
# -------------------------------------------------
# Specifies the Oracle system identifier (SID)
# for the Automatic Storage Management (ASM)instance
# running on this node.
# -------------------------------------------------
ORACLE_SID=+ASM; export ORACLE_SID
# -------------------------------------------------
# JAVA_HOME
# -------------------------------------------------
# Specifies the directory of the Java SDK and Runtime
# Environment.
# -------------------------------------------------
JAVA_HOME=/usr/bin/java; export JAVA_HOME
# -------------------------------------------------
# ORACLE_BASE
# -------------------------------------------------
```

```
# Specifies the base of the Oracle directory structure
# for Optimal Flexible Architecture (OFA) compliant
# installations. The Oracle base directory for the
# grid installation owner is the location where
# diagnostic and administrative logs, and other logs
# associated with Oracle ASM and Oracle Clusterware
# are stored.
# ------------------------------------------------
ORACLE_BASE=/u01/app/grid; export ORACLE_BASE
# ------------------------------------------------
# ORACLE_HOME
# ------------------------------------------------
# Specifies the directory containing the Oracle
# Grid Infrastructure software. For grid
# infrastructure for a cluster installations, the Grid
# home must not be placed under one of the Oracle base
# directories, or under Oracle home directories of
# Oracle Database installation owners, or in the home
# directory of an installation owner. During
# installation, ownership of the path to the Grid
# home is changed to root. This change causes
# permission errors for other installations.
# ------------------------------------------------
ORACLE_HOME=/u01/app/12.1.0/grid; export ORACLE_HOME
# ------------------------------------------------
# ORACLE_TERM
# ------------------------------------------------
ORACLE_TERM=xterm; export ORACLE_TERM
# ------------------------------------------------
# TNS_ADMIN
# ------------------------------------------------
# Specifies the directory containing the Oracle Net
# Services configuration files like listener.ora,
# tnsnames.ora, and sqlnet.ora.
# ------------------------------------------------
TNS_ADMIN=$ORACLE_HOME/network/admin; export TNS_ADMIN
# ------------------------------------------------
# PATH
# ------------------------------------------------
PATH=.:${JAVA_HOME}/bin:${PATH}:$HOME/bin:$ORACLE_HOME/bin
PATH=${PATH}:/usr/bin:/bin:/usr/local/bin
export PATH
# ------------------------------------------------
# TEMP, TMP, and TMPDIR
export TEMP=/tmp
export TMPDIR=/tmp
# ------------------------------------------------
# UMASK
# ------------------------------------------------
umask 022
```

Create Oracle software grid home directories:

Logout from grid and login as root, then perform the following:

```
mkdir -p /u01/app/oracle
mkdir -p /u01/app/grid
```

```
mkdir -p /u01/app/12.1.0/grid
chown -R grid:oinstall /u01
chown oracle:oinstall /u01/app/oracle
chmod -R 775 /u01
```

5. Install Oracle ASM packages

Verify oracleasm package is installed:

```
[root@srv1 ~]# rpm -qa | grep oracleasm
oracleasm-support-2.1.8-1.el6.x86_64
```

Install Oracle ASMLib package

The oracleasm kernel driver for the 64-bit (x86_64) Red Hat Compatible Kernel for Oracle Linux 6 can be installed manually from ULN or http://public-yum.oracle.com using the yum tool:

yum install kmod-oracleasm

Further information can be obtained from a page in Oracle site titled:"Oracle ASMLib Downloads for Oracle Linux 6"

http://www.oracle.com/technetwork/server-storage/linux/asmlib/ol6-1709075.html

```
[root@srv1 ~]# yum install kmod-oracleasm
Loaded plugins: refresh-packagekit, security, ulninfo
Setting up Install Process
public_ol6_UEKR3_latest                                   | 1.2 kB     00:00
public_ol6_latest                                         | 1.4 kB     00:00
Resolving Dependencies
--> Running transaction check
---> Package kmod-oracleasm.x86_64 0:2.0.8-6.el6_7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================
 Package            Arch       Version              Repository             Size
================================================================================
Installing:
 kmod-oracleasm     x86_64     2.0.8-6.el6_7        public_ol6_latest      35 k

Transaction Summary
================================================================================
Install       1 Package(s)

Total download size: 35 k
Installed size: 117 k
Is this ok [y/N]: y
Downloading Packages:
kmod-oracleasm-2.0.8-6.el6_7.x86_64.rpm                                   |  35 kB     00:00
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : kmod-oracleasm-2.0.8-6.el6_7.x86_64
1/1
  Verifying  : kmod-oracleasm-2.0.8-6.el6_7.x86_64
1/1
Installed:
  kmod-oracleasm.x86_64 0:2.0.8-6.el6_7
Complete!
```

Configure and load the ASM kernel module:

The “oracleasm configure” will do the following:

- create the /etc/sysconfig/oracleasm configuration file
- create the /dev/oracleasm mount point
- mounts the ASMLib driver file system

```
[root@srv1 ~]# 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 []: dba
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
```

Load the oracleasm kernel module:

```
[root@srv1 ~]# /usr/sbin/oracleasm init
Creating /dev/oracleasm mount point: /dev/oracleasm
Loading module "oracleasm": oracleasm
Configuring "oracleasm" to use device physical block size
Mounting ASMlib driver filesystem: /dev/oracleasm
```

6. Create ASM disk volumes

List the disks in the OS, you should see the disks created earlier:

```
[root@srv1 ~]# fdisk -l | grep "Disk /dev/sd"
Disk /dev/sda: 107.4 GB, 107374182400 bytes
Disk /dev/sdb: 2147 MB, 2147483648 bytes
Disk /dev/sdc: 53.7 GB, 53687091200 bytes
Disk /dev/sdd: 53.7 GB, 53687091200 bytes
```

In order to use those disks with ASM, partitions should be created in them.

use fdisk <device file>

then press: n, p, 1, ENTER, ENTER, w – to apply changes

Do this for all the disks sdb,sdc,sdd

Following is the output done on sdb:

```
[root@srv1 ~]# 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 0xd2973f79.
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 (1-261, default 1):
Using default value 1
Last cylinder, +cylinders or +size{K,M,G} (1-261, default 261):
Using default value 261

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

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

Verify:

```
[root@srv1 ~]# fdisk -l | grep "/dev/s"
Disk /dev/sda: 107.4 GB, 107374182400 bytes
/dev/sda1   *           1          64      512000   83  Linux
/dev/sda2              64       13055   104344576   8e  Linux LVM
Disk /dev/sdb: 2147 MB, 2147483648 bytes
/dev/sdb1               1         261     2096451   83  Linux
Disk /dev/sdc: 53.7 GB, 53687091200 bytes
```

```
/dev/sdc1               1        6527    52428096   83  Linux
Disk /dev/sdd: 53.7 GB, 53687091200 bytes
/dev/sdd1               1        6527    52428096   83  Linux
```

Create ASM disks:

oracleasm createdisk CRSDISK1 /dev/sdb1

oracleasm createdisk DATADISK1 /dev/sdc1

oracleasm createdisk FRADISK1 /dev/sdd1

```
[root@srv1 ~]# oracleasm createdisk CRSDISK1 /dev/sdb1
Writing disk header: done
Instantiating disk: done
[root@srv1 ~]# oracleasm createdisk DATADISK1 /dev/sdc1
Writing disk header: done
Instantiating disk: done
[root@srv1 ~]# oracleasm createdisk FRADISK1 /dev/sdd1
Writing disk header: done
Instantiating disk: done
[root@srv1 ~]# oracleasm listdisks
CRSDISK1
DATADISK1
FRADISK1
```

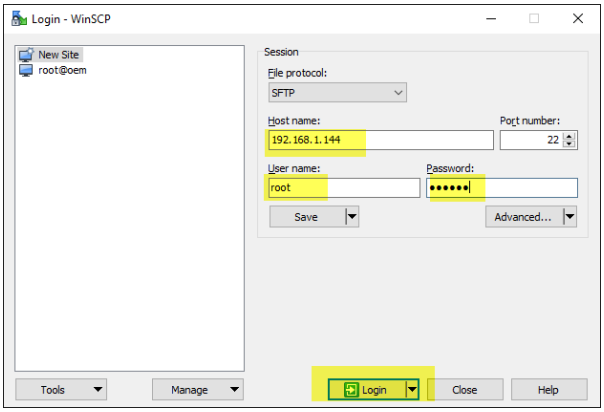
Reboot!

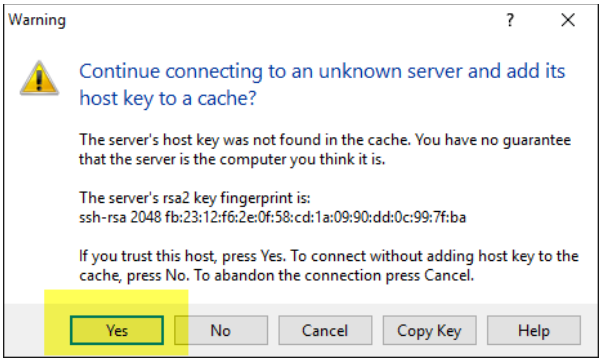
7. Install Oracle Grid Infrastructure software

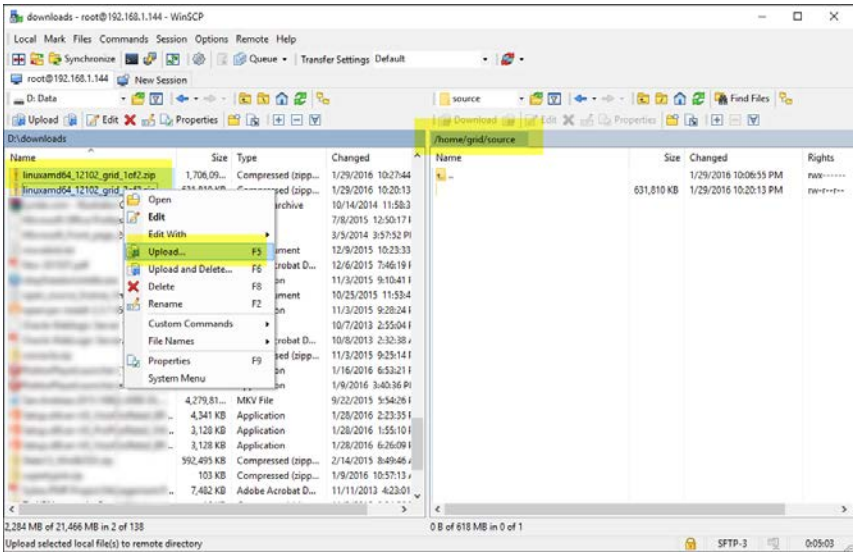
Copy the installation files to the VM appliance:

Use WinSCP to copy Oracle Grid Infrastructure installation files to the VM appliance. As grid user, I created the directory /home/grid/source to copy the installation files to it

```
[root@srv1 ~]# su - grid
[grid@srv1 ~]$ pwd
/home/grid
[grid@srv1 ~]$ mkdir source
```







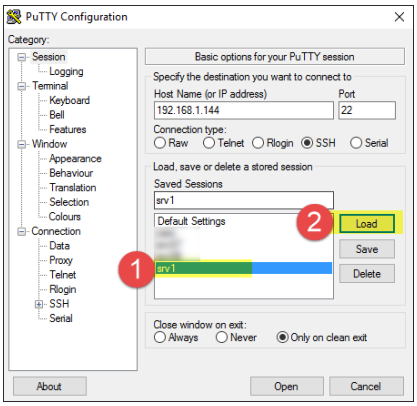
After the files were copied, as `root`, make `grid` user and `oinstall` group the owner of the installation files:

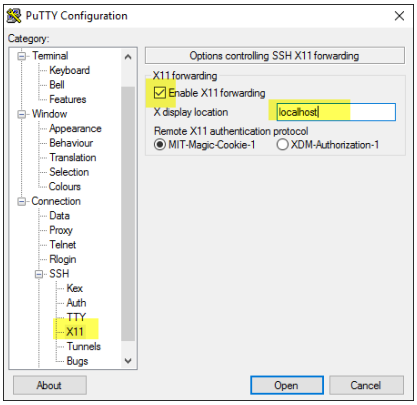
```
[root@srv1 ~]# chown grid:oinstall /home/grid/source/linuxamd64_12102_grid_*
```

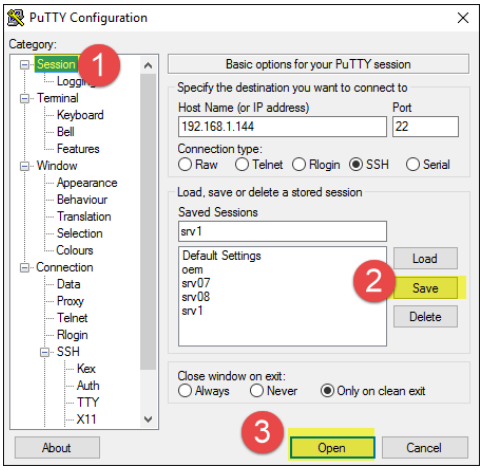
Run Xming and configure Putty for it

Run Xming to view Oracle GUI Installer windows in your host Windows client machine. You should see its icon in the task bar mini icons.

Then, you need to configure PyTTY session with port forwarding enabled to be able to display GUI windows via Xming server and test it with xclock command.



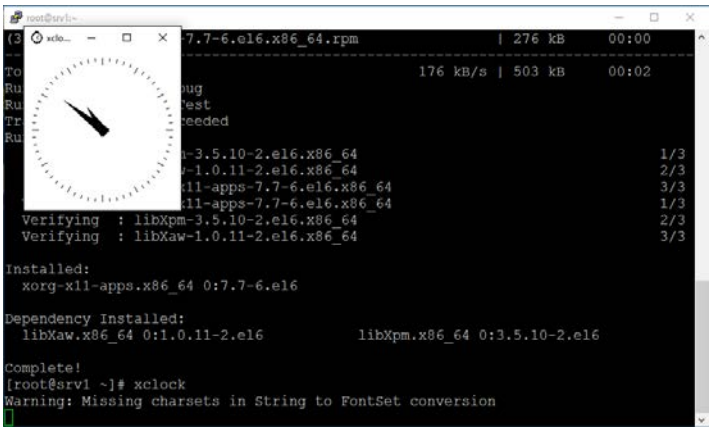




Xclock is not installed in our appliance. To install it, simply run the following command:

```
yum install xclock
```

Run xclock to test the configuration changes. You should see the clock application running in your host Windows machine:



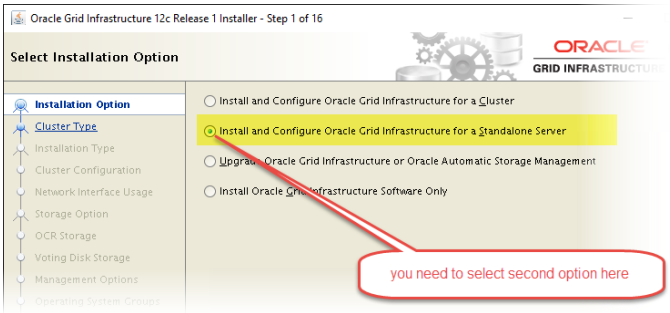
Switch to grid user install the software

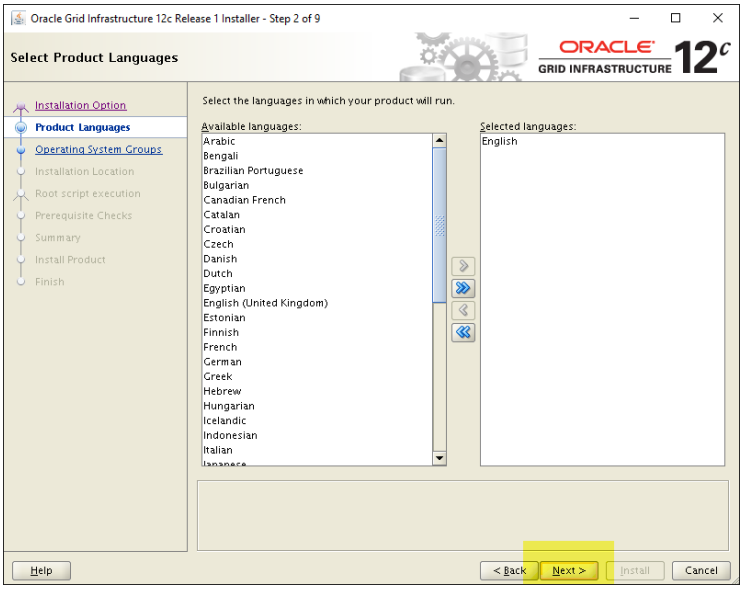
Switch to grid user then use xauth command to set our session cookies for X11 forwarding to work

```
[root@srv1 ~]# xauth list
srv1.localdomain/unix:10  MIT-MAGIC-COOKIE-1  1f999629ceb74de9c492b1129e243877
[root@srv1 ~]# su - grid
[grid@srv1 ~]$ xauth add srv1.localdomain/unix:10   MIT-MAGIC-COOKIE-1  1f999629ceb74de9c492b1129e243877
xauth:  creating new authority file /home/grid/.Xauthority
[grid@srv1 ~]$ export DISPLAY=localhost:10.0
```

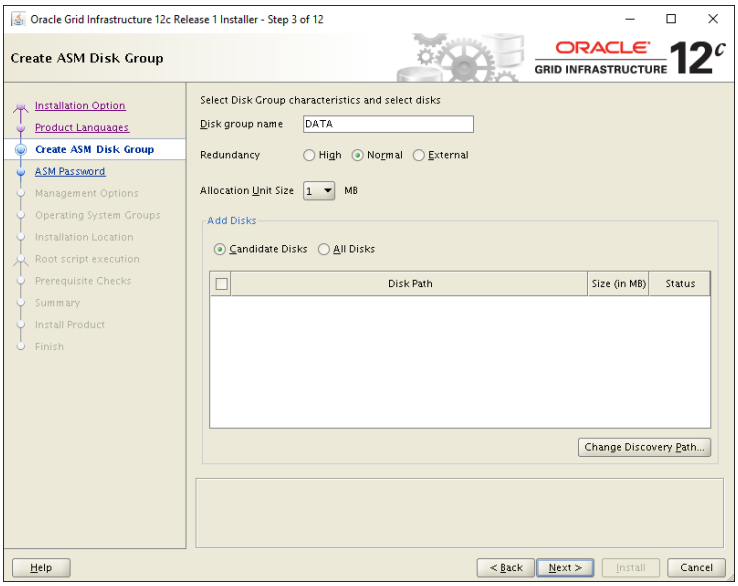
Unzip the installation files and run the installer:

```
[grid@srv1 source]$ unzip linuxamd64_12102_grid_1of2.zip > /dev/null
[grid@srv1 source]$ unzip linuxamd64_12102_grid_2of2.zip > /dev/null
[grid@srv1 source]$ cd grid
[grid@srv1 grid]$ ./runInstaller
Starting Oracle Universal Installer...

Checking Temp space: must be greater than 415 MB.   Actual 79652 MB    Passed
Checking swap space: must be greater than 150 MB.   Actual 5999 MB    Passed
Checking monitor: must be configured to display at least 256 colors.    Actual 16777216    Passed
Preparing to launch Oracle Universal Installer from /tmp/OraInstall2016-01-29_11-13-35PM. Please wait ...
```

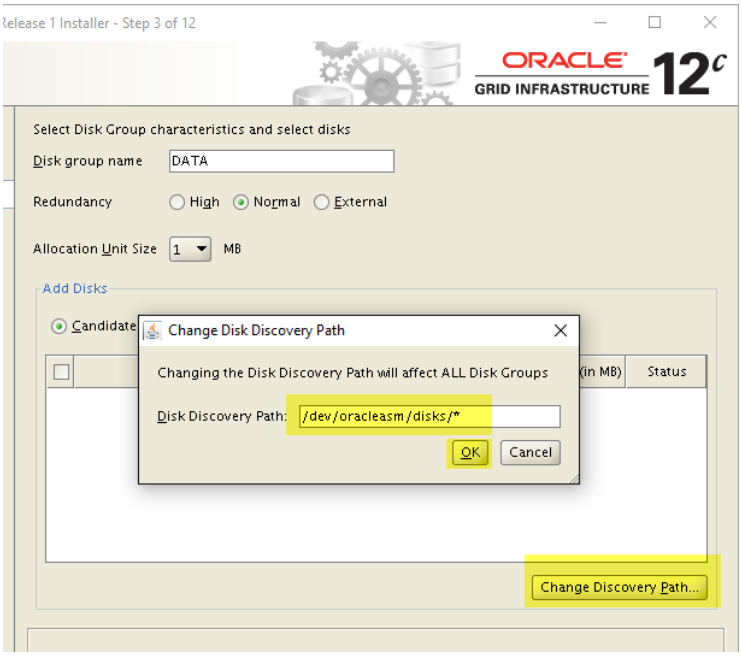


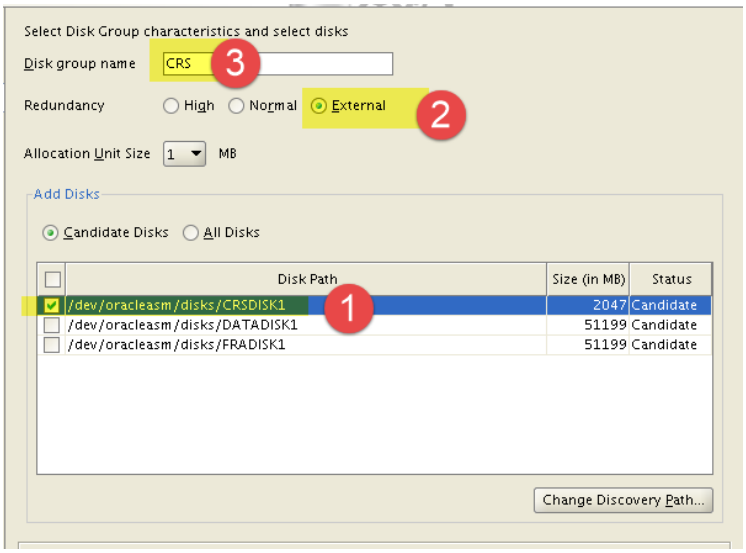


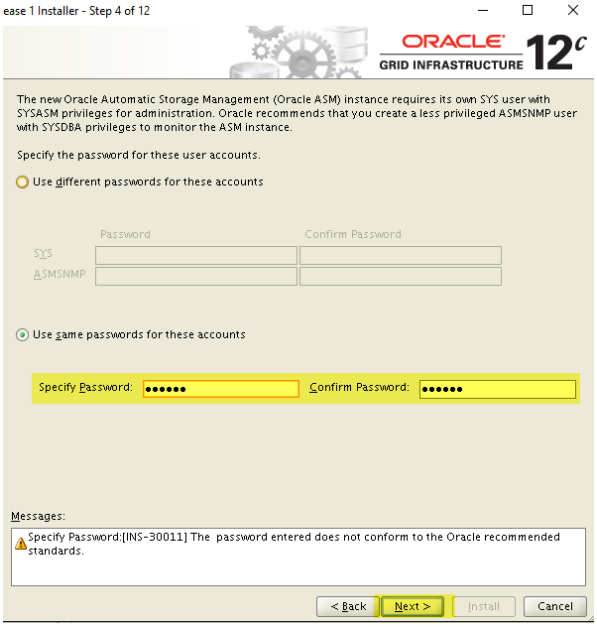
In the next wizard window, we expect to see the ASM disks. But they actually did not appear in our case, as shown below:



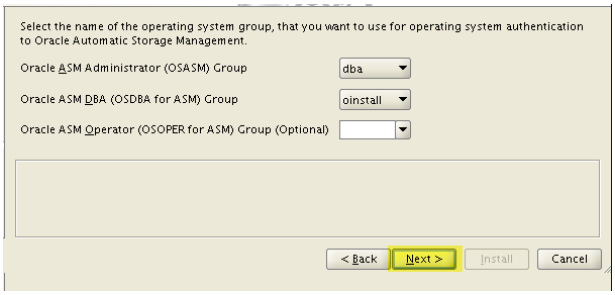
To fix this, we need to change the discovery path. Click on Change Discovery Path button and change it to /dev/oracleasm/disks/*

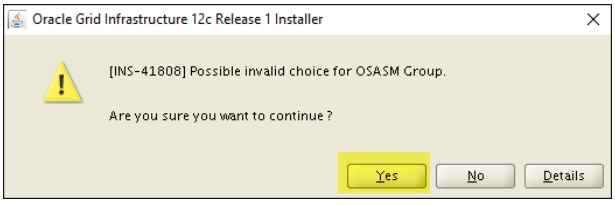


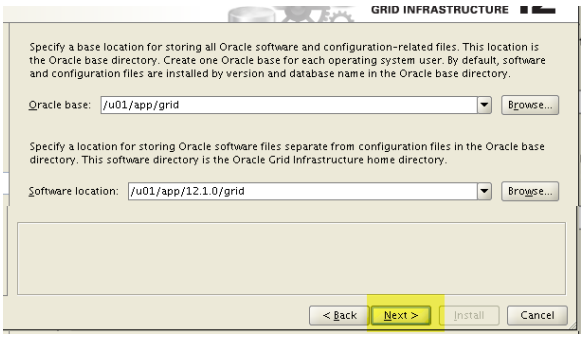


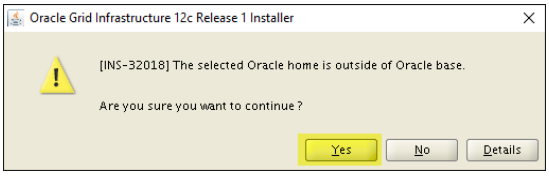

ease 1 Installer - Step 4 of 12
ORACLE
GRID INFRASTRUCTURE 12c
The new Oracle Automatic Storage Management (Oracle ASM) instance requires its own SYS user with SYSASM privileges for administration. Oracle recommends that you create a less privileged ASMSNMP user with SYSDBA privileges to monitor the 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:
Messages:
Specify Password:[INS-30011] The password entered does not conform to the Oracle recommended standards.
< Back
Next >
Install
Cancel

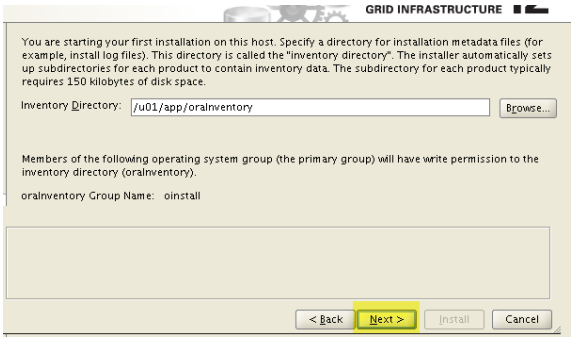
lease 1 Installer - Step 5 of 12
ns
ORACLE
GRID INFRASTRUCTURE 12c
You can configure to have this instance of Oracle Grid Infrastructure and Oracle Automatic Storage Management to be managed by Enterprise Manager Cloud Control. Specify the details of the Cloud Control configuration to perform the registration.
Register with Enterprise Manager (EM) Cloud Control
OMS host:
OMS port:
EM Admin User Name:
EM Admin Password:
< Back
Next >
Install
Cancel

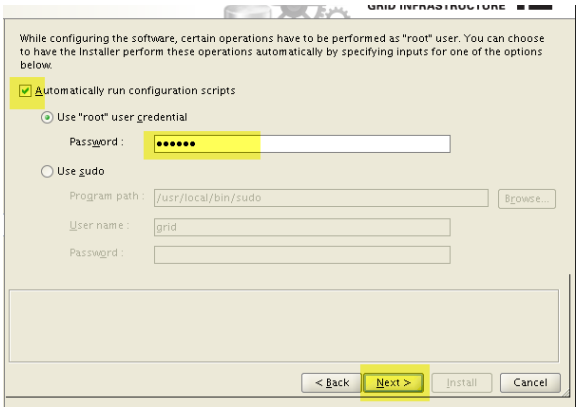

Select the name of the operating system group, that you want to use for operating system authentication to Oracle Automatic Storage Management.
Oracle ASM Administrator (OSASM) Group
dba
Oracle ASM DBA (OSDBA for ASM) Group
oinstall
Oracle ASM Operator (OSOPER for ASM) Group (Optional)
< Back
Next >
Install
Cancel

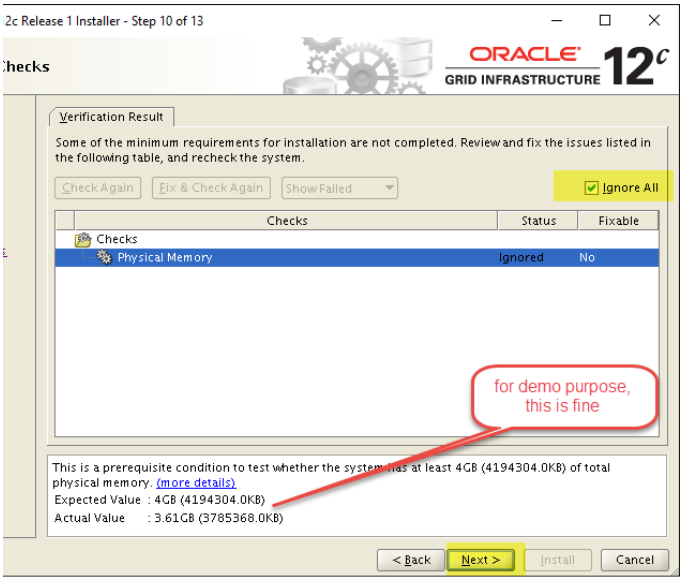

Oracle Grid Infrastructure 12c Release 1 Installer
[INS-41808] Possible invalid choice for OSASM Group.
Are you sure you want to continue ?
Yes
No
Details

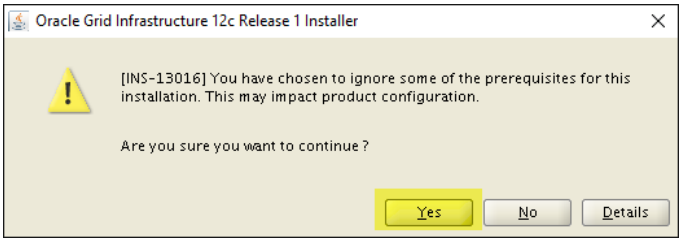

GRID INFRASTRUCTURE
Specify a base location for storing all Oracle software and configuration-related files. This location is the Oracle base directory. Create one Oracle base for each operating system user. By default, software and configuration files are installed by version and database name in the 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/12.1.0/grid
Browse...
< Back
Next >
Install
Cancel

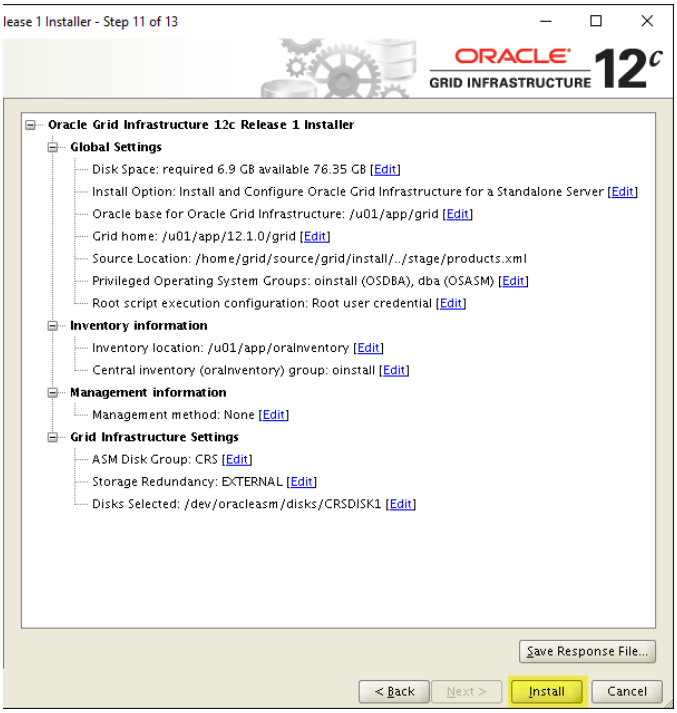

Oracle Grid Infrastructure 12c Release 1 Installer
[INS-32018] The selected Oracle home is outside of Oracle base.
Are you sure you want to continue ?
Yes
No
Details

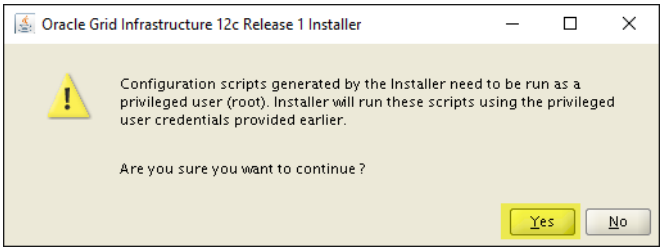

GRID INFRASTRUCTURE
You are starting your first installation on this host. Specify a directory for installation metadata files (for example, install log files). This directory is called the "inventory directory". The installer automatically sets up subdirectories for each product to contain inventory data. The subdirectory for each product typically requires 150 kilobytes of disk space.
Inventory Directory: /u01/app/oraInventory
Browse...
Members of the following operating system group (the primary group) will have write permission to the inventory directory (oraInventory).
oraInventory Group Name: oinstall
< Back
Next >
Install
Cancel

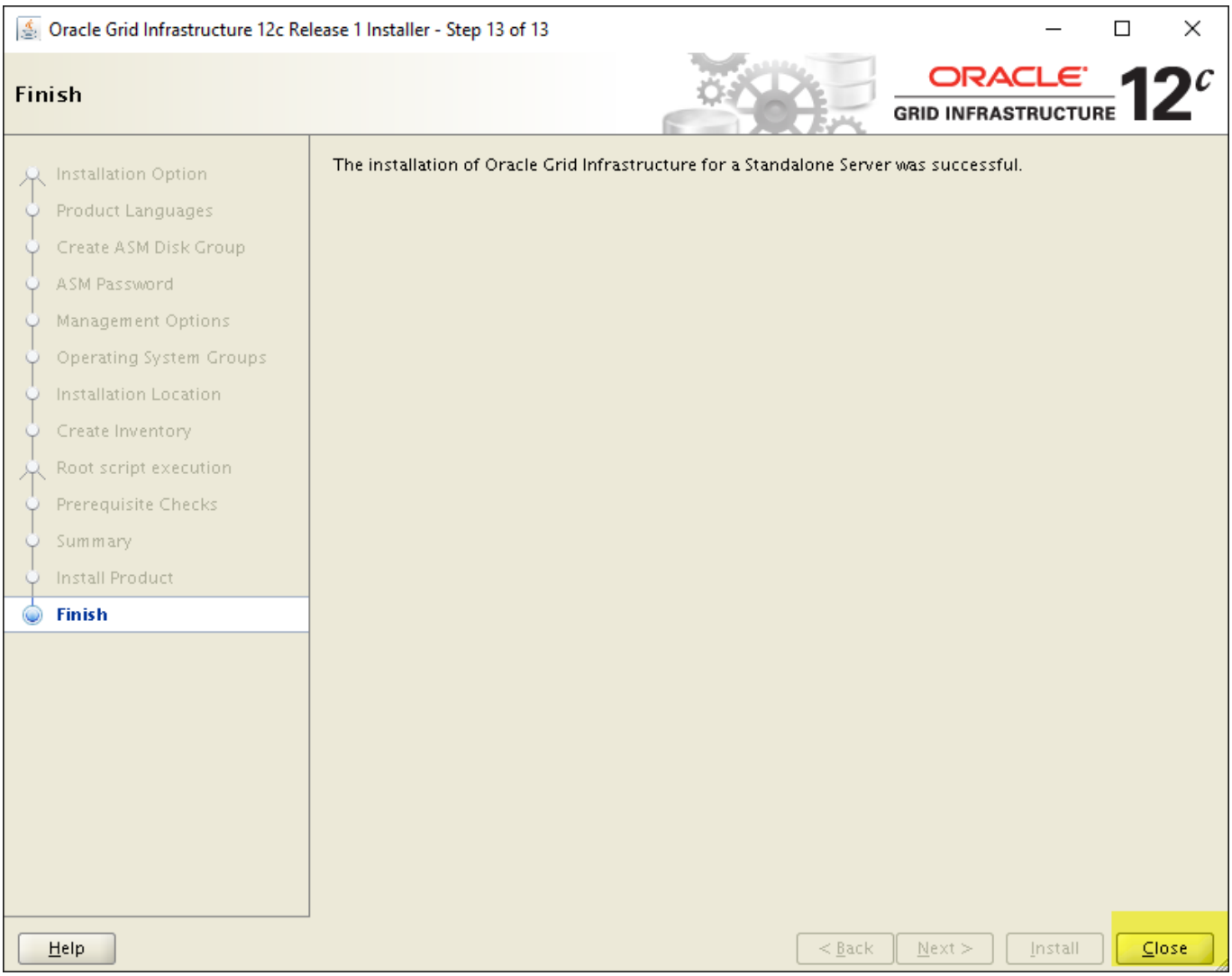

While configuring the software, certain operations have to be performed as "root" user. You can choose to have the Installer perform these operations automatically by specifying inputs for one of the options below.
Automatically run configuration scripts
Use "root" user credential
Password :
Use sudo
Program path : /usr/local/bin/sudo
Browse...
User name : grid
Password :
< Back
Next >
Install
Cancel


2c Release 1 Installer - Step 10 of 13
Checks
ORACLE GRID INFRASTRUCTURE 12c
Verification Result
Some of the minimum requirements for installation are not completed. Review and fix the issues listed in the following table, and recheck the system.
Check Again
Fix & Check Again
Show Failed
Ignore All
Checks
Status
Fixable
Checks
Physical Memory
Ignored
No
for demo purpose, this is fine
This is a prerequisite condition to test whether the system has at least 4GB (4194304.0KB) of total physical memory. (more details)
Expected Value : 4GB (4194304.0KB)
Actual Value : 3.61GB (3785368.0KB)
< Back
Next >
Install
Cancel


Oracle Grid Infrastructure 12c Release 1 Installer
[INS-13016] You have chosen to ignore some of the prerequisites for this installation. This may impact product configuration.
Are you sure you want to continue ?
Yes
No
Details


lease 1 Installer - Step 11 of 13
ORACLE GRID INFRASTRUCTURE 12c
Oracle Grid Infrastructure 12c Release 1 Installer
Global Settings
Disk Space: required 6.9 GB available 76.35 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/12.1.0/grid [Edit]
Source Location: /home/grid/source/grid/install/../stage/products.xml
Privileged Operating System Groups: oinstall (OSDBA), dba (OSASM) [Edit]
Root script execution configuration: Root user credential [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: CRS [Edit]
Storage Redundancy: EXTERNAL [Edit]
Disks Selected: /dev/oracleasm/disks/CRSDISK1 [Edit]
Save Response File...
< Back
Next >
Install
Cancel





Check CRS services status:

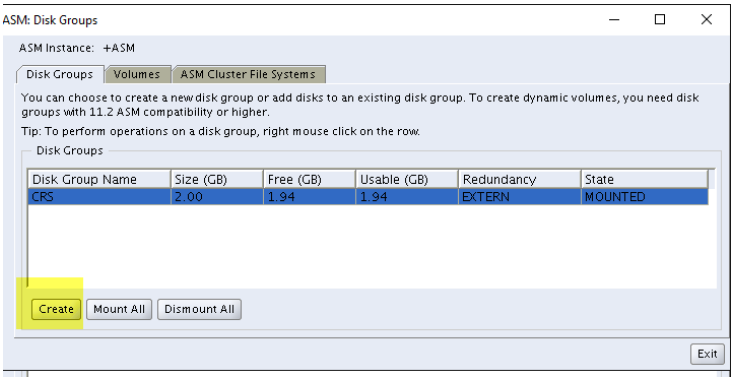
```
crsctl status resource -t
```

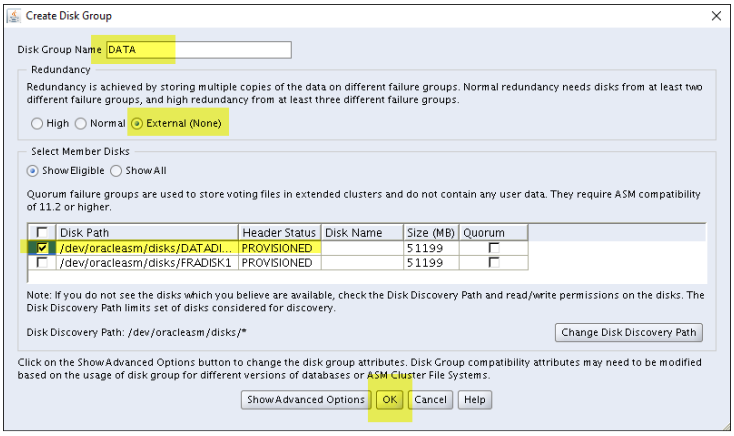
Do not close the Putty command prompt window at this stage. Go to next section and execute the commands over there using the same Putty window. If you have already closed it, start it, login as root, and re-run the “xauth list” again, switch to grid, and re-run the commands “xauth add” and “export DISPLAY” as shown earlier.

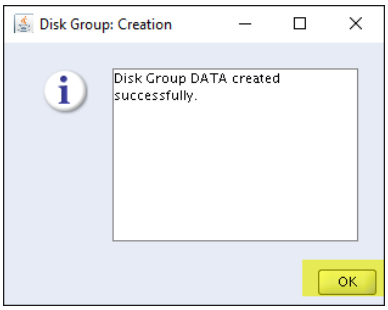
8. Create ASM disk groups

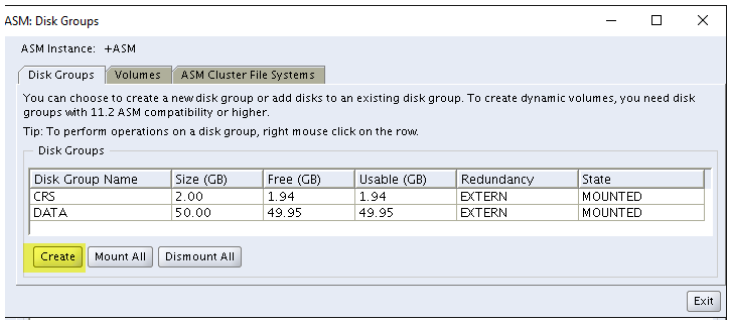
As grid initiate ASM Configuration Assistant:

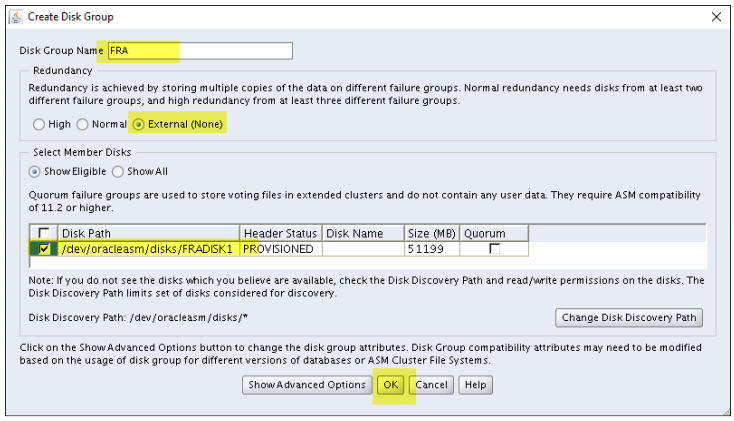
```
[grid@srv1 grid]$ asmca
```

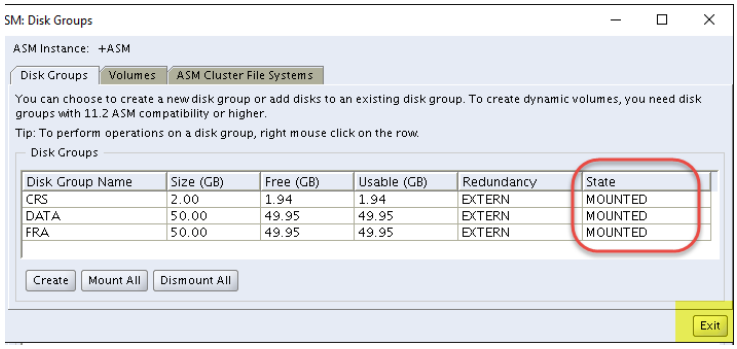












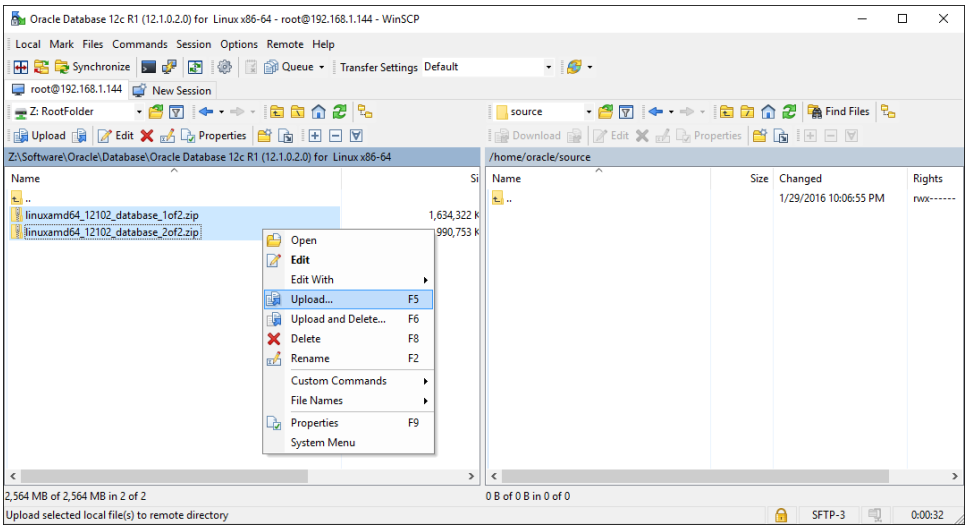
Although it is optional, if your disk free space allows it, I'd recommend shutting down the VM and taking a backup copy of it at this stage.

9. Install Oracle database software

Switch to oracle user and create a directory to save the installation files in it:

```
[root@srv1 ~]# su - oracle
[oracle@srv1 ~]$ mkdir source
[oracle@srv1 ~]$ cd source
```

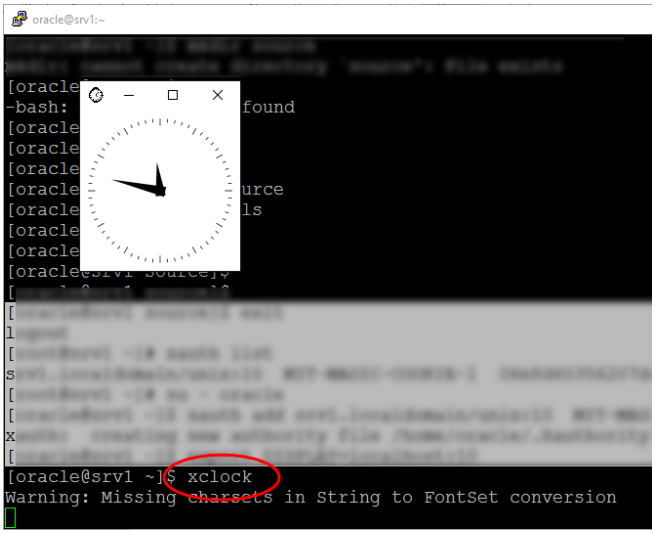
Using WinSCP copy the installation files to that folder:



Similar to what we have done with grid, get the Xming working for current oracle user session, as follows:

```
[oracle@srv1 source]$ exit
logout
[root@srv1 ~]# xauth list
srv1.localdomain/unix:10  MIT-MAGIC-COOKIE-1  06e8d60356207d4e15c7e1a4f4185ad3
[root@srv1 ~]# su - oracle
[oracle@srv1 ~]$ xauth add srv1.localdomain/unix:10  MIT-MAGIC-COOKIE-1  06e8d60356207d4e15c7e1a4f4185ad3
xauth:  creating new authority file /home/oracle/.Xauthority
[oracle@srv1 ~]$ export DISPLAY=localhost:10
```

To test, issue xclock command:

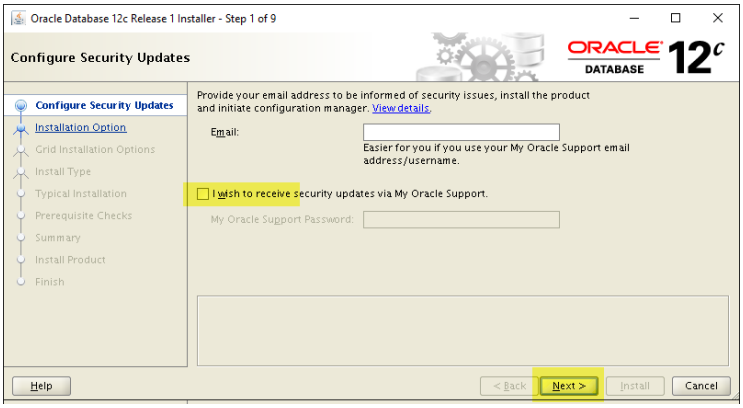


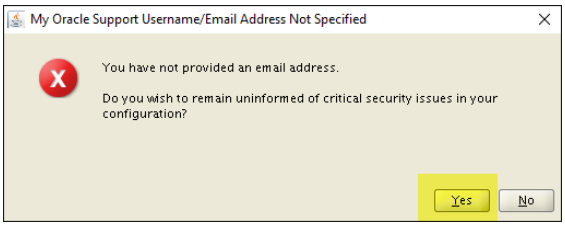
Unzip the installation zip files:

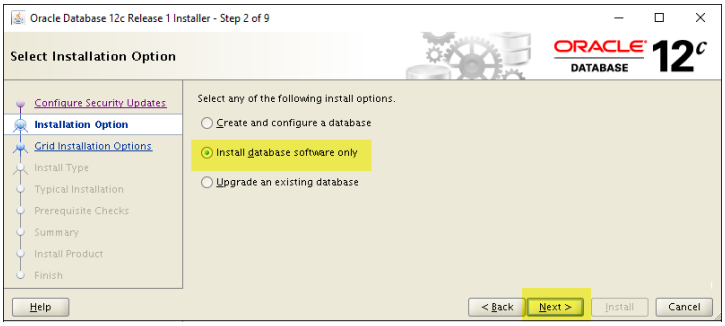
```
[oracle@srv1 ~]$ cd source/
[oracle@srv1 source]$ unzip linuxamd64_12102_database_1of2.zip > /dev/null
[oracle@srv1 source]$ unzip linuxamd64_12102_database_2of2.zip > /dev/null
```

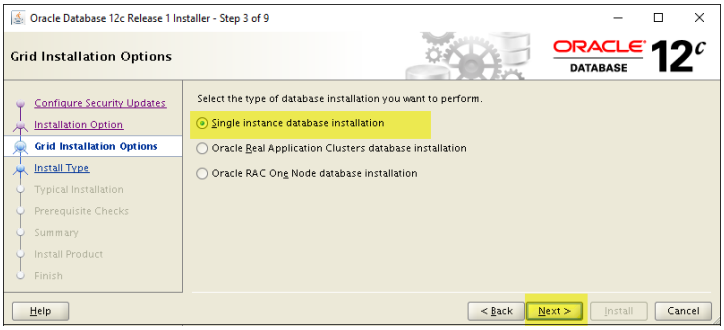
Run the installer:

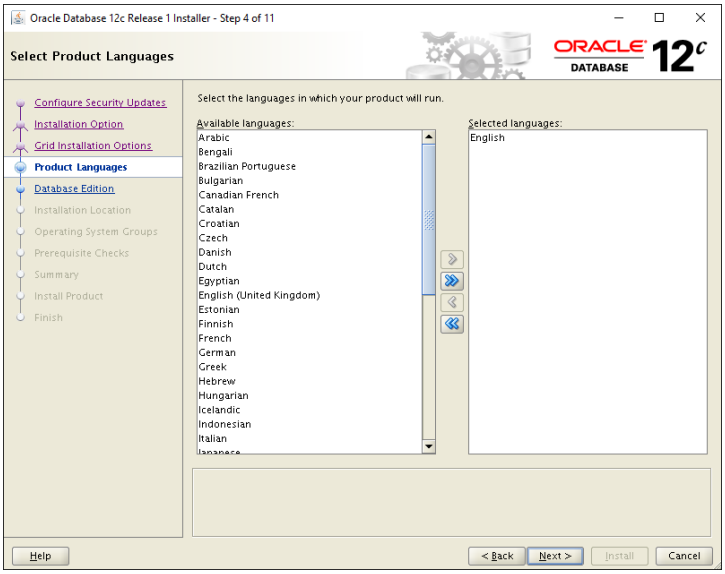
```
[oracle@srv1 source]$ cd database/
[oracle@srv1 database]$ ./runInstaller
```

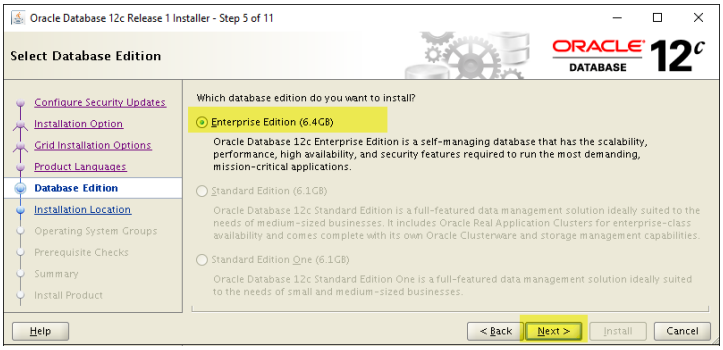


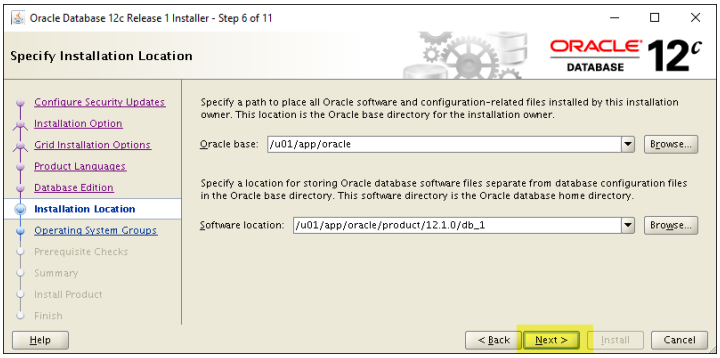


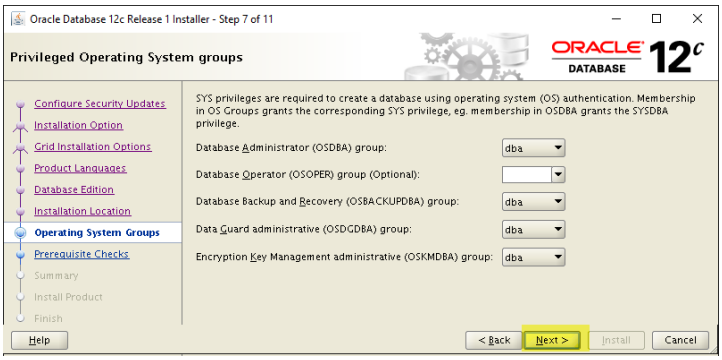

Oracle Database 12c Release 1 Installer - Step 2 of 9
Select Installation Option
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Install Type
Typical Installation
Prerequisite Checks
Summary
Install Product
Finish
Select any of the following install options.
Create and configure a database
Install database software only
Upgrade an existing database
Help
< Back
Next >
Install
Cancel

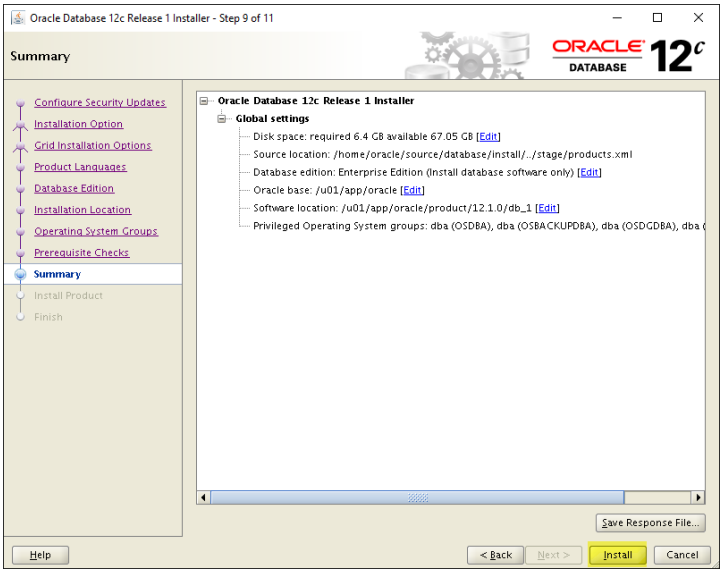

Oracle Database 12c Release 1 Installer - Step 3 of 9
Grid Installation Options
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Install Type
Typical Installation
Prerequisite Checks
Summary
Install Product
Finish
Select the type of database installation you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

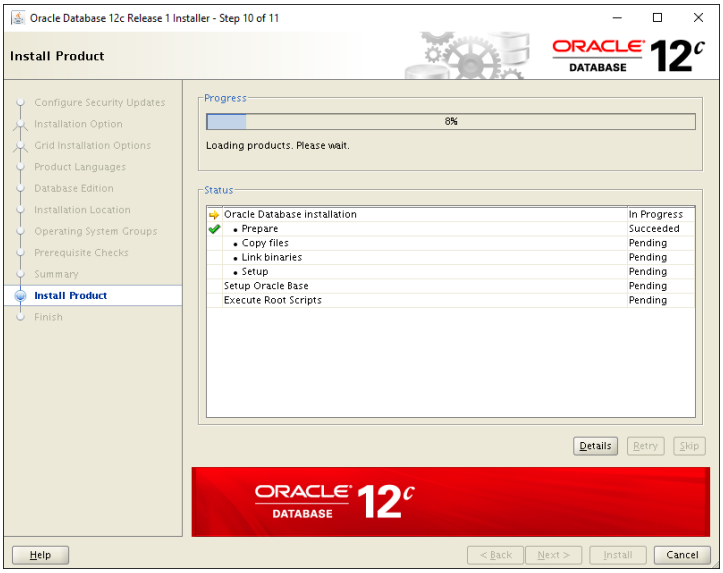

Oracle Database 12c Release 1 Installer - Step 4 of 11
Select Product Languages
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Product Languages
Database Edition
Installation Location
Operating System Groups
Prerequisite Checks
Summary
Install Product
Finish
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
Italian
Selected languages:
English
Help
< Back
Next >
Install
Cancel

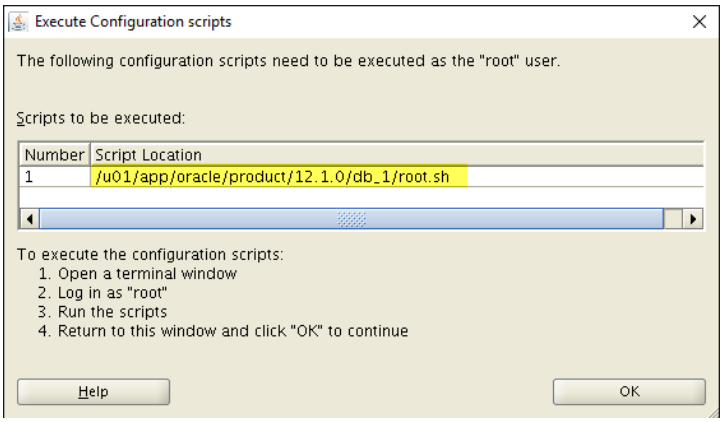

Oracle Database 12c Release 1 Installer - Step 5 of 11
Select Database Edition
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Product Languages
Database Edition
Installation Location
Operating System Groups
Prerequisite Checks
Summary
Install Product
Which database edition do you want to install?
Enterprise Edition (6.4GB)
Oracle Database 12c Enterprise Edition is a self-managing database that has the scalability, performance, high availability, and security features required to run the most demanding, mission-critical applications.
Standard Edition (6.1GB)
Oracle Database 12c Standard Edition is a full-featured data management solution ideally suited to the needs of medium-sized businesses. It includes Oracle Real Application Clusters for enterprise-class availability and comes complete with its own Oracle Clusterware and storage management capabilities.
Standard Edition One (6.1GB)
Oracle Database 12c Standard Edition One is a full-featured data management solution ideally suited to the needs of small and medium-sized businesses.
Help
< Back
Next >
Install
Cancel

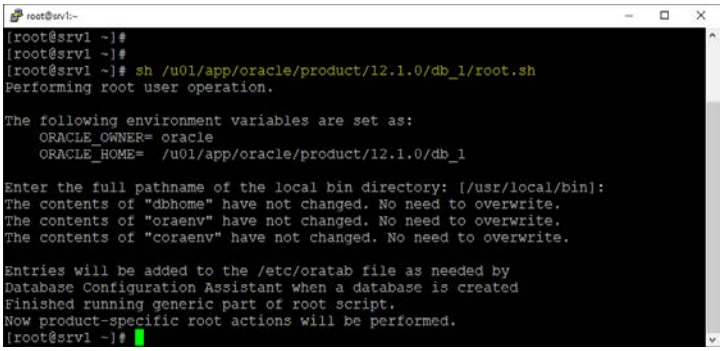

Oracle Database 12c Release 1 Installer - Step 6 of 11
Specify Installation Location
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Product Languages
Database Edition
Installation Location
Operating System Groups
Prerequisite Checks
Summary
Install Product
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/db_1
Browse...
Help
< Back
Next >
Install
Cancel

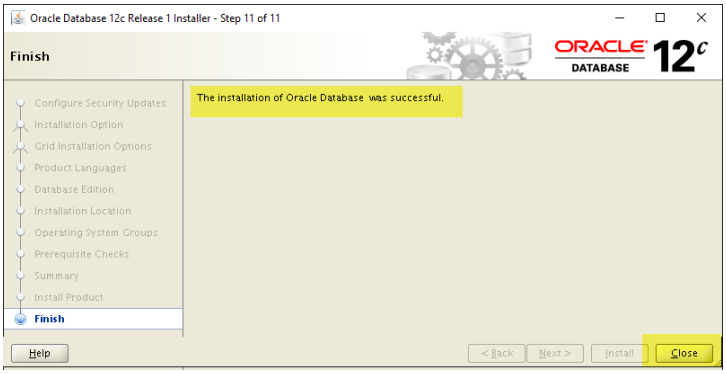

Oracle Database 12c Release 1 Installer - Step 7 of 11
Privileged Operating System groups
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Product Languages
Database Edition
Installation Location
Operating System Groups
Prerequisite Checks
Summary
Install Product
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):
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


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 67.05 GB [Edit]
Source location: /home/oracle/source/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/db_1 [Edit]
Privileged Operating System groups: dba (OSDBA), dba (OSBACKUPDBA), dba (OSDGDBA), dba (
Save Response File...
Help
< Back
Next >
Install
Cancel


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
8%
Loading products. Please wait.
Status
Oracle Database installation
Prepare
Copy files
Link binaries
Setup
Setup Oracle Base
Execute Root Scripts
In Progress
Succeeded
Pending
Details
Retry
Skip
Help
< Back
Next >
Install
Cancel


Execute Configuration scripts
The following configuration scripts need to be executed as the "root" user.
Scripts to be executed:
Number
Script Location
1
/u01/app/oracle/product/12.1.0/db_1/root.sh
To execute the configuration scripts:
1. Open a terminal window
2. Log in as "root"
3. Run the scripts
4. Return to this window and click "OK" to continue
Help
OK


root@srv1:~
[root@srv1 ~]#
[root@srv1 ~]#
[root@srv1 ~]# sh /u01/app/oracle/product/12.1.0/db_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/db_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.
[root@srv1 ~]#

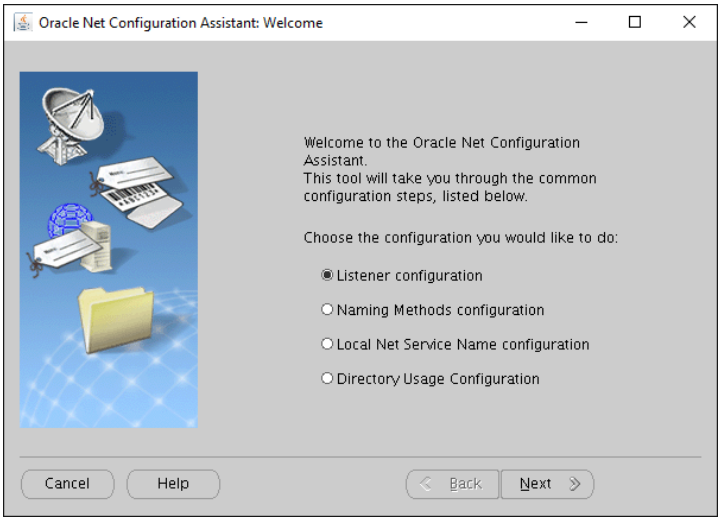

Oracle Database 12c Release 1 Installer - Step 11 of 11
Finish
ORACLE DATABASE 12c
Configure Security Updates
Installation Option
Grid Installation Options
Product Languages
Database Edition
Installation Location
Operating System Groups
Prerequisite Checks
Summary
Install Product
Finish
The installation of Oracle Database was successful.
Help
< Back
Next >
Install
Close

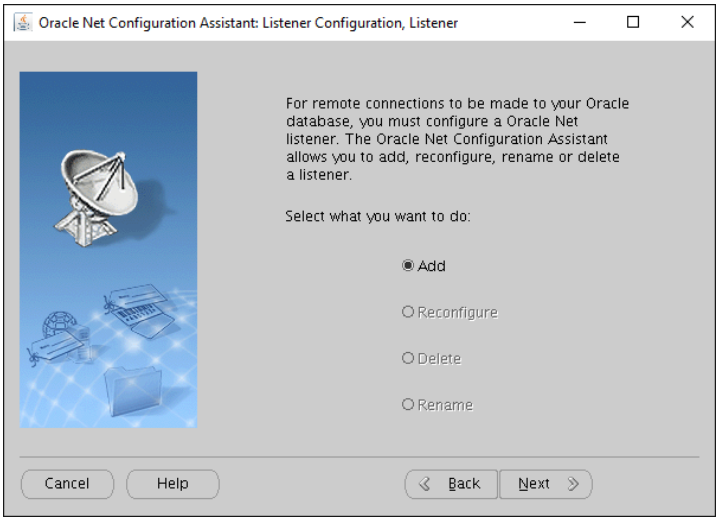
10. Create an Oracle database

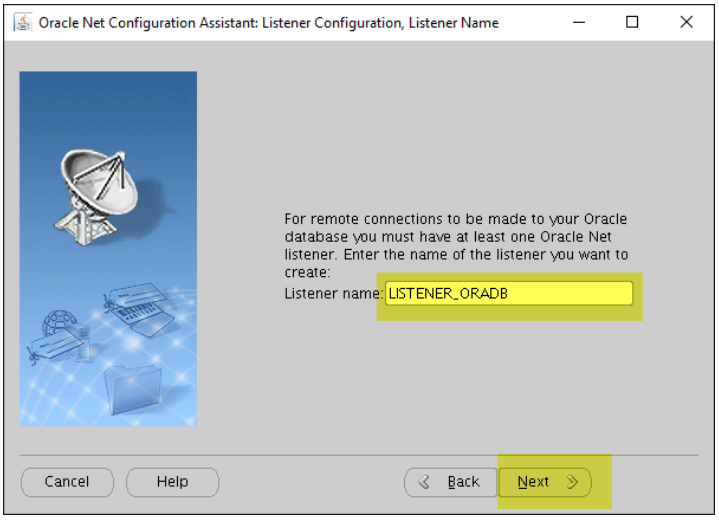
Configure a dedicate database Listener

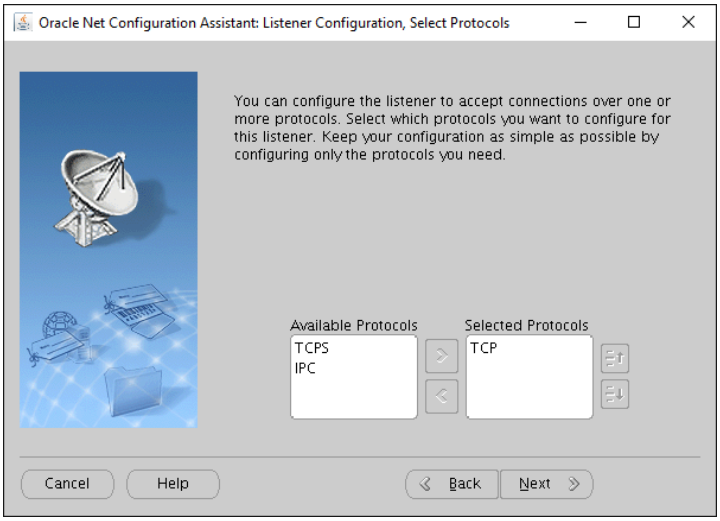
Configure a dedicate database Listener (this is different from the default Listener running in the gird):

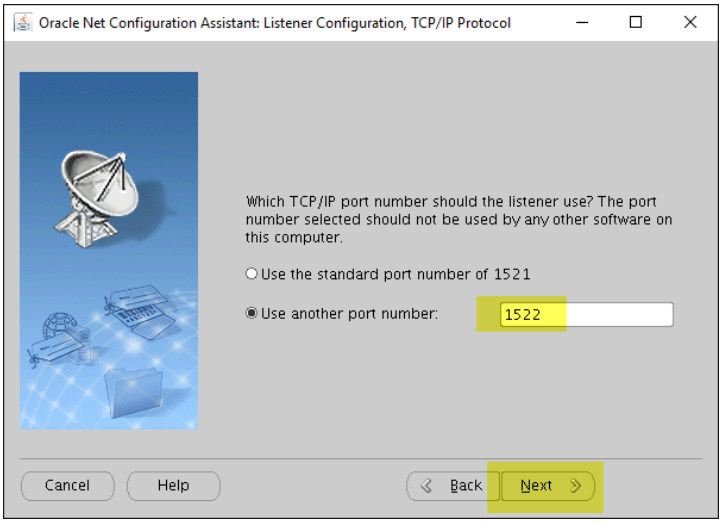
```
[oracle@srv1 database]$ netca
```

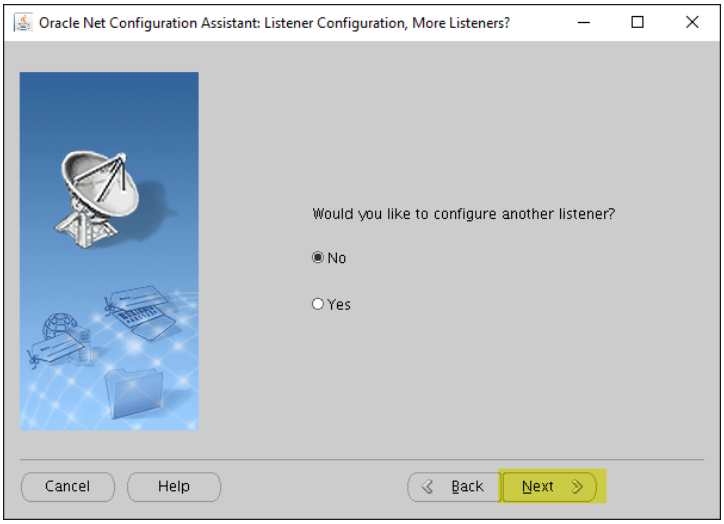


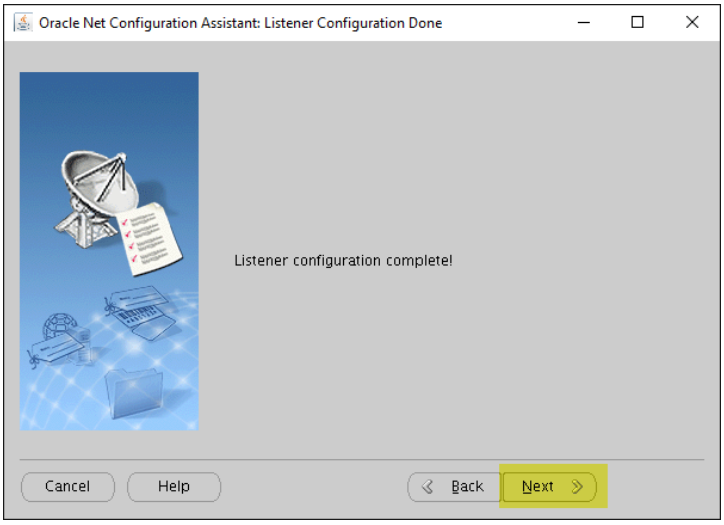


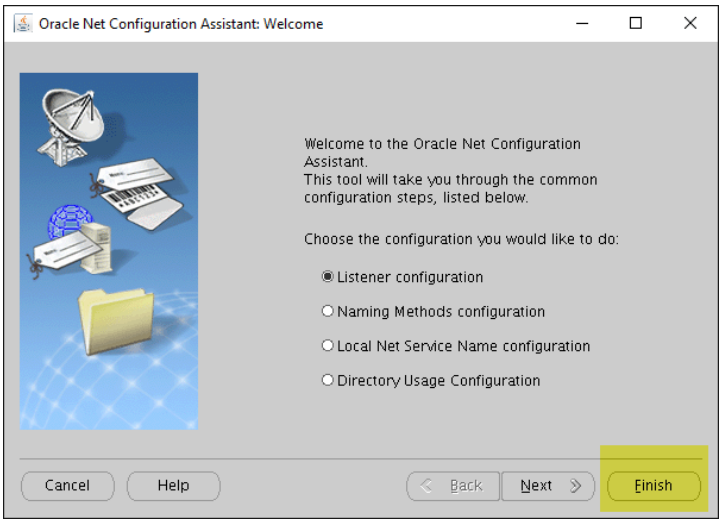



Oracle Net Configuration Assistant: Listener Configuration, Select Protocols
You can configure the listener to accept connections over one or more protocols. Select which protocols you want to configure for this listener. Keep your configuration as simple as possible by configuring only the protocols you need.
Available Protocols
TCPS
IPC
Selected Protocols
TCP
Cancel
Help
Back
Next


Oracle Net Configuration Assistant: Listener Configuration, TCP/IP Protocol
Which TCP/IP port number should the listener use? The port number selected should not be used by any other software on this computer.
Use the standard port number of 1521
Use another port number:
1522
Cancel
Help
Back
Next


Oracle Net Configuration Assistant: Listener Configuration, More Listeners?
Would you like to configure another listener?
No
Yes
Cancel
Help
Back
Next





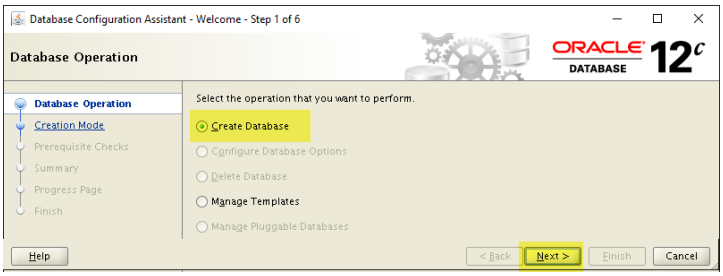
Check the status of the created listener, and start is if it was down:

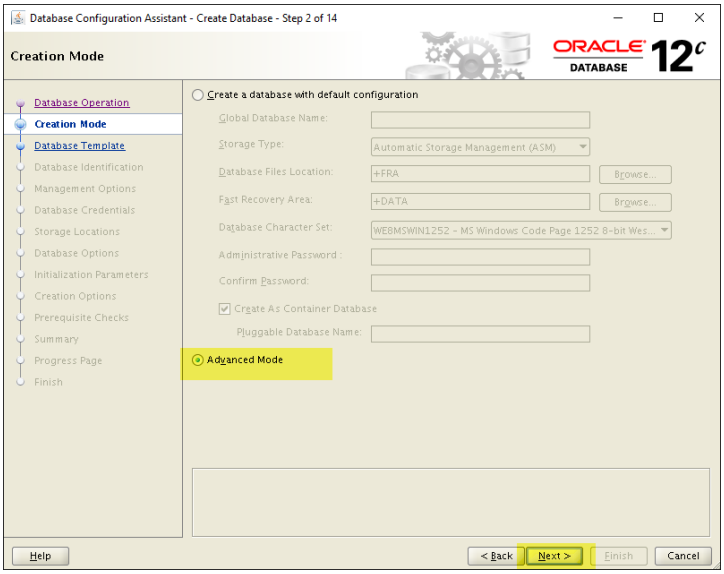
```
lsnrctl status listener_oradb
lsnrctl start listener_oradb
```

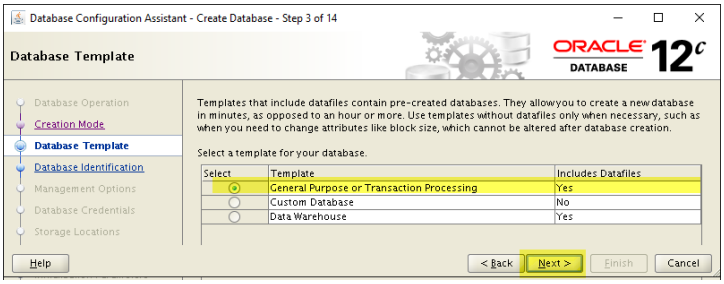
Create the Database

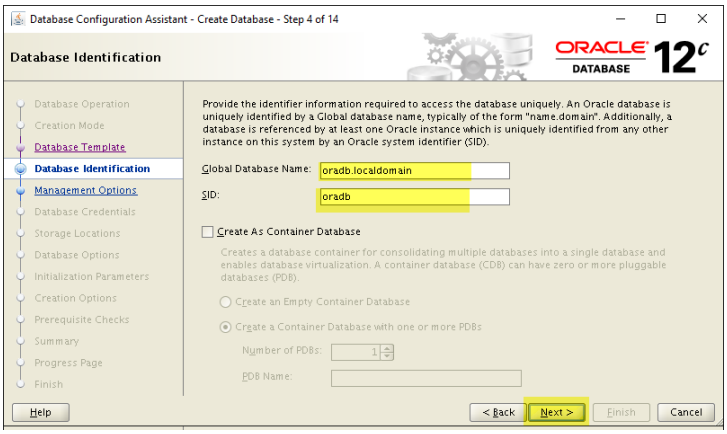
Run dbca (Database Creation Assistant) to create a database

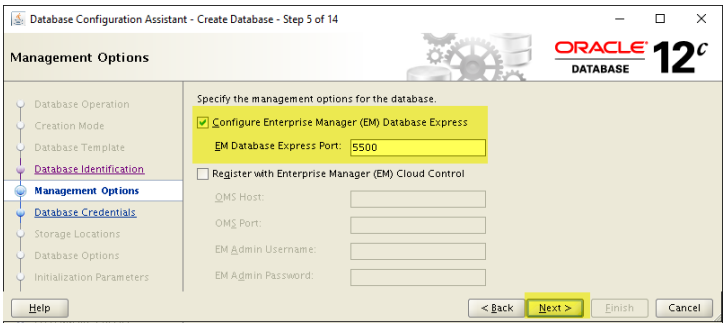
```
[oracle@srv1 database]$ dbca
```

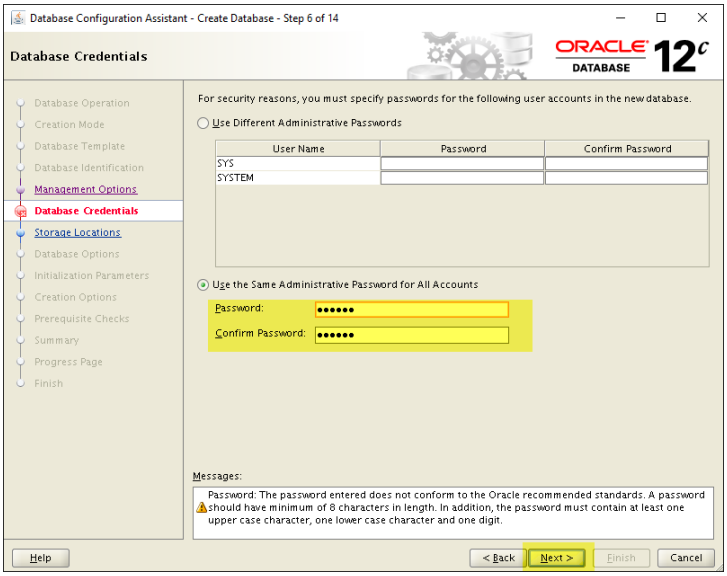


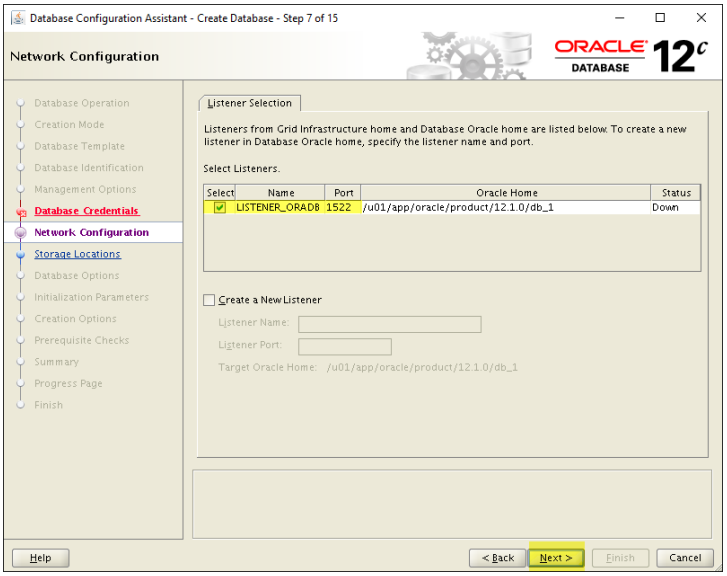

Database Configuration Assistant - Create Database - Step 2 of 14
Creation Mode
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Create a database with default configuration
Global Database Name:
Storage Type:
Automatic Storage Management (ASM)
Database Files Location:
+FRA
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


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
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
Help
< Back
Next >
Finish
Cancel

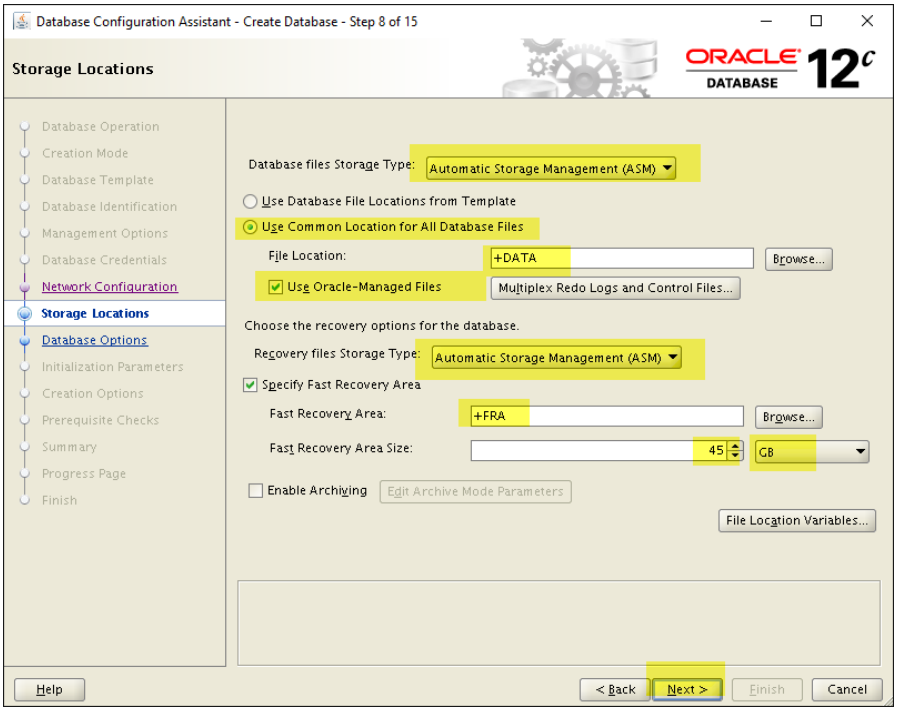

Database Configuration Assistant - Create Database - Step 4 of 14
Database Identification
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Provide the identifier information required to access the database uniquely. An Oracle database is uniquely identified by a Global database name, typically of the form "name.domain". Additionally, a database is referenced by at least one Oracle instance which is uniquely identified from any other instance on this system by an Oracle system identifier (SID).
Global Database Name:
oradb.localdomain
SID:
oradb
Create As Container Database
Creates a database container for consolidating multiple databases into a single database and enables database virtualization. A container database (CDB) can have zero or more pluggable databases (PDB).
Create an Empty Container Database
Create a Container Database with one or more PDBs
Number of PDBs:
1
PDB Name:
Help
< Back
Next >
Finish
Cancel

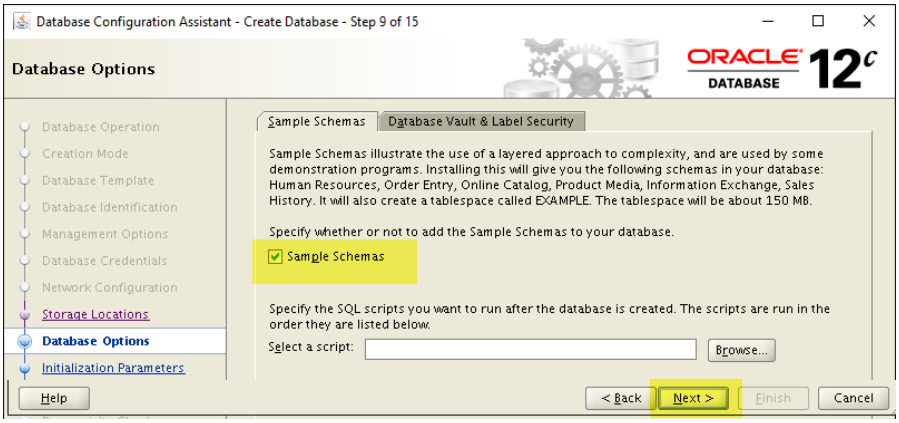

Database Configuration Assistant - Create Database - Step 5 of 14
Management Options
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Storage Locations
Database Options
Initialization Parameters
Specify the management 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

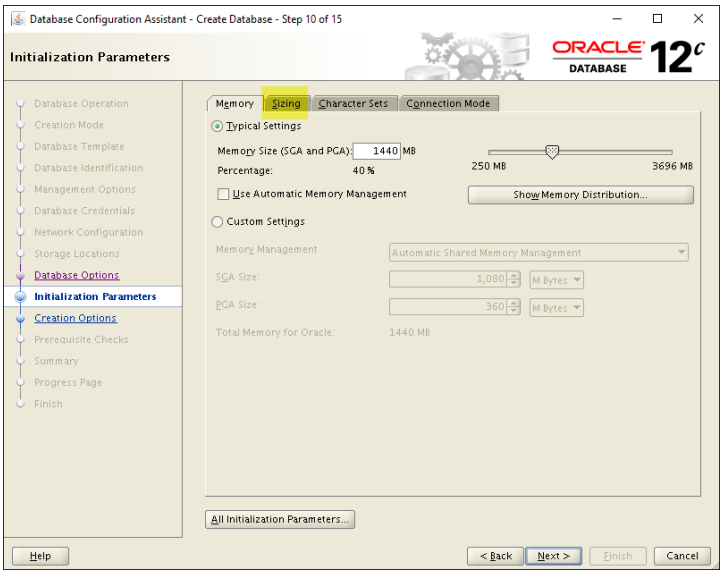

Database Configuration Assistant - Create Database - Step 6 of 14
Database Credentials
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
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:
Messages:
Password: The password entered does not conform to the Oracle recommended standards. A password should have minimum of 8 characters in length. In addition, the password must contain at least one upper case character, one lower case character and one digit.
Help
< Back
Next >
Finish
Cancel

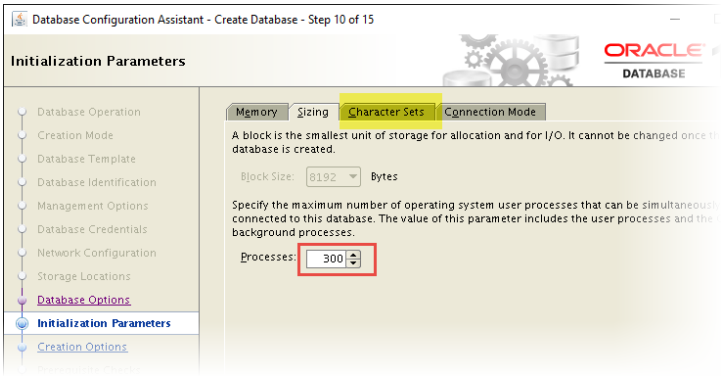

Database Configuration Assistant - Create Database - Step 7 of 15
Network Configuration
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters
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_ORAD8
1522
/u01/app/oracle/product/12.1.0/db_1
Down
Create a New Listener
Listener Name:
Listener Port:
Target Oracle Home: /u01/app/oracle/product/12.1.0/db_1
Help
< Back
Next >
Finish
Cancel

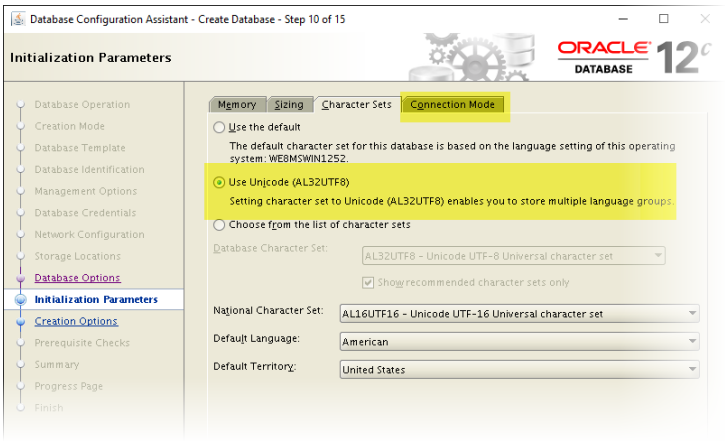
I had issues with selecting from the drop list items in the following windows with my mouse. It worked fine with me using the keyboard.

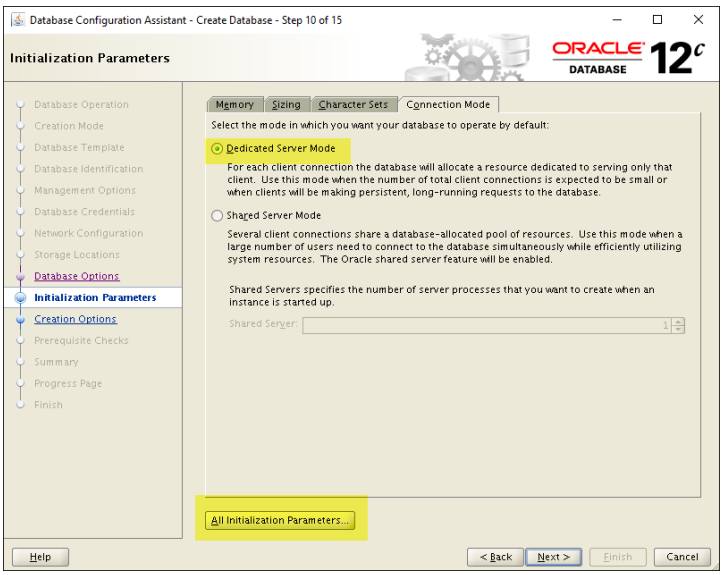




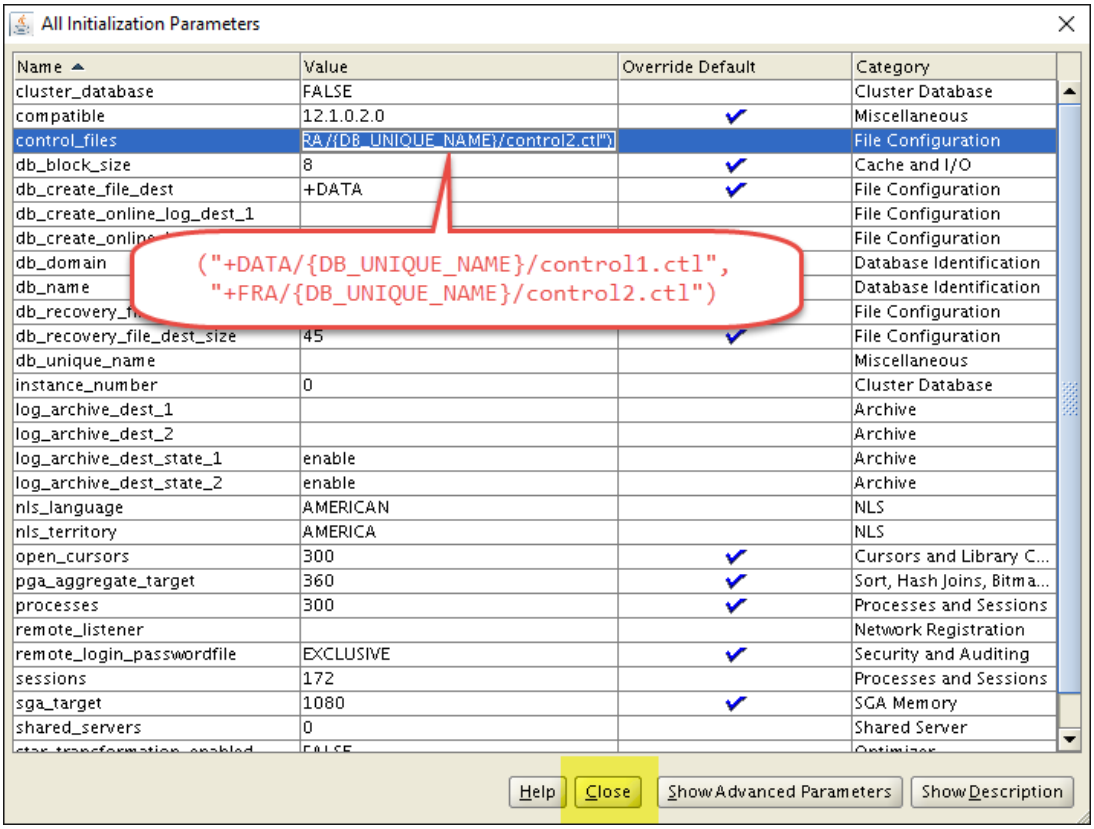


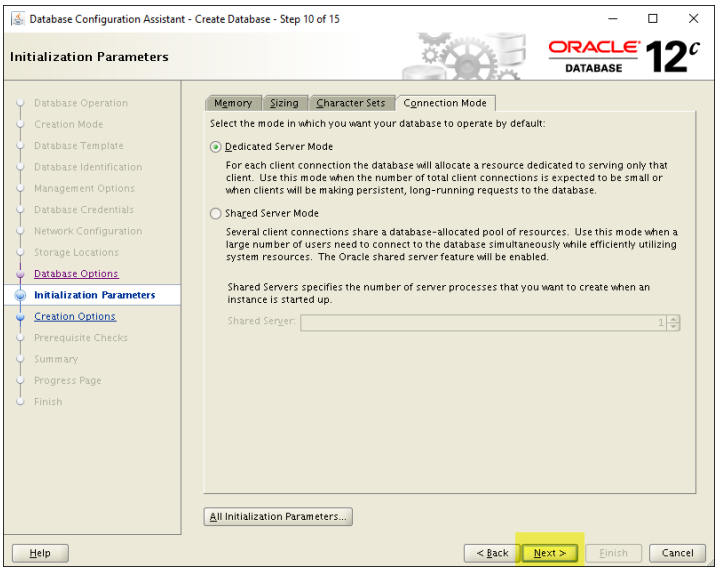

Database Configuration Assistant - Create Database - Step 10 of 15
Initialization Parameters
ORACLE DATABASE
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters
Creation Options
Memory
Sizing
Character Sets
Connection Mode
A block is the smallest unit of storage for allocation and for I/O. It cannot be changed once
database is created.
Block Size:
8192
Bytes
Specify the maximum number of operating system user processes that can be simultaneous
connected to this database. The value of this parameter includes the user processes and the
background processes.
Processes:
300

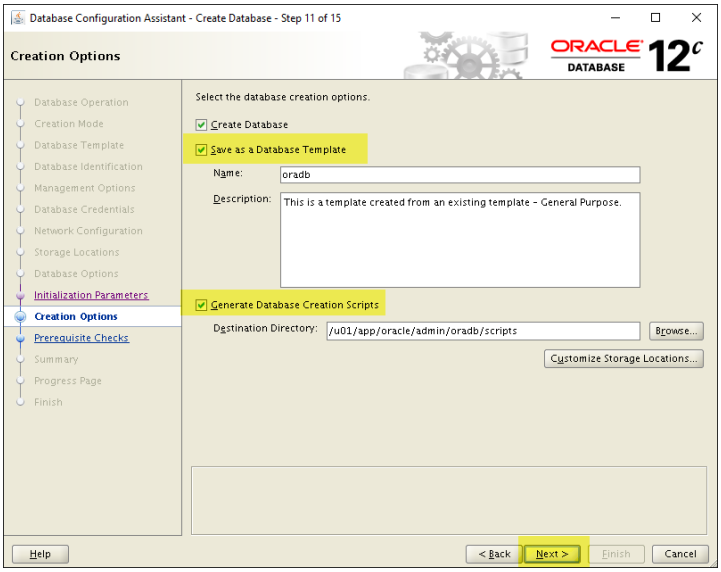

Database Configuration Assistant - Create Database - Step 10 of 15
Initialization Parameters
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters
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

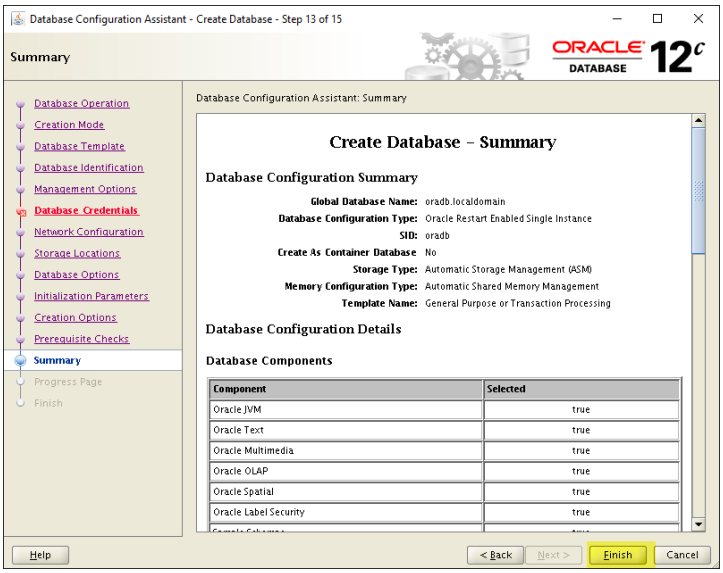

Database Configuration Assistant - Create Database - Step 10 of 15
Initialization Parameters
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters
Creation Options
Prerequisite Checks
Summary
Progress Page
Finish
Memory
Sizing
Character Sets
Connection Mode
Select the mode in which you want your database to operate by default:
Dedicated Server Mode
For each client connection the database will allocate a resource dedicated to serving only that client. Use this mode when the number of total client connections is expected to be small or when clients will be making persistent, long-running requests to the database.
Shared Server Mode
Several client connections share a database-allocated pool of resources. Use this mode when a large number of users need to connect to the database simultaneously while efficiently utilizing system resources. The Oracle shared server feature will be enabled.
Shared Servers specifies the number of server processes that you want to create when an instance is started up.
Shared Server:
All Initialization Parameters...
Help
< Back
Next >
Finish
Cancel

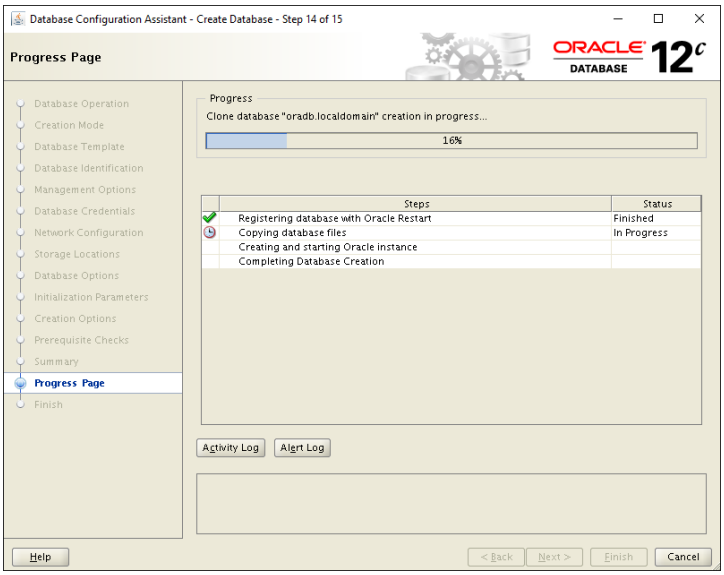
Set the control files parameter to (`"+DATA/{DB_UNIQUE_NAME}/control1.ctl","+FRA/{DB_UNIQUE_NAME}/control2.ctl"`)

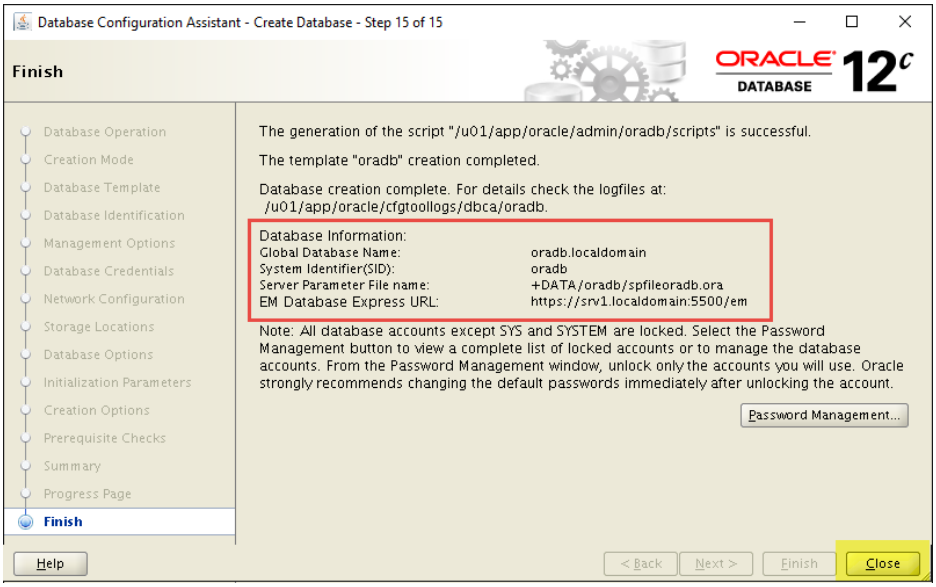





Database Configuration Assistant - Create Database - Step 11 of 15
Creation Options
ORACLE DATABASE 12c
Database Operation
Creation Mode
Database Template
Database Identification
Management Options
Database Credentials
Network Configuration
Storage Locations
Database Options
Initialization Parameters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


Database Configuration Assistant - Create Database - Step 13 of 15
Summary
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 Configuration Assistant: Summary
Create Database - Summary
Database Configuration Summary
Global Database Name: oradb.localdomain
Database Configuration Type: Oracle Restart Enabled Single Instance
SID: oradb
Create As Container Database No
Storage Type: Automatic Storage Management (ASM)
Memory Configuration Type: Automatic Shared Memory Management
Template Name: General Purpose or Transaction Processing
Database Configuration Details
Database Components
Component
Selected
Oracle JVM
true
Oracle Text
true
Oracle Multimedia
true
Oracle OLAP
true
Oracle Spatial
true
Oracle Label Security
true
Help
< Back
Next >
Finish
Cancel


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 "oradb.localdomain" creation in progress...
16%
Steps
Status
Registering database with Oracle Restart
Finished
Copying database files
In Progress
Creating and starting Oracle instance
Completing Database Creation
Activity Log
Alert Log
Help
< Back
Next >
Finish
Cancel

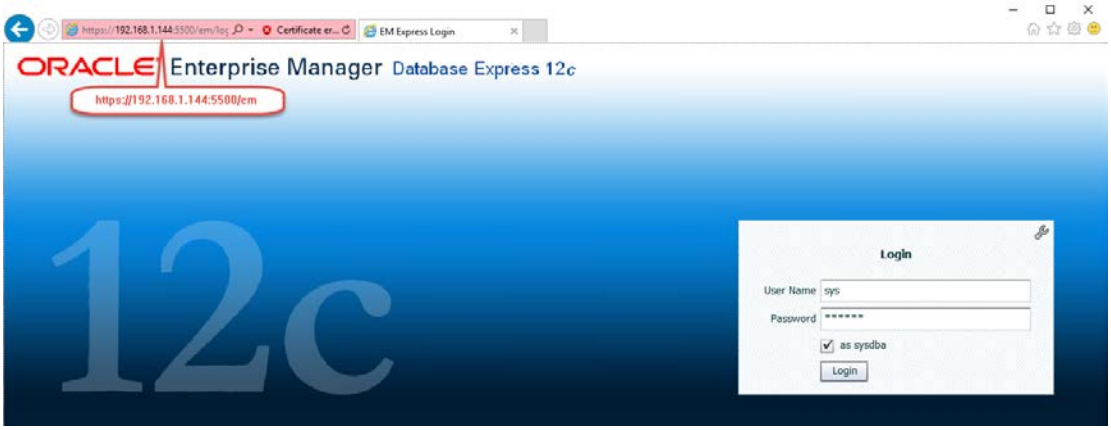


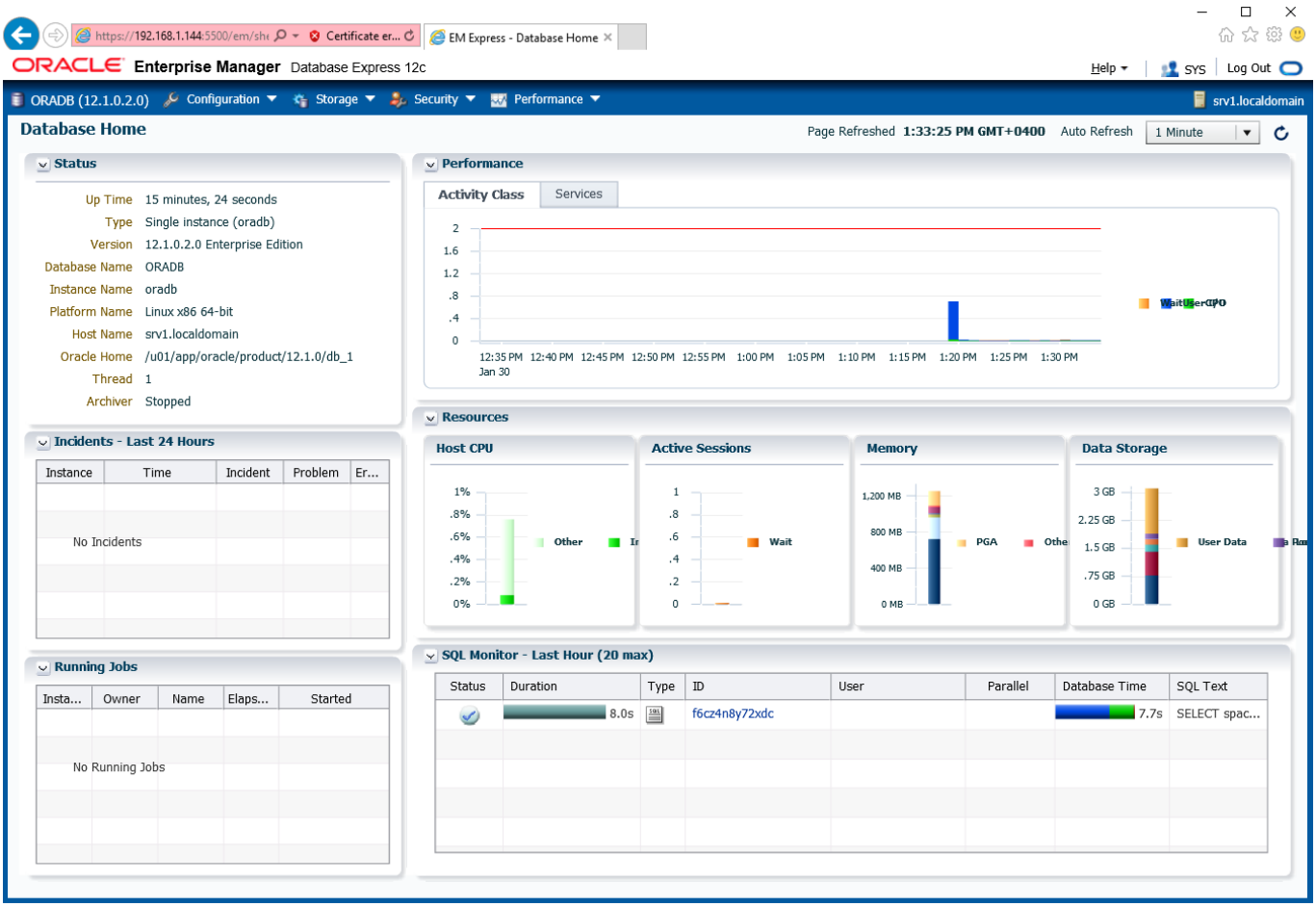
Connect to the database using sqlplus utility for testing:

```
[oracle@srv1 database]$ echo $ORACLE_SID
oradb
[oracle@srv1 database]$ sqlplus system

SQL*Plus: Release 12.1.0.2.0 Production on Sat Jan 30 13:27:27 2016

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

Enter password:
Last Successful login time: Sat Jan 30 2016 13:25:43 +04:00

Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production
With the Partitioning, Automatic Storage Management, OLAP, Advanced Analytics
and Real Application Testing options

SQL> exit
Disconnected from Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production
With the Partitioning, Automatic Storage Management, OLAP, Advanced Analytics
and Real Application Testing options
```

Test the Enterprise Manager Database Express

If you want to test from hosting machine, use the url `https://192.168.1.144:5500/em`





Sounds good, isn't it?

About Database Autostart

Traditionally, when you create a standalone Oracle database without ASM, you need to configure Linux to auto-start it with the server reboot. When you use the ASM, the Grid Infrastructure service will take care of this.

Try rebooting the VM machine, login as grid, and check the status of the database. You will see it up and running, as follows:

```
[grid@srv1 ~]$ srvctl status database -d oradb
```

```
Database is running.
```

Practically, you do not need to do anything here. I just want to point that out.

```
[grid@srv1 ~]$ crsctl config has
CRS-4622: Oracle High Availability Services autostart is enabled.
```