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Oracle Database 11g Administration and Development



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**Install and Configure a 2-Node Real Application Cluster (RAC)**

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## Install and Configure a 2-Node RAC



This is an intensive hands-on training in Oracle Real Application Clusters (RAC). It teaches you about the Oracle Grid Infrastructure products, including Oracle Automatic Storage Manager (ASM), and Oracle Cluster ware. You will also learn to administer the Oracle Cluster ware and storage products using both command line utilities and graphical user interface clients

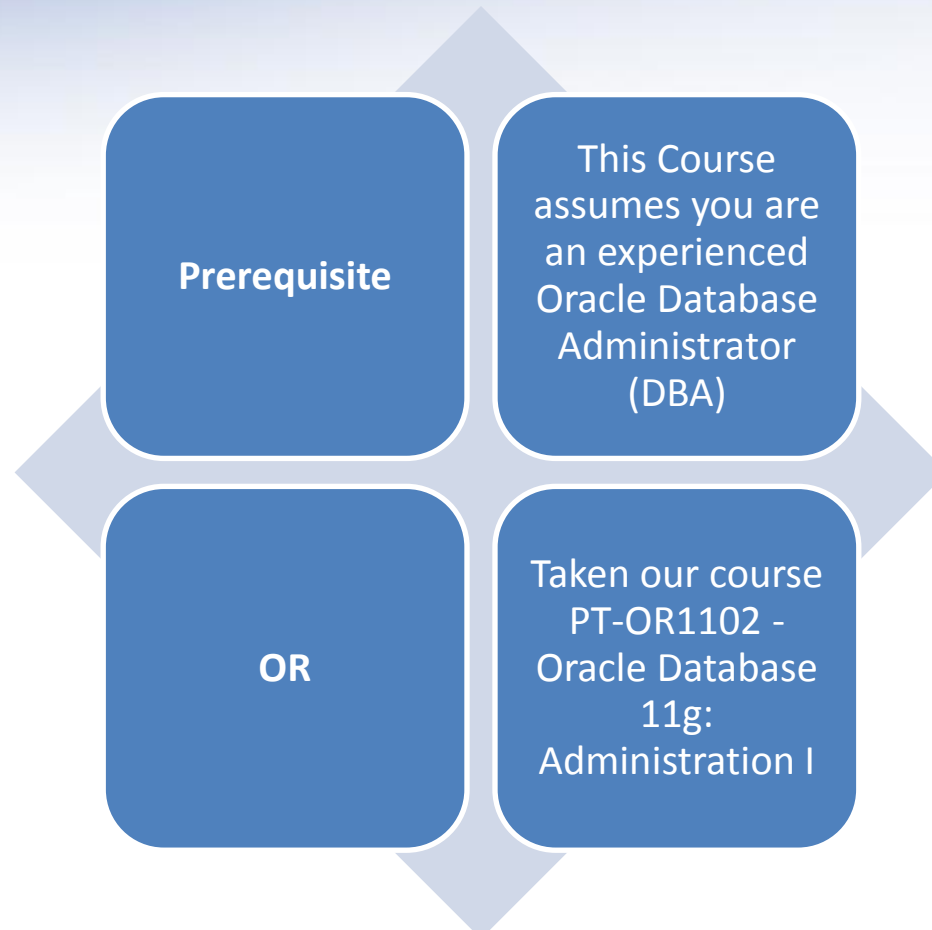
This course will provide you step by step guidance to create a 2-node RAC environment and hands-on training administering cluster databases using Enterprise Manager and command-line utilities like SRVCTL, CRSCTL, ASMCMD and SQL\*Plus.

You will learn how to leverage the Oracle Cluster ware to make applications highly available, supporting monitoring and failover to other nodes. This class is roughly equivalent to Oracle University course [Oracle 11g: RAC and Grid Infrastructure Administration Accelerated Rel.2.](#) but focuses only on essential topics and eliminating time spent on material not directly relevant.

**Each student will build their own cluster on a UNIX Platform.**

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# Install and Configure a 2-Node RAC



**Each participant is prescreened before enrolment in this course**

# A. System Requirements

Host Hardware (Laptop/Desktop)

**8GB RAM Minimum**  
**100GB Disk Free Space**

Virtual Machine Name:  
**PishonTech\_RACWORLD**

Virtual Machine  
**2GB / 2048 RAM**  
**60GB Virtual Disk**

Network Adapter  
**Network Address Translation (NAT)**

You will need the file  
**command\_RACGRID\_2Nodes**



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## B. Configure Virtual Networks – VMnet2

Virtual Network Editor

Name	Type	External Connection	Host Connection	DHCP	Subnet Address
VMnet0	Bridged	Auto-bridging	-	-	-
VMnet1	Host-only	-	Connected	Enabled	192.168.255.0
VMnet2	Host-only	-	Connected	Enabled	10.10.1.0
VMnet3	Host-only	-	Connected	Enabled	10.10.2.0
VMnet4	Custom	-	-	-	192.168.80.0
VMnet5	Custom	-	-	-	192.168.6.0
VMnet6	Custom	-	-	-	192.168.220.0
VMnet7	Custom	-	-	-	192.168.182.0
VMnet8	NAT	NAT	Connected	Enabled	192.168.133.0

VMnet Information

Bridged (connect VMs directly to the external network)  
Bridged to: Automatic Automatic Settings...

NAT (shared host's IP address with VMs) NAT Settings...

Host-only (connect VMs internally in a private network)

Connect a host virtual adapter to this network  
Host virtual adapter name: VMware Network Adapter VMnet2

Use local DHCP service to distribute IP address to VMs DHCP Settings...

Subnet IP: 10 . 10 . 1 . 0 Subnet mask: 255 . 255 . 255 . 0

Restore Default OK Cancel Apply Help



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## B. Configure Virtual Networks – VMnet3

Virtual Network Editor

Name	Type	External Connection	Host Connection	DHCP	Subnet Address
VMnet0	Bridged	Auto-bridging	-	-	-
VMnet1	Host-only	-	Connected	Enabled	192.168.255.0
VMnet2	Host-only	-	Connected	Enabled	10.10.1.0
VMnet3	Host-only	-	Connected	Enabled	10.10.2.0
VMnet4	Custom	-	-	-	192.168.80.0
VMnet5	Custom	-	-	-	192.168.6.0
VMnet6	Custom	-	-	-	192.168.220.0
VMnet7	Custom	-	-	-	192.168.182.0
VMnet8	NAT	NAT	Connected	Enabled	192.168.133.0

VMnet Information

Bridged (connect VMs directly to the external network)  
Bridged to: Automatic Automatic Settings...

NAT (shared host's IP address with VMs) NAT Settings...

Host-only (connect VMs internally in a private network)

Connect a host virtual adapter to this network  
Host virtual adapter name: VMware Network Adapter VMnet3

Use local DHCP service to distribute IP address to VMs DHCP Settings...

Subnet IP: 10 . 10 . 2 . 0 Subnet mask: 255 . 255 . 255 . 0

Restore Default OK Cancel Apply Help



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## B. Configure Virtual Networks – PT\_RACSERVER\_1 (Settings)

Virtual Machine Settings

Hardware Options

Device	Summary
Memory	2048 MB
Processors	1
Hard Disk (SCSI)	60 GB
Hard Disk 2 (S...)	15 GB (Persistent)
Hard Disk 3 (S...)	20 GB (Persistent)
Hard Disk 4 (S...)	5 GB (Persistent)
CD/DVD (IDE)	Using file Y:\OracleStuff\Linu...
Network Adapter	Bridged
Network Adapt...	Custom (VMnet2)
Network Adapt...	Custom (VMnet3)
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Disk file  
\\ACWORLD\PT\_RACWSHARED\PT\_RACWDISK\_1.vmdk

Capacity  
Current size: 15 GB  
System free: 54.9 GB  
Maximum size: 15 GB

Disk information  
Disk space is preallocated for this hard disk.  
Hard disk contents are stored in a single file.

Utilities ▼ Advanced...

Add... Remove

OK Cancel Help



## C. Prepare the Operating System

Login as user : **root/<Racpassword>**

Determine your **IP Address** and make it static on **eth0**

Define **SSH** connection to the User **root**



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## C. Prepare the Operating System – Domain Names in Hosts file

#This is not required for RAC but just to connect to the Internet

#192.168.???.??? ptnode1.domain ptnode1

# Public IP Addresses

10.10.1.10 ptracnode1.ptdomain ptracnode1

10.10.1.20 ptracnode2.ptdomain ptracnode2

10.10.1.30 ptracnode3.ptdomain ptracnode3

# Private IP Addresses

10.10.2.10 ptracnode1-priv.ptdomain ptracnode1-priv

10.10.2.20 ptracnode2-priv.ptdomain ptracnode2-priv

10.10.2.30 ptracnode3-priv.ptdomain ptracnode3-priv

# Virtual IP Addresses

10.10.1.11 ptracnode1-vip.ptdomain ptracnode1-vip

10.10.1.21 ptracnode2-vip.ptdomain ptracnode2-vip

10.10.1.31 ptracnode3-vip.ptdomain ptracnode3-vip

# SCAN IP Addresses

#10.10.1.12 ptworld-scan.ptdomain ptworld-scan

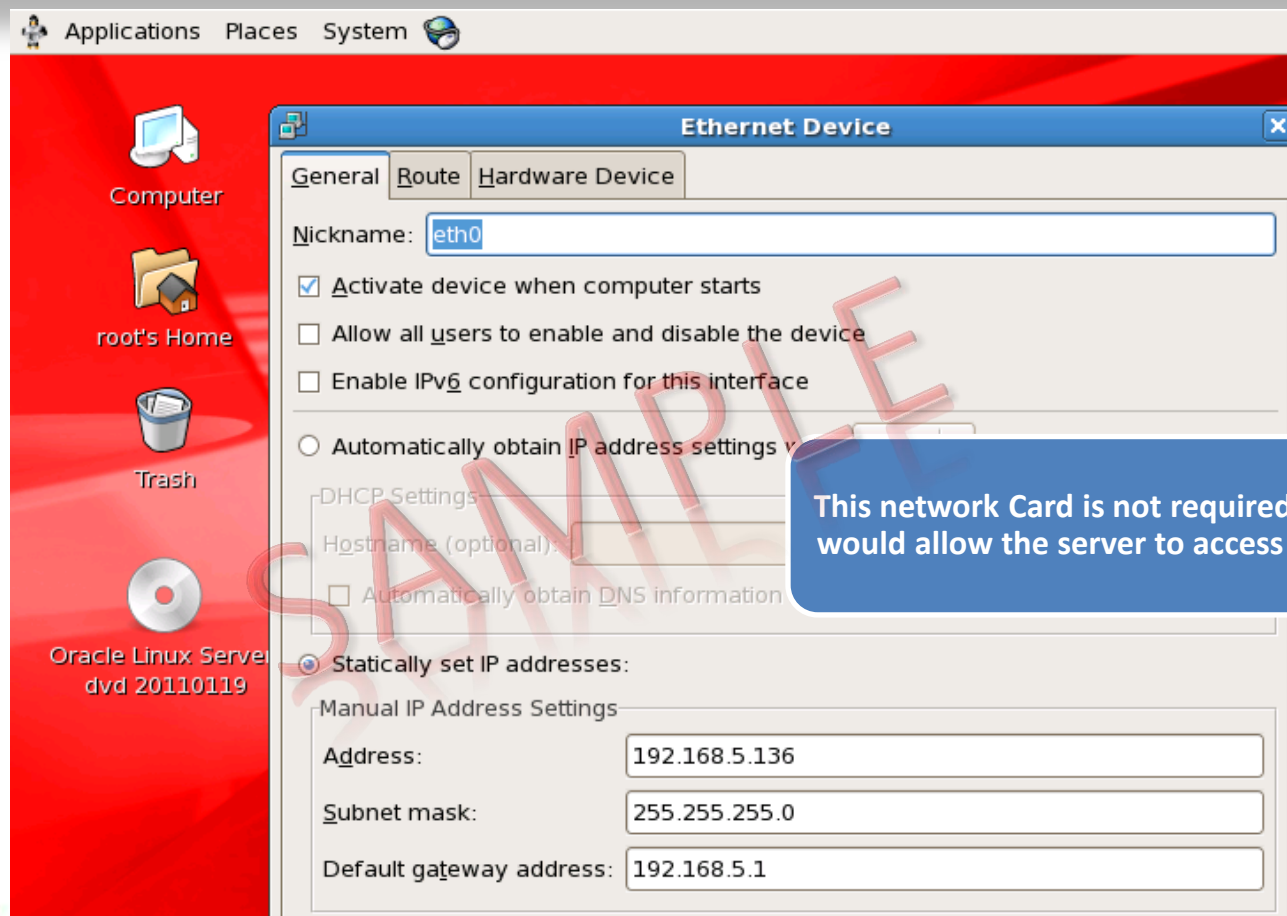
#10.10.1.22 ptworld-scan.ptdomain ptworld-scan

#10.10.1.32 ptworld-scan.ptdomain ptworld-scan



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## C. Prepare the Operating System – Setup Network Cards (eth0)



The screenshot shows the Oracle Linux desktop environment with a red background. A window titled "Ethernet Device" is open, showing the configuration for the network interface "eth0". The "General" tab is selected, and the "Statically set IP addresses" option is chosen. The manual IP address settings are: Address: 192.168.5.136, Subnet mask: 255.255.255.0, and Default gateway address: 192.168.5.1. A blue callout box on the right contains the text: "This network Card is not required for RAC but would allow the server to access the internet".

Applications Places System

Computer  
root's Home  
Trash  
Oracle Linux Server  
dvd 20110119

**Ethernet Device**

General Route Hardware Device

Nickname: eth0

Activate device when computer starts

Allow all users to enable and disable the device

Enable IPv6 configuration for this interface

Automatically obtain IP address settings via DHCP

DHCP Settings

Hostname (optional):

Automatically obtain DNS information

Statically set IP addresses:

Manual IP Address Settings

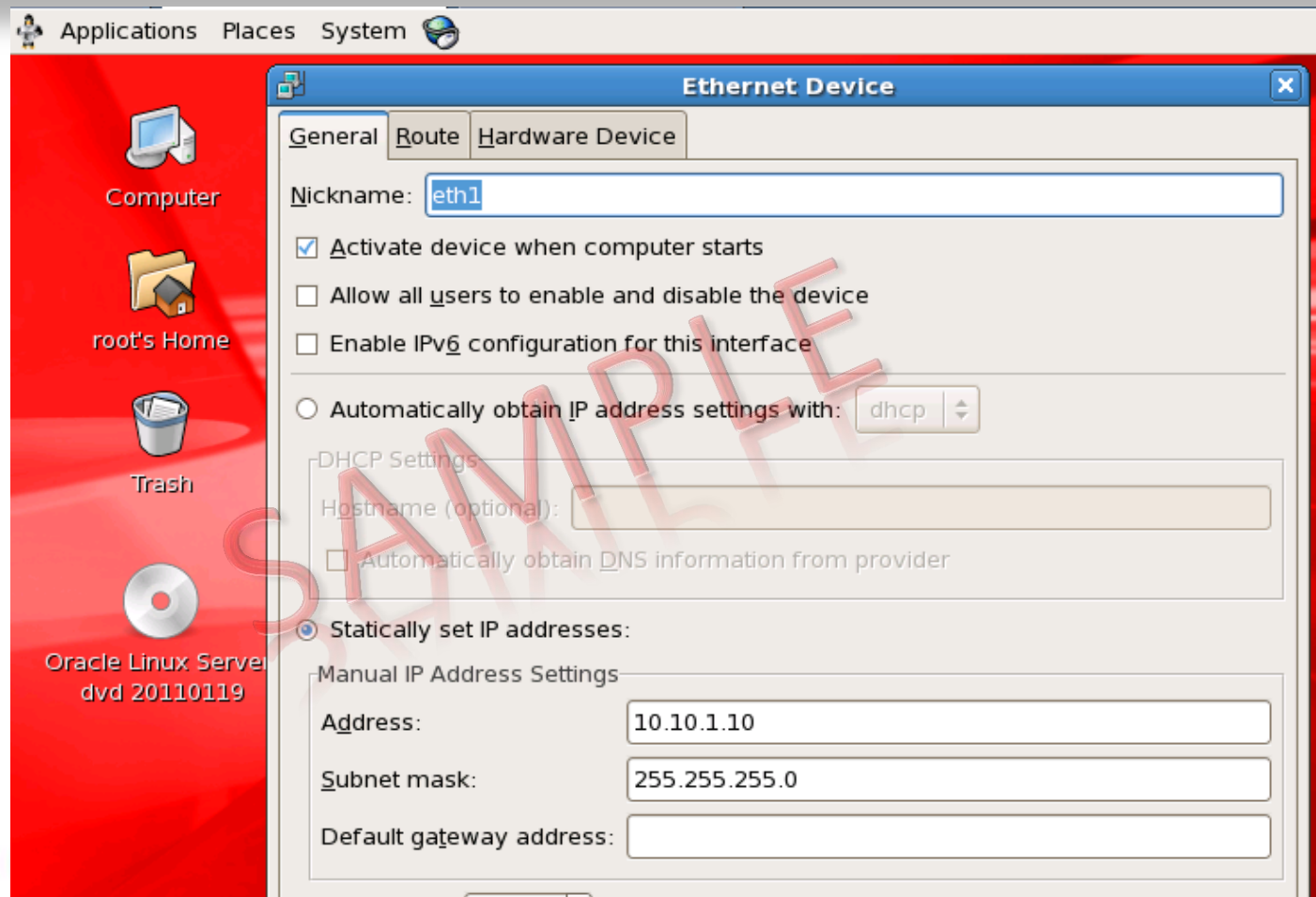
Address: 192.168.5.136

Subnet mask: 255.255.255.0

Default gateway address: 192.168.5.1

This network Card is not required for RAC but would allow the server to access the internet

## C. Prepare the Operating System – Setup Network Cards (eth1)



## C. Prepare the Operating System – Setup Network Cards (eth2)

The screenshot displays a Linux desktop environment with a red background. The desktop contains icons for 'Computer', 'root's Home', 'Trash', and 'Oracle Linux Server dvd 20110119'. A window titled 'Ethernet Device' is open, showing the configuration for the 'eth2' interface. The 'General' tab is selected, and the 'Nickname' is set to 'eth2'. The 'Activate device when computer starts' checkbox is checked. The 'Automatically obtain IP address settings with:' dropdown is set to 'dhcp'. The 'Statically set IP addresses:' radio button is selected, and the 'Manual IP Address Settings' section is expanded, showing the following values: Address: 10.10.2.10, Subnet mask: 255.255.255.0, and Default gateway address: (empty). The 'Set MTU to:' checkbox is unchecked.

## C. Prepare the Operating System – Security & Firewall

- ❑ Change Host Name in `/etc/sysconfig/network`  
`HOSTNAME=ptracnode1.ptdomain`
- ❑ Disable Firewall  
`service iptables stop`  
`chkconfig iptables off`
- ❑ Disable SELINUX by modifying `/etc/sysconfig/selinux`  
`SELINUX=disabled`
- ❑ ADD the following lines to `/etc/security/limits.conf`
  - \* `soft nproc 2047`
  - \* `hard nproc 16384`
  - \* `soft nofile 4096`
  - \* `hard nofile 65536`
  - \* `soft stack 10240`





## C. Prepare the Operating System – Install Packages

### Install Oracle Automatic Storage Management Packages

```
rpm -ivh oracleasm-2.6.18-238.el5-2.0.5-1.el5.x86_64.rpm
```

```
rpm -ivh oracleasm-support-2.1.4-1.el5.x86_64.rpm
```

```
rpm -ivh /home/oracle/stage/gridstage/oracleasm-lib-2.0.4-1.el5.x86_64.rpm
```

### Install DNS package

```
rpm -ivh bind-9.3.6-16.P1.el5.x86_64.rpm
```

### Reboot the server and confirm Hostname & IP address Okay



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## C. Prepare the Operating System – Configure DNS File & Zone

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## C. Prepare the Operating System – Configure Name Resolution

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## C. Prepare the Operating System – Start and Test DNS Service

### Start DNS Service

`service named start`

### Set DNS Service to auto-start on reboot

`chkconfig named on`

### Test DNS Service

`nslookup ptracnode2`

`nslookup ptracnode2-vip`

`nslookup ptworld-scan`

`nslookup ptracnode1`

`nslookup ptracnode1-vip`



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## C. Prepare the Operating System – Configure Network Time Protocol (NTP)

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## C. Prepare the Operating System – Configure Network Time Protocol (NTP)

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## C. Prepare the Operating System – Configure NTP Slewing Option

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## C. Prepare the Operating System – Create Grid & Oracle Users

The grid user will own the Grid Infrastructure including ASM administration while the Oracle user will own the Oracle instances and database

### ❑ Create groups

```
groupadd asmadmin  
groupadd asmdba
```

### ❑ Create users

```
useradd -g oinstall -G asmadmin, asmdba, dba grid  
passwd grid  
usermod -g oinstall -G dba, asmdba oracle  
passwd oracle
```



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## C. Prepare the Operating System – Create Grid & Oracle Homes

**Warning!!!** GRID\_HOME should not be created inside ORACLE\_BASE

### ❑ Create ORACLE\_HOME & BASE

```
mkdir -p /u01/app/oracle/product/11.2.0/db_1  
chown -R oracle:oinstall /u01  
chmod -R 775 /u01
```

### ❑ Create GRID\_HOME & BASE

```
mkdir -p /u01/app/11.2.0/grid  
chown -R grid:oinstall /u01/app/11.2.0/grid  
chmod 775 /u01/app/11.2.0/grid
```

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

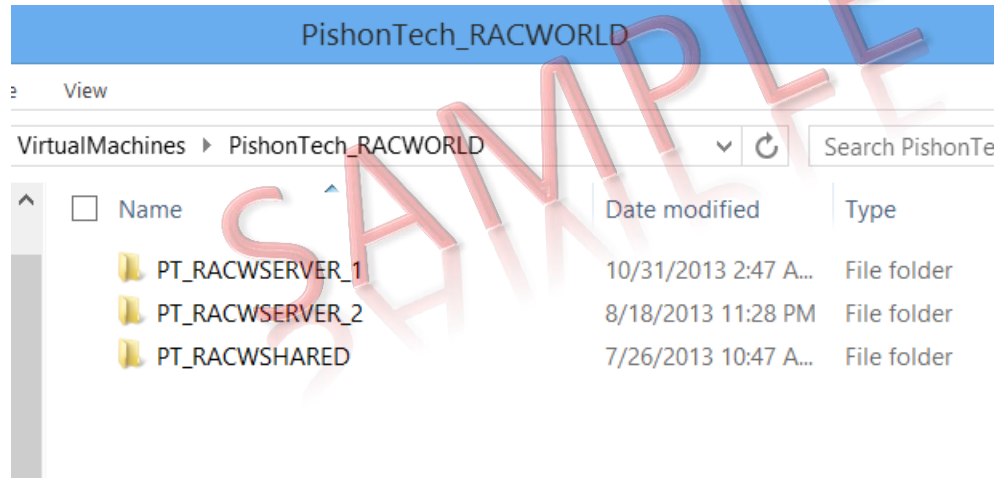


**Power off the Server Completely**

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## D. Clone Virtual Machine – PT\_RACWSERVER\_2

- ❑ Using the Virtual Machine Utility, clone PT\_RACWSERVER\_1 to **PT\_RACWSERVER\_2**
- ❑ The folder structure should be as shown:



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## E. Configure PT\_RACWSERVER\_2 – Power ON

- ❑ The newly copied machine will have all the IP Addresses and properties of the original machine, so we need to make appropriate changes.

### POWER ON ONLY PT\_RACWSERVER\_2

Login as user : **root/<Racpassword>**

Determine your **IP Address** and make it static on **eth0**

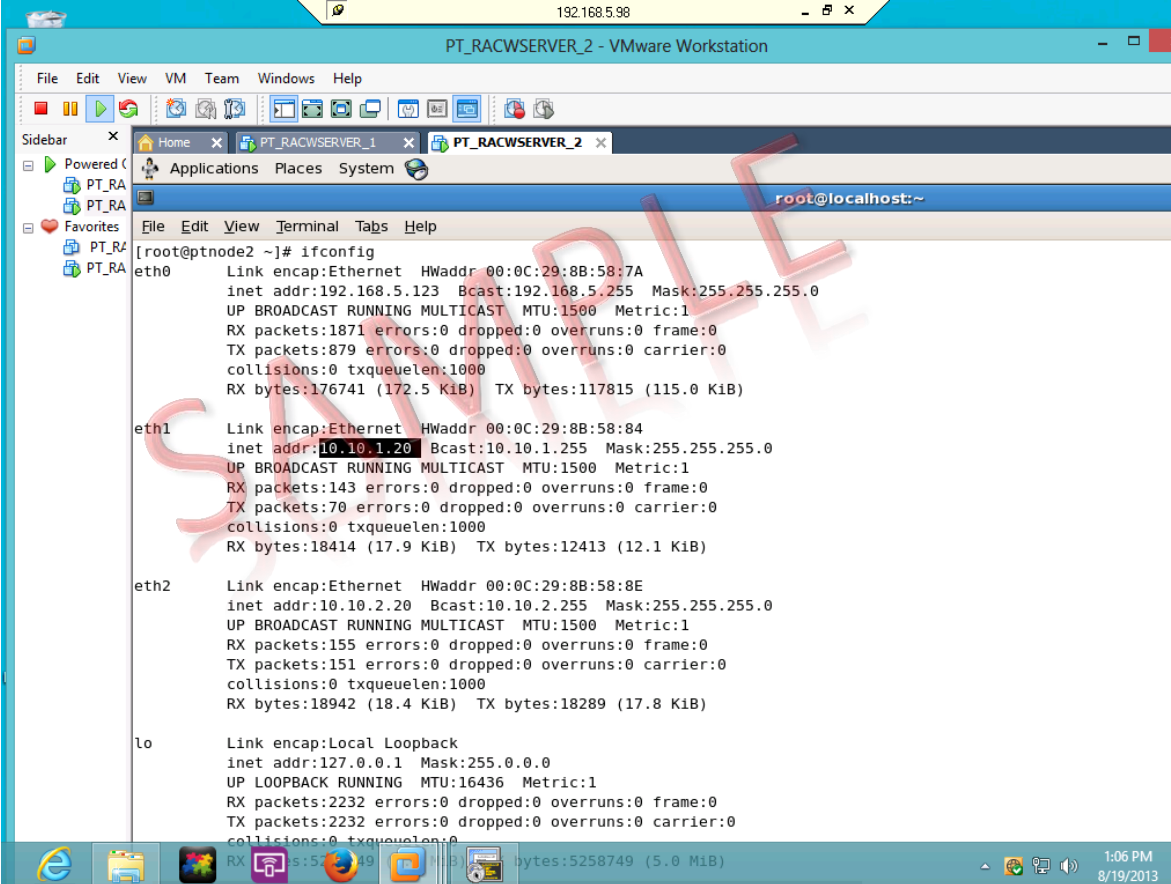
Define **SSH** connection to the User **root**



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## E. Configure PT\_RACWSERVER\_2 – Setup Network Cards

- Make changes to the IP addresses in the host file and network adapters eth0, eth1, eth2



```
[root@ptnode2 ~]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:8B:58:7A
          inet addr:192.168.5.123  Bcast:192.168.5.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:1871 errors:0 dropped:0 overruns:0 frame:0
          TX packets:879 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:176741 (172.5 KiB)  TX bytes:117815 (115.0 KiB)

eth1      Link encap:Ethernet  HWaddr 00:0C:29:8B:58:84
          inet addr:10.10.1.20  Bcast:10.10.1.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:143 errors:0 dropped:0 overruns:0 frame:0
          TX packets:70 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:18414 (17.9 KiB)  TX bytes:12413 (12.1 KiB)

eth2      Link encap:Ethernet  HWaddr 00:0C:29:8B:58:8E
          inet addr:10.10.2.20  Bcast:10.10.2.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:155 errors:0 dropped:0 overruns:0 frame:0
          TX packets:151 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:18942 (18.4 KiB)  TX bytes:18289 (17.8 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:2232 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2232 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:5258749 (5.0 MiB)
```



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## E. Configure **PT\_RACWSERVER\_2** – Hostname & ntp

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Power off the Server Completely

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## F. Create 3 Additional Disk – PT\_RACWSERVER\_1

- ❑ Using the Virtual Machine utility, create 3 new hard drives with all disk space **pre-allocated** in the **PT\_RACWSHARED** folder

**Disk File:** ... VirtualMachines\PishonTech\_RACWORLD\PT\_RACWSHARED\PT\_RACWDISK\_1

**Size :** **15GB** **Adapter :** SCSI 1:0

**Disk File:** ... VirtualMachines\PishonTech\_RACWORLD\PT\_RACWSHARED\PT\_RACWDISK\_2

**Size :** **20GB** **Adapter :** SCSI 2:0

**Disk File:** ... VirtualMachines\PishonTech\_RACWORLD\PT\_RACWSHARED\PT\_RACWDISK\_3

**Size :** **5GB** **Adapter :** SCSI 2:0

Next Slide - Screenshot



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## F. Create 3 Additional Disk - **PT\_RACWSERVER\_1**

- ❑ Use SCSI disk and allocate all space as shown

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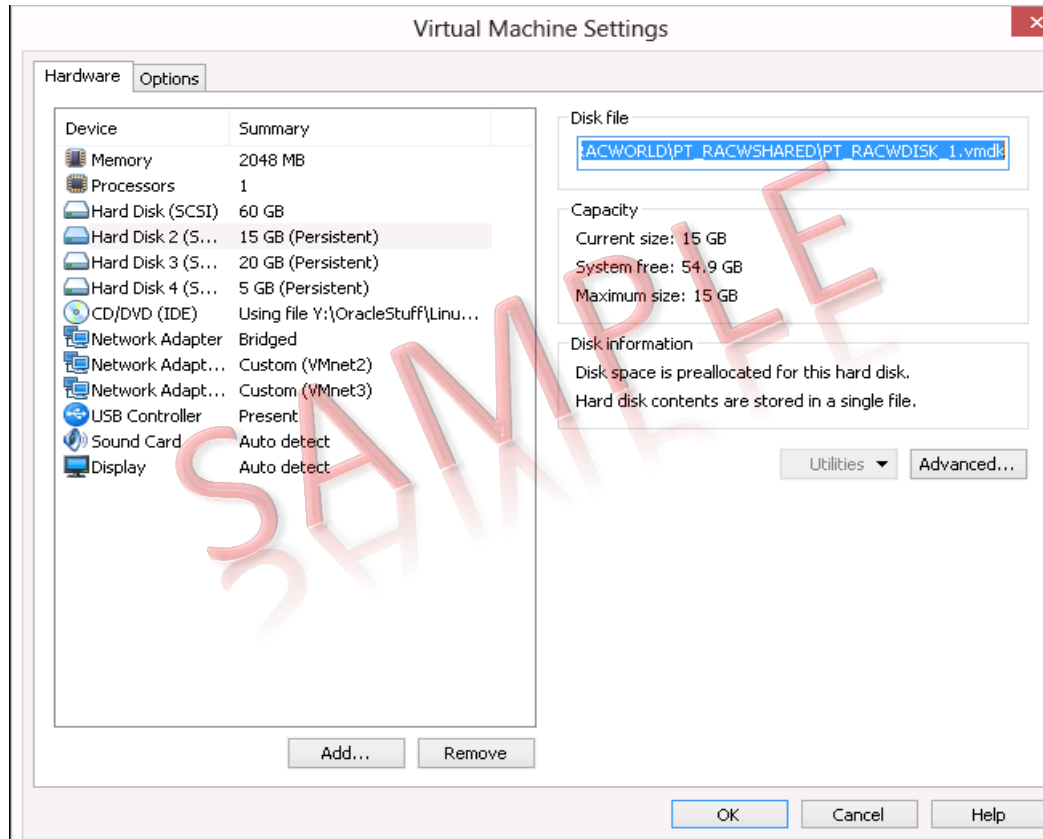
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## F. Create 3 Additional Disk - PT\_RACWSERVER\_1

- ❑ Click on the Advanced button and adjust the SCSI Disk Adapter



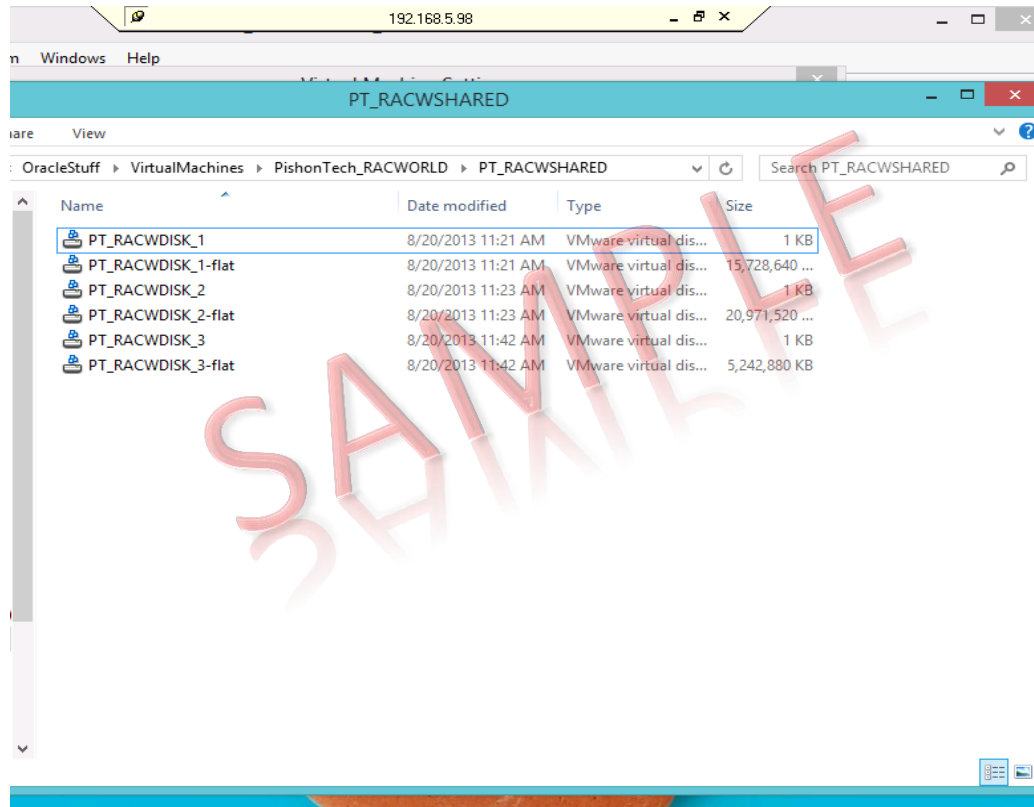
DO NOT CREATE ANY EXTRA DISK ON PT\_RACWSERVER\_2



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## F. Create 3 Additional Disk - PT\_RACWSERVER\_1

- ❑ The shared storage folder – PT\_RACWSHARED should look like screenshot



DO NOT CREATE ANY EXTRA DISK ON PT\_RACWSERVER\_2



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## F. Create 3 Additional Disk - **PT\_RACWSERVER\_1**

- Edit the disk configuration settings as shown but **DO NOT ADJUST** the file path and filenames

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## F. Create 3 Additional Disk – Confirm New Disk

Power ON both servers one at a time

Confirm the new disk on both servers

```
fdisk -l /dev/sd[b-d]
```

If the 3 new disk are not listed on both servers, **DO NOT PROCEED** until you fix the issue



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## G. Partition New Disk - **PT\_RACWSERVER\_1**

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## I. Create ASM Disk – Configure ASMLIB

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# I. Create ASM Disk – Stamp Disk with ASMLIB

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# I. Create ASM Disk – Stamp Disk with ASMLIB

- ❑ The shared ASM disk must be listed on both servers, if not **REBOOT** the servers and retry

```
File Edit View Options Transfer Script Tools Help
RACNODE1_root | RACNODE2_root
Last login: Tue Aug 20 14:18:21 2013
[root@ptracnode2 ~]# oracleasm scandisks
oracleasm listdisks Reloading disk partitions: done
Cleaning any stale ASM disks...
Scanning system for ASM disks...
Instantiating disk "ASMDISK1"
Instantiating disk "ASMDISK2"
Instantiating disk "ASMDISK3"
You have new mail in /var/spool/mail/root
[root@ptracnode2 ~]# oracleasm listdisks
ASMDISK1
ASMDISK2
ASMDISK3
[root@ptracnode2 ~]#
```



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## J. Grid Infrastructure – Pre Installation Task -1

- ❑ ONLY on **PT\_RACWSERVER\_1**, Stage the GI Installation software

```
cd /home/oracle/stage/gridstage
```

```
mkdir -p /home/grid/stage
```

```
chown -R grid:oinstall /home/grid/stage
```

```
mv linux.x64_11gR2_grid.zip /home/grid/stage/linux.x64_11gR2_grid.zip
```

```
chown -R grid:oinstall /home/grid/stage/linux.x64_11gR2_grid.zip
```

- ❑ Remove the GI zip file from **PT\_RACWSERVER\_2** (*It is not needed*)

```
rm /home/oracle/stage/gridstage/stagelinux.x64_11gR2_grid.zip
```



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## J. Grid Infrastructure – Pre Installation Task -1

- ❑ ONLY on **PT\_RACWSERVER\_1**, Login as User – **grid** and unzip the GI Installation software

```
cd $HOME/stage
```

```
unzip linux.x64_11gR2_grid.zip
```

SAMPLE



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## J. Grid Infrastructure – Pre Installation Task -2

- ❑ On **BOTH Servers**, Set environment variables with ORACLE\_SID = **+ASM1** and **+ASM2** accordingly

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## J. Grid Infrastructure – Pre Installation Task -3

- ❑ On **BOTH Servers**, Login as User – **oracle** and set environment variables with **ORACLE\_SID = +fmis1** and **+fmis2** accordingly

```
# SET Database Environment variables
```

```
TMP=/tmp; export TMP
```

```
TMPDIR=$TMP; export TMPDIR
```

```
ORACLE_SID=fmis1; export ORACLE_SID
```

```
ORACLE_HOSTNAME=`hostname`; export ORACLE_HOSTNAME
```

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

```
ORACLE_HOME = $ORACLE_BASE/product/11.2.0/db_1; export ORACLE_HOME
```

```
TNS_ADMIN=$ORACLE_HOME/network/admin; export TNS_ADMIN
```

```
ORACLE_TERM=xterm; export ORACLE_TERM
```

```
PATH=/usr/sbin:$PATH; export PATH
```

```
PATH=$ORACLE_HOME/bin:$PATH; export PATH
```

```
LD_LIBRARY_PATH=$ORACLE_HOME/lib:/lib:/usr/lib; export LD_LIBRARY_PATH
```

```
CLASSPATH=$ORACLE_HOME/JRE:$ORACLE_HOME/jlib:$ORACLE_HOME/rdbms/jlib; export CLASSPATH
```

```
if [ $USER = "oracle" ]; then
```

```
    if [ $SHELL = "/bin/ksh" ]; then
```

```
        ulimit -p 16384
```

```
        ulimit -n 65536
```

```
    else
```

```
        ulimit -u 16384 -n 65536
```

```
    fi
```

```
fi
```



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## POWER OFF **PT\_RACWSERVER\_2** ONLY

Using the virtual machine utility, clone **PT\_RACWSERVER\_2** to **PT\_RACWSERVER\_3** as this will facilitate the addition of more nodes later

## POWER ON **PT\_RACWSERVER\_2**



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# J. Grid Infrastructure – Pre Installation Task - 5 : User Equivalency

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SAMPLE



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# J. Grid Infrastructure – Pre Installation Task - 6 : Cluvfy

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SAMPLE

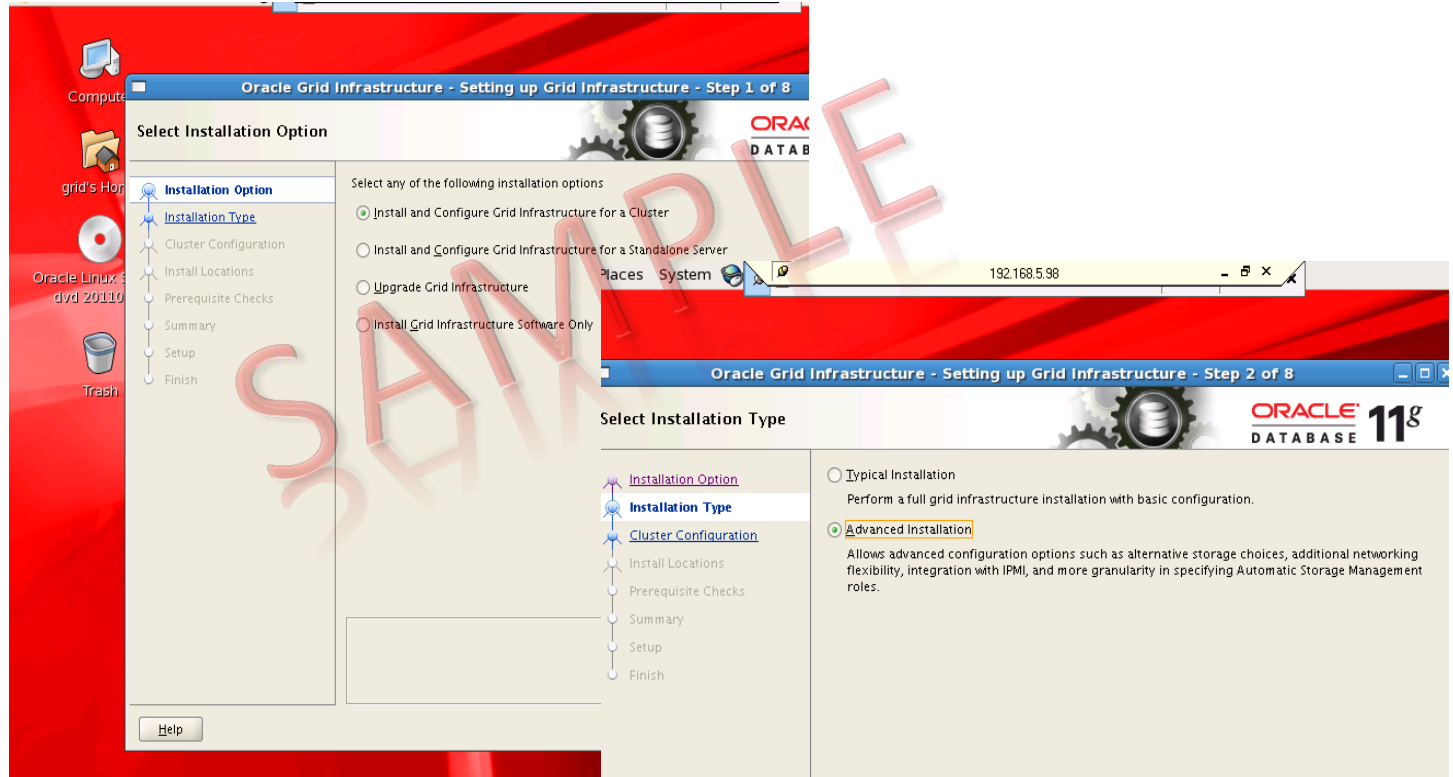


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# K. Grid Infrastructure Installation – Option 1

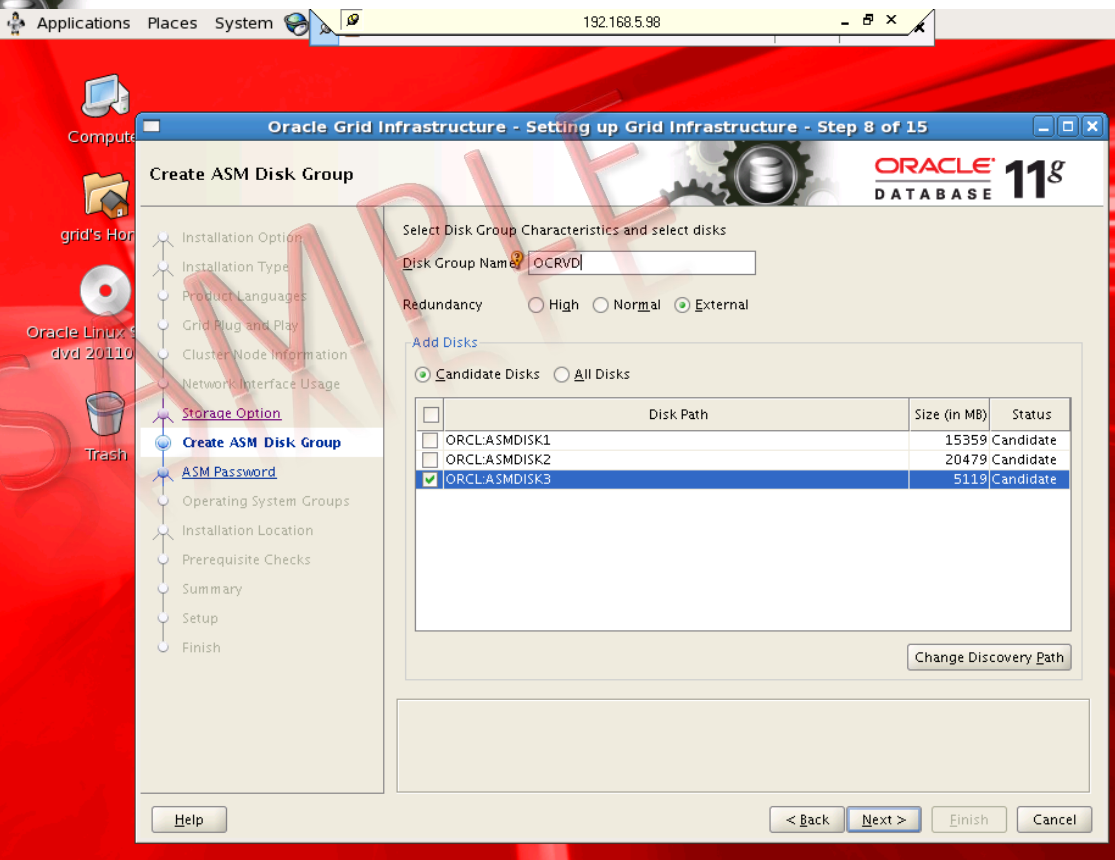
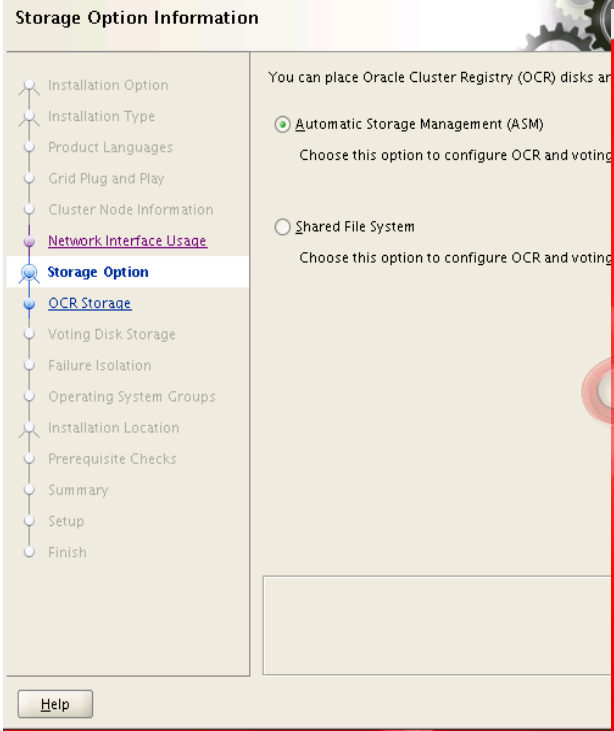
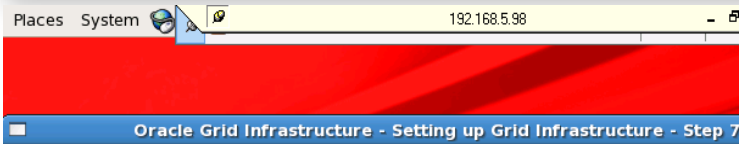
❑ ONLY on **PT\_RACSERVER\_1**, Login as User – **grid** and launch the Grid installer

```
cd $HOME/stage  
./runInstaller
```



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# K. Grid Infrastructure Installation – Option 5



racnode1:~/stage/grid  Oracle Grid Infrastructure



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# K. Grid Infrastructure Installation – Option 10

**WARNING !!!** It is very important that you run both scripts as root user on ptracnode1 and wait for it to complete before running them on ptracnode2

Step 16 of 17

ORACLE DATABASE 11g

Configure Configuration scripts

pts need to be executed as the "root" user in each cluster

	Nodes
ory/orainstRoot.sh	ptracnode1,ptracnode2
rid/root.sh	ptracnode1,ptracnode2

To execute the configuration scripts:

1. Open a terminal window
2. Log in as "root"
3. Run the scripts in each cluster node
4. Return to this window and click "OK" to continue

Run the script on the local node first. After successful completion, you can run the script in parallel on all the other nodes.

Help OK



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# L. Explore ASM Instance

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## L. Explore ASM Instance

```
column path format a15
column name format a15
select path, name, header_status, os_mb
from v$asm_disk;
```

```
column inst_id format 9999999
column instance_name format a15
column host_name format a20
select inst_id, instance_name, host_name
from gv$instance;
```

```
---check how much disk space is allocated/ in-use by an ASM instance
COL % FORMAT 99.0
SELECT name, free_mb, total_mb, round(free_mb/total_mb*100,2) "Free%"
FROM v$asm_diskgroup;
```

```
break on inst_id skip 1
column inst_id format 9999999 heading "Instance ID" justify left
column name format a15 heading "Disk Group" justify left
column total_mb format 999,999,999 heading "Total (MB)" justify right
column free_mb format 999,999,999 heading "Free (MB)" justify right
column pct_free format 999.99 heading "% Free" justify right
SELECT inst_id, name, total_mb, free_mb, round((free_mb/total_mb)*100,2) pct_free
FROM gv$asm_diskgroup
WHERE total_mb != 0
ORDER BY inst_id, name;
```



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## M. Create ASM DiskGroups – Command Line

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# M. Create ASM DiskGroups – ASMCA

- ❑ ONLY on **PT\_RACWSERVER\_1**, Login as User – **grid** and create a new Disk group using ASM configuration Assistant (asmca)

The screenshot shows the ASM Configuration Assistant (asmca) interface. The main window is titled "ASM Configuration Assistant: Configure ASM: Disk Groups". It has tabs for "ASM Instances", "Disk Groups", "Volumes", and "ASM Cluster File Systems". The "Disk Groups" tab is active, showing a table of existing disk groups:

Disk Group Name	Size (GB)	Free (GB)	Usable (GB)	Redundancy	State
DATA	15.00	14.95	14.95	EXTERN	MOUNTED(1 of 2)
OCRVD	5.00	4.61	4.61	EXTERN	MOUNTED(2 of 2)

Below the table are buttons for "Create", "Mount All", and "Dismount All". A "Create Disk Group" dialog box is open in the foreground. It has the following fields and options:

- Disk Group Name: RECO
- Redundancy: External (None) (selected), High, Normal
- Select Member Disks: Show Eligible (selected), Show All
- Quorum failure groups are used to store voting files in extended clusters and do not contain any user data. It requires ASM compatibility of 11.2 or higher.
- Disk Path table:

Disk Path	Header Status	Disk Name	Size (MB)	Quorum
<input checked="" type="checkbox"/> ORCL:ASMDISK2	PROVISIONED		20479	<input type="checkbox"/>
- Disk Discovery Path: <default> (with "Change Disk Discovery Path" button)
- Buttons: Show Advanced Options, OK, Cancel, Help



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# M. Create ASM DiskGroups – ASMCA

- ❑ The Disk group DATA was created with a SQL Command – we will use it to store Oracle data files, online redo logs and parameter file. RECO was created with asmca – we will use it as our FRA. During GI Installation , OCRVD was automatically created and used to store Oracle Cluster Registry (OCR) and Voting Disk

ASM Configuration Assistant: Configure ASM: Disk Groups

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

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

Disk Group Name	Size (GB)	Free (GB)	Usable (GB)	Redundancy	State
DATA	15.00	14.95	14.95	EXTERN	MOUNTED(1 of 2)
OCRVD	5.00	4.61	4.61	EXTERN	MOUNTED(2 of 2)
RECO	20.00	19.91	19.91	EXTERN	MOUNTED(2 of 2)

Create Mount All Dismount All

## N. Install Oracle Database – Cluvfy

- ❑ ONLY on **PT\_RACWSERVER\_1**, Login as User – **oracle** and use the script called `runcluvfy.sh` to check that our cluster is ready for the Oracle Instance/Database

```
cluvfy stage -pre dbinst -n ptracnode1,ptracnode2
```

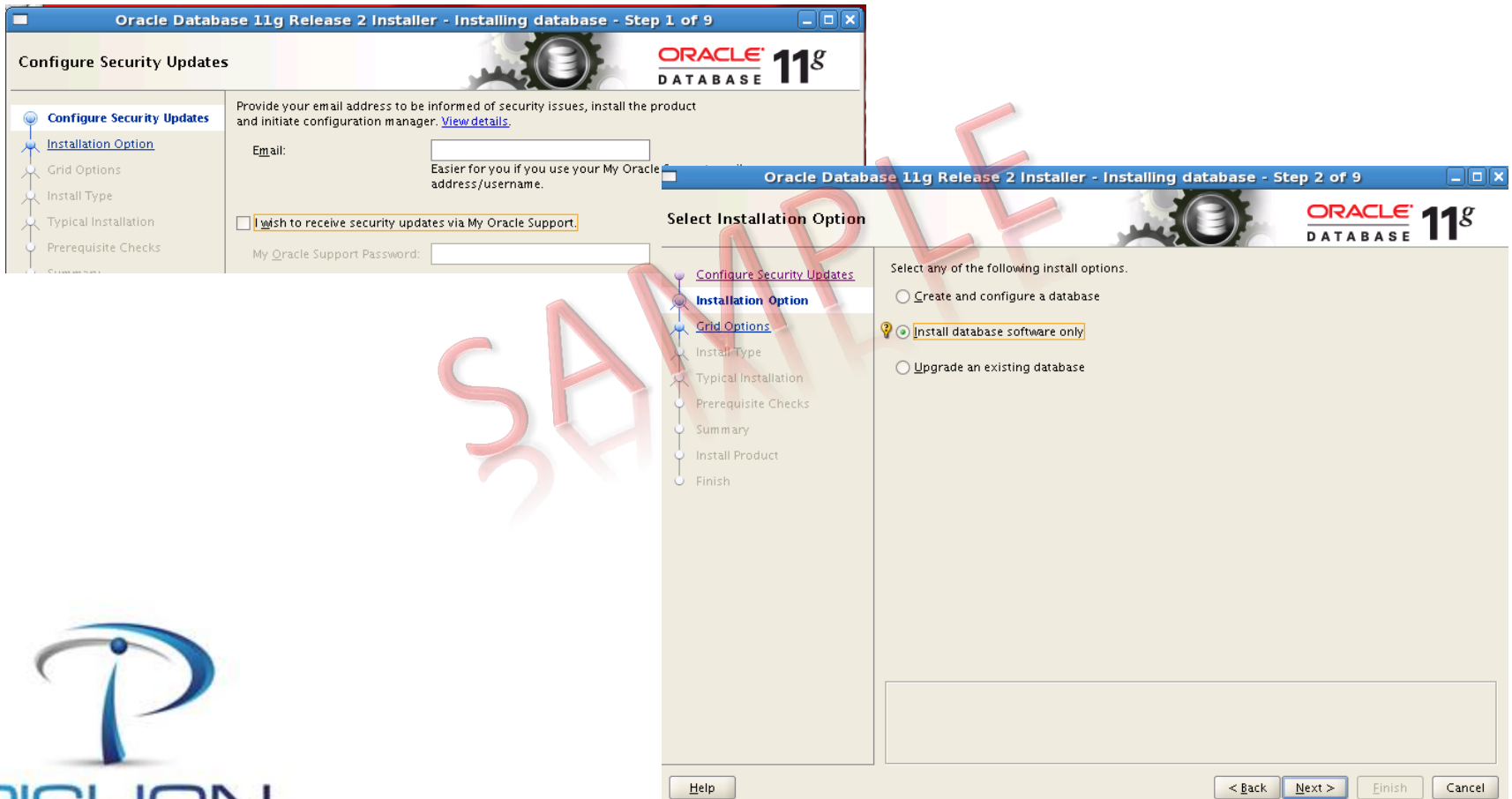
If all the steps have been carefully followed, the script should report success and we are ready to start the Oracle Instance and Database installation, else **DO NOT PROCEED**, fix the failures



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# N. Install Oracle Database – Instance ONLY

- ❑ ONLY on **PT\_RACSERVER\_1**, Login as User – **oracle** and Install Software ONLY

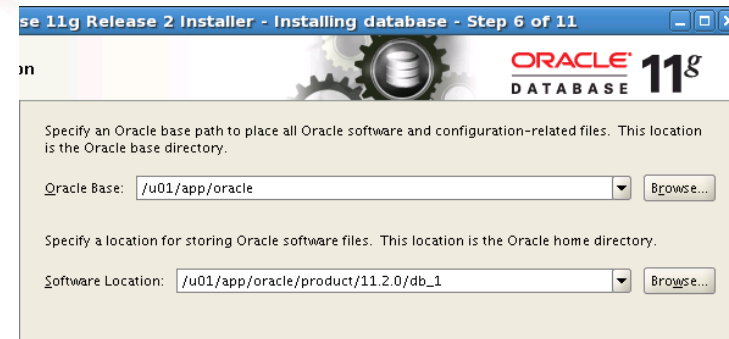
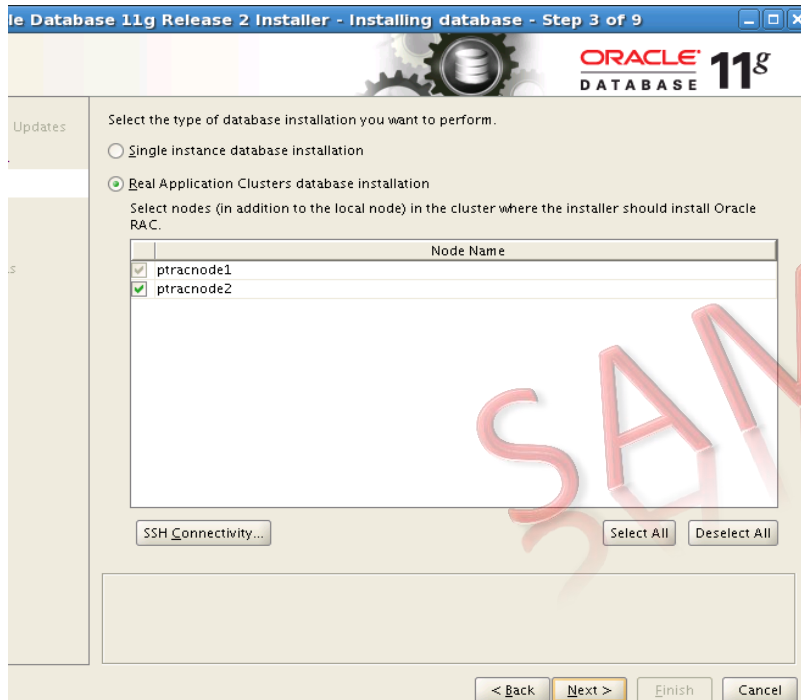


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# N. Install Oracle Database – Instance ONLY

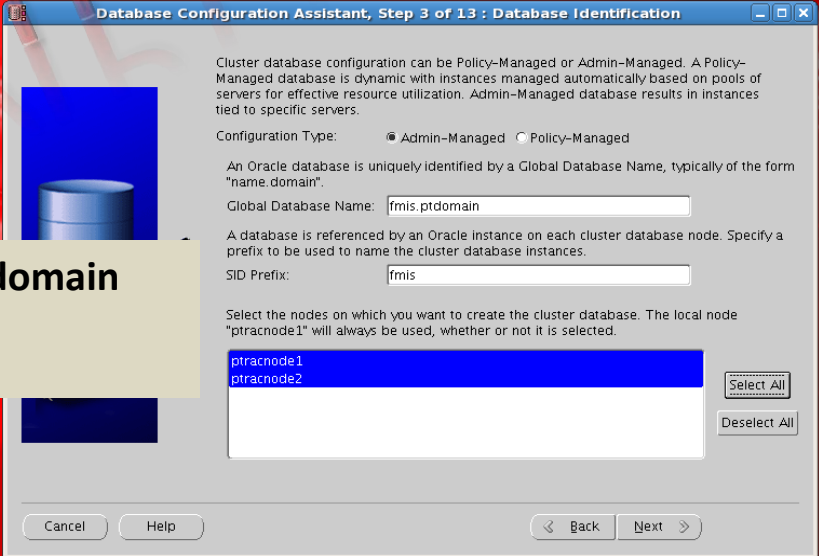
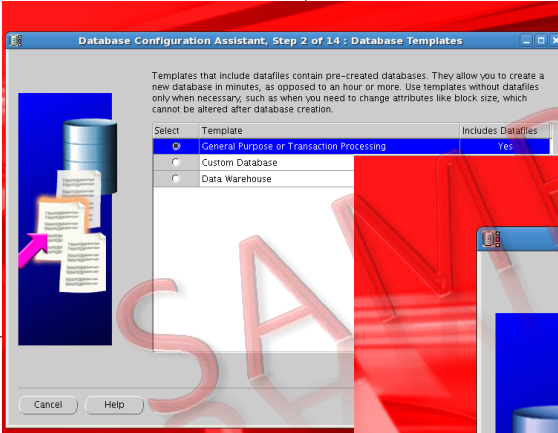
- ❑ ONLY on **PT\_RACWSERVER\_1**, Login as User – **oracle** and Install Software ONLY



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# N. Install Oracle Database – DBCA

- ❑ ONLY on **PT\_RACWSERVER\_1**, Login as User – **oracle** and Install Database using dbca  
The listener is already running from the GRID HOME

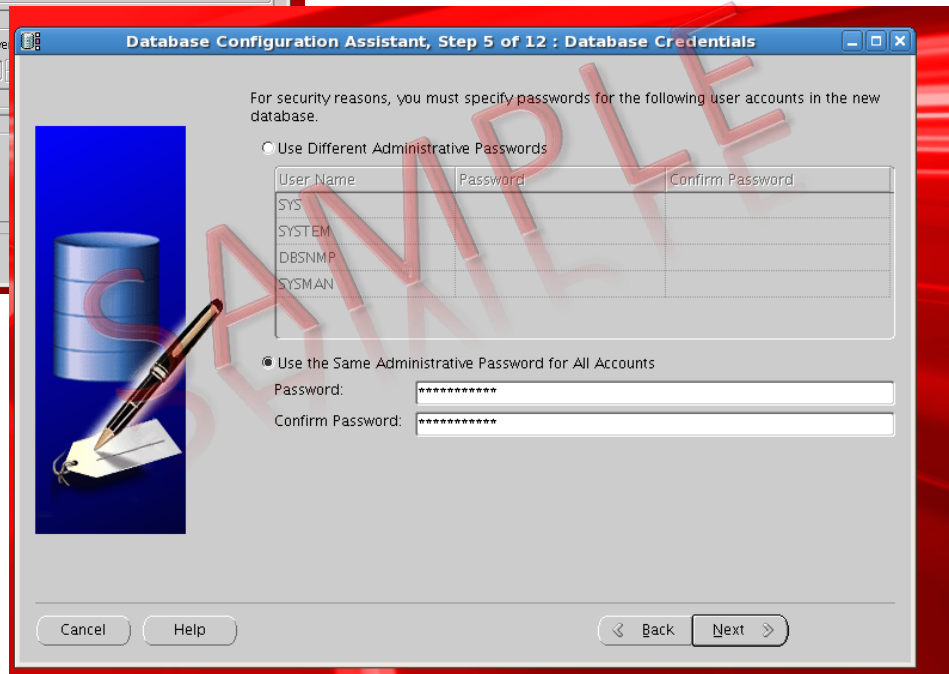
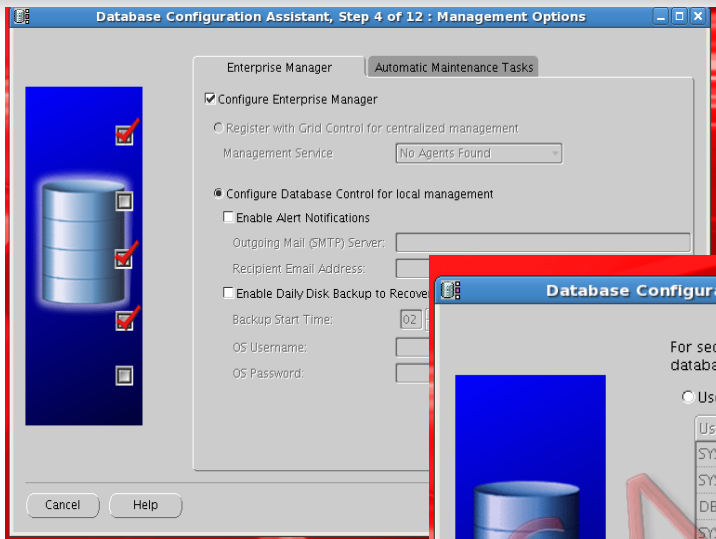


**Global Database Name: fmis.ptdomain**  
**SID Prefix : fmis**



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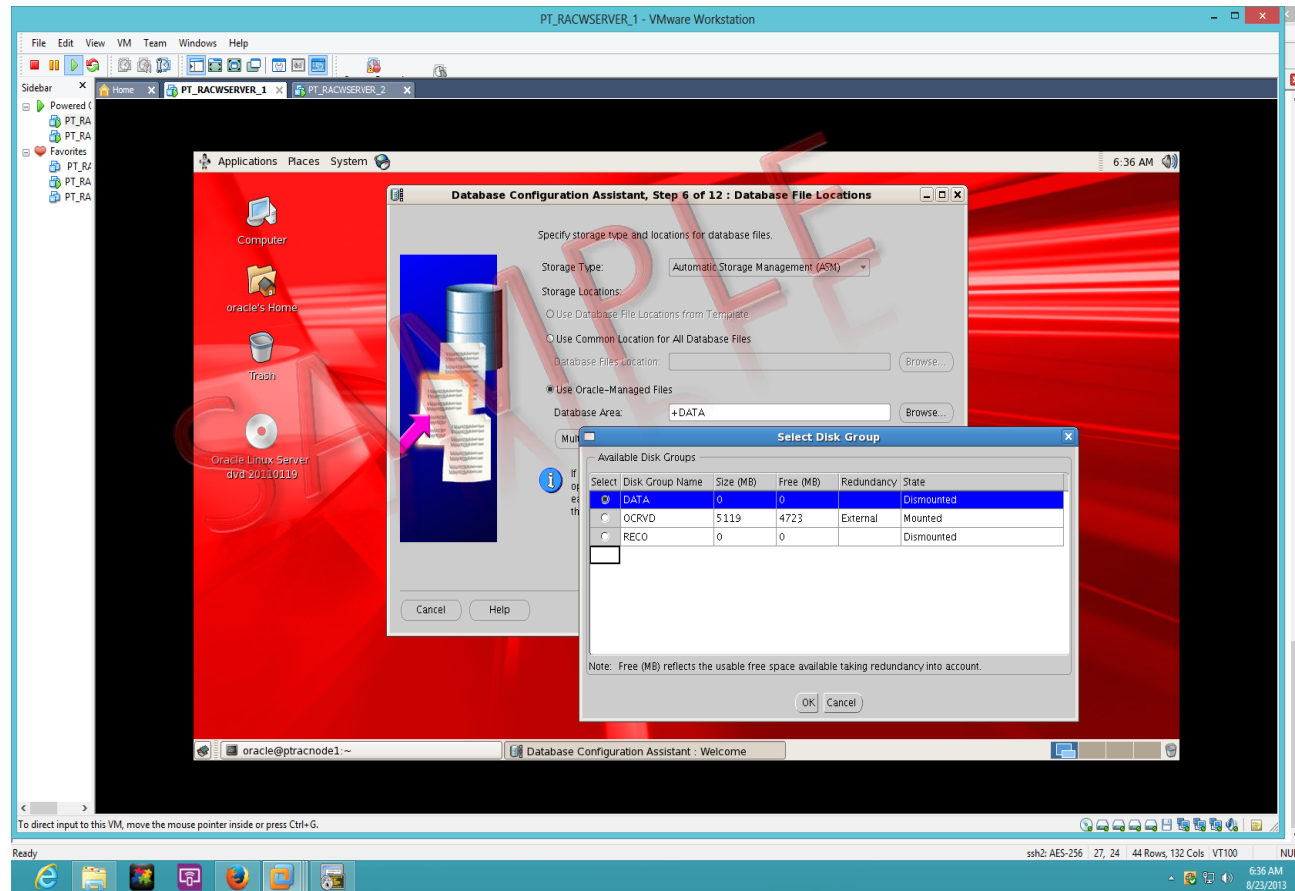
# N. Install Oracle Database – DBCA



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# N. Install Oracle Database – DBCA

- ❑ Use Disk Group DATA for data files, Online Redo logs and Parameter file



# N. Install Oracle Database – DBCA

- ❑ Provide sysasm password and mount any unmounted disk group

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

Specify storage type and locations for database files.

Storage Type: Automatic Storage Management (ASM)

Storage Locations:

ASM Credentials

Specify ASM/NMP password specific to ASM: .....

Database Area: DATA

Multiplex Redo Logs and Control Files...

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

RACNODE1\_grid - SecureCRT

```
File Edit View Options Transfer Script Tools Help
| RACNODE2_zool | RACNODE1_oracle | RACNODE2_oracle | RACNODE1_grid | RACNODE2_grid
Last login: Wed Aug 21 23:03:51 2013 from 192.168.5.98
lgrid@ptracnode1 ~]$ sqlplus / as sysasm

SQL*Plus: Release 11.2.0.1.0 Production on Fri Aug 23 06:39:39 2013
Copyright (c) 1982, 2009, Oracle. All rights reserved.

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production
With the Real Application Clusters and Automatic Storage Management options

SQL> ALTER DISKGROUP ALL MOUNT;
ALTER DISKGROUP ALL MOUNT
*
ERROR at line 1:
ORA-15032: not all alterations performed
ORA-15017: diskgroup "OCRVD" cannot be mounted
ORA-15013: diskgroup "OCRVD" is already mounted

SQL> alter diskgroup DATA mount;

Diskgroup altered.

SQL> alter diskgroup RECO mount;

Diskgroup altered.

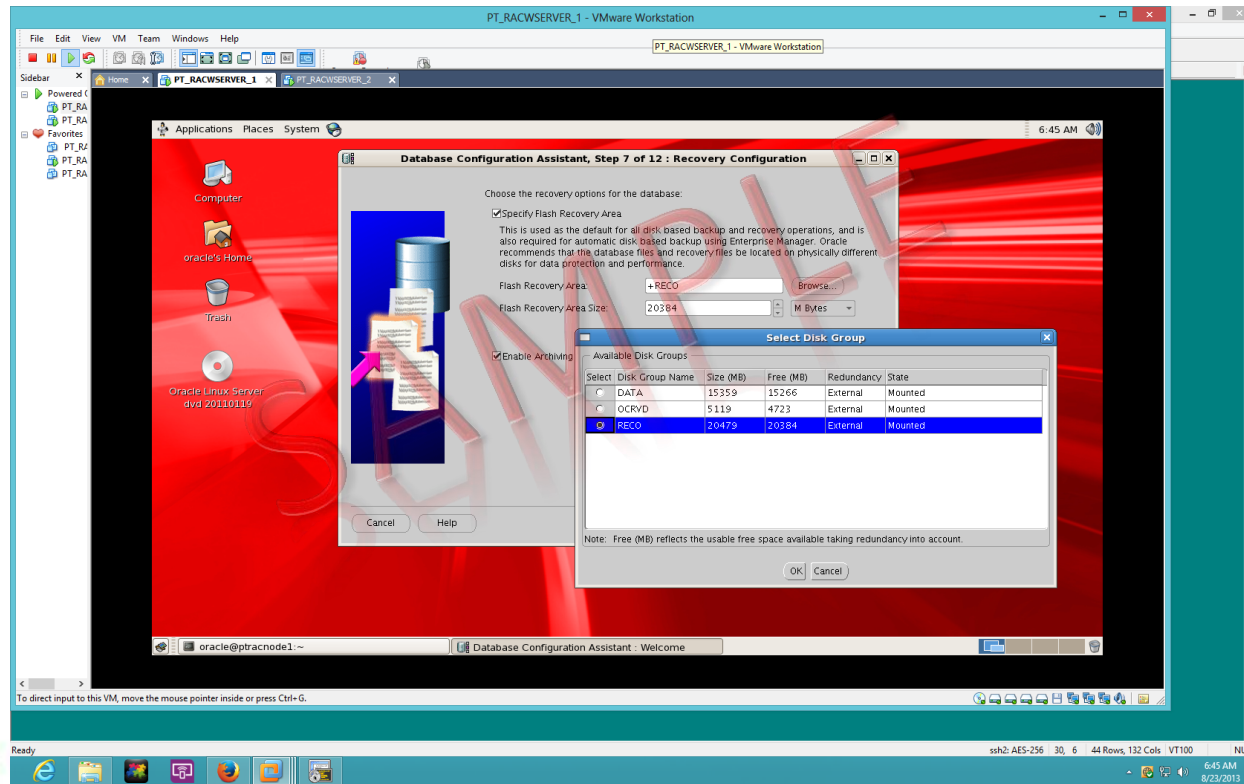
SQL> █
```



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# N. Install Oracle Database – DBCA

- ❑ Use Disk Group RECO for FRA





# N. Install Oracle Database – DBCA

## ❑ Install Sample Schema and Finish

The image shows two screenshots of the Oracle Database Configuration Assistant (DBCA) interface. The top screenshot is titled "Database Configuration Assistant, Step 8 of 12 : Database Content". It displays the "Sample Schemas" tab, which lists various sample schemas (Human Resources, Order Entry, Online Catalog, Product Media, Information Exchange, Sales History) and a tablespace named EXAMPLE. The bottom screenshot is titled "Database Configuration Assistant, Step 11 of 11 : Creation Options". It shows the "Database Information" section with the following details: Database Name: fms1.ptdomain, System Identifier (SID) Prefix: fms1, Server Parameter File name: +DATA/fms1/spfilefms1.ora, and The Database Control URL is https://pt racnode1.ptdomain:1158/em. A "Password Management..." button is visible at the bottom right of the window.



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## O. Explore Oracle Instance and Database

- ❑ Srvctl commands will be used to manage the instance and database

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# O. Explore Oracle Instance and Database

- ❑ Oracle Enterprise Manager (OEM) will be used for administration

The screenshot displays the Oracle Enterprise Manager 11g Database Control interface for a cluster database named 'fmis.ptdomain'. The interface is organized into several sections:

- General:** Includes status (Up), instances (2), availability (100%), cluster (ptworld), database name (fmis), and version (11.2.0.1.0).
- Host CPU:** A bar chart showing CPU usage for 'Other' and 'fmis' processes, with a load of 1.89.
- Active Sessions:** A bar chart showing session counts for 'Wait', 'User I/O', and 'CPU', with a maximum CPU of 2.
- Diagnostic Summary:** Lists interconnect alerts, ADDM findings, active incidents, and key SQL profiles, all with zero counts.
- Space Summary:** Shows database size (1,348 GB), problem tablespaces (0), and segment advisor recommendations (0).
- High Availability:** Details console status, last backup (n/a), usable flash recovery area (98.6%), and flashback database logging (Disabled).
- Alerts:** A table listing four alerts, including 'User SYS logged on from ptracnode2.ptdomain' and 'Metrics "Database Time Spent Waiting (%)" is at 58.17935 for event class "Concurrency"'.

Severity	Target Name	Target Type	Category	Name	Impact	Message	Alert Triggered
Warning	fmis.ptdomain_fmism2	Database Instance	User Audit	Audited User		User SYS logged on from ptracnode2.ptdomain.	Aug 23, 2013 9:03:47 AM
Warning	fmis.ptdomain_fmism2	Database Instance	Waits by Wait Class	Database Time Spent Waiting (%)		Metrics "Database Time Spent Waiting (%)" is at 58.17935 for event class "Concurrency".	Aug 23, 2013 9:02:08 AM
Warning	fmis.ptdomain_fmism2	Database Instance	Waits by Wait Class	Database Time Spent Waiting (%)		Metrics "Database Time Spent Waiting (%)" is at 100 for event class "Other".	Aug 23, 2013 9:01:08 AM
Warning	fmis.ptdomain_fmism1	Database Instance	User Audit	Audited User		User SYS logged on from ptracnode1.ptdomain.	Aug 23, 2013 7:30:13 AM
- Related Alerts:** Shows 6 warnings.
- Policy Violations:** Shows 10 critical rules violated and a compliance score of 92.



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## P. Explore Listener Options

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## Q. Explore Clusterware components

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## Q. Explore Clusterware components – Voting Disk

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##	STATE	File Universal Id	File Name	Disk group
1.	ONLINE	16e47020731a4f1bbf9962d8aa57c0d7	(ORCL:ASMDISK3)	[OCRVD

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## Q. Explore Clusterware components – Voting Disk

### ❑ Locate the Voting Disk using command-line tool

```
grid@ptracnode1 ~]$ asmcmd
ASMCMDB> ls
DATA/
OCRVD/
RECO/
ASMCMDB> cd OCRVD
ASMCMDB> ls
ptworld/
ASMCMDB> cd ptworld
ASMCMDB> ls
ASMPARAMETERFILE/
OCRFILE/
ASMCMDB> cd OCRFILE
ASMCMDB> ls
REGISTRY.255.823976117
ASMCMDB> exit
```

*ptworld is the overall name of our RAC cluster. We must have at least 1 voting disk in 11gR2 because ASM would take care of redundancy.*



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## Q. Explore Clusterware components – OCR

### ❑ Locate the Oracle Cluster Registry (OCR)

```
[grid@ptracnode1 ~]$ ocrcheck
```

```
Status of Oracle Cluster Registry is as follows :
```

```
Version          :      3
```

```
Total space (kbytes) : 262120
```

```
Used space (kbytes)  :   2688
```

```
Available space (kbytes) : 259432
```

```
ID                : 329473399
```

```
Device/File Name   : +OCRVD
```

```
Device/File integrity check succeeded
```

```
Device/File not configured
```

```
Cluster registry integrity check succeeded
```

```
Logical corruption check bypassed due to non-privileged user
```



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## Q. Explore Clusterware components – OCR

- ❑ Locate **Local copy** of the Oracle Cluster Registry (OCR) residing on each instance

```
[root@ptracnode1 ~]# . oraenv
ORACLE_SID = [root] ? +ASM1
The Oracle base for ORACLE_HOME=/u01/app/11.2.0/grid is /u01/app/grid

[root@ptracnode1 ~]# ocrcheck -local
Status of Oracle Local Registry is as follows :
Version           : 3
Total space (kbytes) : 262120
Used space (kbytes) : 2184
Available space (kbytes) : 259936
ID                : 2138756702
Device/File Name   : /u01/app/11.2.0/grid/cdata/ptracnode1.olr
                   Device/File integrity check succeeded

Local registry integrity check succeeded

Logical corruption check succeeded
```



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