Oracle 9iR2 (9.2.0.5) RAC
on
SUSE Linux Enterprise Server 9

(Based on Oracle Metalink Note:184821.1)

This document will provides step-by-step instructions on how to install Oracle Real Application Clusters (RAC) (Version 9.2.0.5), and start a cluster database on SUSE Linux Enterprise Server 9.

Note: This document is work in progress. Please post your questions to suse-oracle@suse.com mailing list. Suggestions to improve or corrections caan be mailed to arun.singh@novell.com.

1. Configuring the Clusters Hardware

Please check the RAC/Linux certification matrix (http://metalink.oracle.com) for information on currently supported hardware/software.

1. **Hardware Requirements -** Ensure that the system has at least the following resources:
   - 400 MB free space in /tmp
   - 512 MB of Physical Memory (RAM)
   - Two times the amount of Physical Memory for Swap space

   Sample disk layout:

A sample system disk layout		
Slice	Contents	Allocation (in Mbytes)
0	/	2000 or more
1	/boot	64
2	/tmp	1000
3	/usr	3000-7000 depending on operating system and packages installed
4	/var	512 (can be more if required)
5	swap	Two times the amount of Physical Memory for Swap space.
6	/home	2000 (can be more if required)

2. **Software & Patches**
   Install SUSE Linux Enterprise Server 9 SP3 with "C/C++ Compiler and Tools".
   uname -a will report kernel version "2.6.5.-7.244-*".

   Make sure you have rsh-server packages installed, check with:
   $rpm -q rsh-server

3. **Installing the Shared Disk Subsystem**

This is highly dependent on the subsystem you have chosen. Make sure the shared disk subsystem is correctly installed and shared disks are visible to all nodes in the cluster.

4. Configuring the Cluster Interconnect and Public Network Hardware

If not already installed, install host adapters in your cluster nodes. Consult the documentation that shipped with your host adapters and node hardware.

Each system will have at least an IP address for the public network and one for the private cluster interconnect. For the public network, get the addresses from your network manager. For the private interconnect use 1.1.1.1 , 1.1.1.2 for the first and second node. Make sure to add all addresses in /etc/hosts. i.e.

```
$ more /etc/hosts
9.25.120.143        rac1        #Oracle 9i Rac node 1 - public network
9.25.120.143        rac2        #Oracle 9i Rac node 2 - public network
1.1.1.1             int-rac1    #Oracle 9i Rac node 1 - interconnect
1.1.1.2             int-rac2    #Oracle 9I Rac node 2 - interconnect
```

Use your favorite tool to configure these adapters. **Make sure your public network is the primary (eth0).** Interprocess communication is an important issue for RAC since cache fusion transfers buffers between instances using this mechanism. Thus, **networking parameters are important for RAC databases.** The values in the following table are the recommended values. These are NOT the default on most distributions.

Parameter	Meaning	Value
/proc/sys/net/core/rmem_default	The default setting in bytes of the socket receive buffer	262144
/proc/sys/net/core/rmem_max	The maximum socket receive buffer size in bytes	262144
/proc/sys/net/core/wmem_default	The default setting in bytes of the socket send buffer	262144
/proc/sys/net/core/wmem_max	The maximum socket send buffer size in bytes	262144

You can see these settings with: `$ cat /proc/sys/net/core/rmem_default`
Change them with: `$ echo 262144 > /proc/sys/net/core/rmem_default`

This will need to be done each time the system boots. On SUSE Linux put this in /etc/init.d/boot.local or set in /etc/sysctl.conf (like : net.core.rmem_default = 262144).

2. Creating a Cluster

The cluster software is included in the Oracle distribution. The Oracle Cluster Manager (**ORACM**) installation process includes eight major tasks:

1. Linux pre-installation tasks.
2. Configuring the shared disks
3. Run the Oracle Universal Installer to install the 9.2.0.4 ORACM (Oracle Cluster Manager)
4. Configure the hangcheck-timer.
5. Install version 10.1.0.2 of the Oracle Universal Installer
6. Run the 10.1.0.2 Oracle Universal Installer to patch the Oracle Cluster Manager (ORACM) to 9.2.0.5
7. Modify the ORACM configuration files to utilize the hangcheck-timer.
8. Start the ORACM (Oracle Cluster Manager)

2.1 Linux Pre-installation tasks – These steps need to be performed on ALL nodes.

You can use SUSE Linux **orarun** package to do some of the tasks.

First, on each node, create the Oracle group dba. **Example:** ***# groupadd dba -g 501***
Next, make the Oracle user's home directory. **Example:** ***# mkdir -p /u01/home/oracle***
On each node, create the Oracle user. Make sure that the Oracle user is part of the dba group.
Example: ***# useradd -c "Oracle Software Owner" -G dba -u 101 -m -d /u01/home/oracle -s /bin/csh oracle***

On each node, Create a mount point for the Oracle software installation (at least 2.5 GB, typically /u01). The oracle user should own this mount point and all of the directories below the mount point.
Example:

```
# mkdir /u01
# chown -R oracle.dba /u01
# chmod -R ug=rwx,o=rx /u01
```

Once this is done, test the permissions on each node to ensure that the oracle user can write to the new mount points. Example:

```
# su - oracle
$ touch /u01/test
$ ls -l /u01/test
-rw-rw-r-- 1 oracle dba 0 Aug 15 09:36 /u01/test
```

Enable xinetd on all nodes and ensure ftp, telnet, shell and login (or rsh) services are enabled (Hint: use YaST -> Network Services). Example:

```
# more /etc/xinetd.d/telnet
# default: on
# description: The telnet server serves telnet sessions; it uses \
# unencrypted username/password pairs for authentication.
service telnet
{
flags = REUSE
socket_type = stream
wait = no
user = root
server = /usr/sbin/in.telnetd
log_on_failure += USERID
disable = no
 }
```

In this example, disable should be set to 'no'.

On the node from which you will run the Oracle Universal Installer, set up user equivalence by adding entries for all nodes in the cluster, including the local node, to the .rhosts file of the oracle account, or the /etc/hosts.equiv file.

Sample entries in /etc/hosts.equiv file:

rac1
rac2
int-rac1
int-rac2

As oracle user, check for user equivalence for the oracle account by performing a remote copy (rcp) to each node (public and private) in the cluster. Example:

RAC1:
$ touch /u01/test
$ rcp /u01/test rac2:/u01/test1
$ rcp /u01/test int-rac2:/u01/test2
RAC2:
$ touch /u01/test
$ rcp /u01/test rac1:/u01/test1
$ rcp /u01/test int-rac1:/u01/test2
$ ls /u01/test*
/u01/test /u01/test1 /u01/test2

RAC1: $ ls /u01/test*
/u01/test /u01/test1 /u01/test2

Note: If you are prompted for a password, you have not given the oracle account the same attributes on all nodes. You must correct this because the Oracle Universal Installer cannot use the rcp command to copy Oracle products to the remote node's directories without user equivalence.

System Kernel Parameters - If you are using orarun, it will do this part (Verify and set recommonded operating system kernel parameters.)

Kernel Parameter	**Setting**	**Purpose**
SHMMAX	2147483648	Maximum allowable size of one shared memory segment.
SHMMIN	1	Minimum allowable size of a single shared memory segment.
SHMMNI	100	Maximum number of shared memory segments in the entire system.
SHMSEG	10	Maximum number of shared memory segments one process can attach.
SEMMNI	100	Maximum number of semaphore sets in the entire system.
SEMMSL	250	Minimum recommended value. SEMMSL should be 10 plus the largest PROCESSES parameter of any Oracle database on the system.
SEMMNS	1000	Maximum semaphores on the system. This setting is a minimum recommended value. SEMMNS should be set to the sum of the PROCESSES parameter for each Oracle database, add the largest one twice, plus add an additional 10 for each database.
SEMOPM	100	Maximum number of operations per semop call.

You might want to increase the maximum number of file handles, include this in your startup script or use /etc/sysctl.conf :
$ echo 65536 > /proc/sys/fs/file-max

To allow your oracle processes to use these file handles, add the following to your oracle account login script (ex.: .profile)
$ ulimit -n 65536

Establish Oracle environment variables: Set the following Oracle environment variables:

Environment Variable	Suggested value
ORACLE_HOME	eg `/u01/app/oracle/product/920`
ORACLE_TERM	xterm
PATH	/u01/app/oracle/product/9.2.0/bin: /usr/ccs/bin:/usr/bin/X11/:/usr/local/bin and any other items you require in your PATH
DISPLAY	<ip-address>:0.0 (review Note:153960.1 for detailed information) Note:153960.1 for detailed information)
TMPDIR	Set a temporary directory path for TMPDIR with at least 100 Mb of free space to which the OUI has write permission.
ORACLE_SID	Set this to what you will call your database instance. This should be ***UNIQUE*** on each node.

Put these in a .login or .profile. **Create the directory `/var/opt/oracle` and set ownership to the oracle user. (orarun package will do this)**
Example:

```
$ mkdir /var/opt/oracle
$ chown oracle.dba /var/opt/oracle
```

Set the oracle user's umask to "022" in you ".profile" or ".login" file. Example:

```
$ umask 022
```

Note: There is a verification script (InstallPrep.sh) available which may be downloaded and run prior to the installation of Oracle Real Application Clusters. This script verifies that the system is configured correctly according to the Installation Guide. The output of the script will report any further tasks that need to be performed before successfully installing Oracle *9.x* DataServer (RDBMS). This script performs the following verifications:-

- ORACLE_HOME Directory Verification
- Linux User/umask Verification
- Linux Group Verification
- Memory/Swap Verification
- TMP Space Verification
- Real Application Cluster Option Verification
- Linux Kernel Verification

```
. ./InstallPrep.sh
You are currently logged on as oracle
Is oracle the Linux user that will be installing Oracle Software? y or n
y

Enter the Linux group that will be used during the installation
Default: dba
```

```
Enter the version of Oracle RDBMS you will be installing
Enter either : 901 OR 920 - Default: 920
920
The rdbms version being installed is 920

Enter Location where you will be installing Oracle
Default: /u01/app/oracle/product/oracle9i
/u01/app/oracle/product/9.2.0
Your Operating System is Linux
Gathering information... Please wait
JDK check is ignored for Linux since it is provided by Oracle

Checking Linux user ...

Checking Linux umask ...
umask test passed

Checking Linux group ...
Linux Group test passed

Checking Memory & Swap...
Memory test passed
/tmp test passed

Checking for a cluster...

Linux Cluster test section has not been implemented yet
No cluster warnings detected
Processing kernel parameters... Please wait
Running Kernel Parameter Report...
Check the report for Kernel parameter verification\n

Completed.

/tmp/Oracle_InstallPrep_Report has been generated

Please review this report and resolve all issues before attempting to install the Oracle
Database Software.

Note: If you get an error like this: InstallPrep.sh: line 45: syntax error near unexpected
token `fi' or ./InstallPrep.sh: Command not found.
Then you need to copy the script into a text file (it will not run if the file is in binary
format).
```

2.2 Configuring the Shared Disks

For 9.2 Real Application Clusters on Linux, you can use either OCFS (Oracle Cluster Filesystem), RAW, or NFS (Network Appliance Only) for storage of Oracle database files.

- For more information on setting up OCFS for RAC on Linux, see the following MetaLink Note: Note 220178.1 - Installing and setting up ocfs on Linux - BasicNote 220178.1 - Installing and setting up ocfs on Linux - Basic Guide

- For more information on setting up RAW for RAC on Linux, see the following MetaLink Note: Note 246205.1 - Configuring Raw Devices for Real ApplicationNote 246205.1 - Configuring Raw Devices for Real Application Clusters on Linux

- For more information on setting up NFS for RAC on Linux, see the following MetaLink Note (Steps 1-6): Note 210889.1 - RAC Installation with a NetApp Filer in Red HatNote 210889.1 - RAC Installation with a NetApp Filer in Red Hat Linux Environment

2.3 Run the Oracle Universal Installer to install the 9.2.0.4 ORACM (Oracle Cluster Manager)

– **Only need to be performed on the node that you are installing from (typically Node 1)**

If you are using OCFS or NFS for your shared storage, pre-create the quorum file and srvm file. Example:

```
# dd if=/dev/zero of=/ocfs/quorum.dbf bs=1M count=20
# dd if=/dev/zero of=/ocfs/srvm.dbf bs=1M count=100
# chown root:dba /ocfs/quorum.dbf
# chmod 664 /ocfs/quorum.dbf
# chown oracle:dba /ocfs/srvm.dbf
# chmod 664 /ocfs/srvm.dbf
```

Verify the Environment - Log off and log on as the oracle user to ensure all environment variables are set correctly. Use the following command to view them:

% env | more

Before attempting to run the Oracle Universal Installer, verify that you can successfully run the following command: *% /usr/bin/X11/xclock*
If this does not display a clock on your display screen, please review the following article: Note 153960.1 FAQ: X Server testing and troubleshooting

Start the Oracle Universal Installer and install the RDBMS software - Follow these procedures to use the Oracle Universal Installer to install the Oracle Cluster Manager software. Oracle*9i* is supplied on multiple CD-ROM disks. During the installation process it is necessary to switch between the CD-ROMS. OUI will manage the switching between CDs.

Use the following commands to start the installer: ***cd to /stage/Disk1 and run ./runInstaller***

Respond to the installer prompts as shown below:
At the "Welcome Screen", click Next.

If this is your first install on this machine: ● If the "Inventory Location" screen appears, enter the inventory location then click

OK.

- If the "Linux Group Name" screen appears, enter the Linux group name created in step 2.1 then click **Next**.
- At this point you may be prompted to run /tmp/orainstRoot.sh. Run this and click **Continue**.

At the "File Locations Screen", verify the destination listed is your ORACLE_HOME directory.
Also enter a NAME to identify this ORACLE_HOME. The NAME can be anything.
At the "Available Products Screen", Check "Oracle Cluster Manager". Click Next.
At the public node information screen, enter the public node names and click Next.
At the private node information screen, enter the interconnect node names. Click Next.
Enter the full name of the file or raw device you have created for the ORACM Quorum disk information. Click Next. Press Install at the summary screen.

You will now briefly get a progress window followed by the end of installation screen. Click Exit and confirm by clicking Yes.

Note: Create the directory $ORACLE_HOME/oracm/log (as oracle) on the other nodes if it doesn't exist.

2.4 Configure the hangcheck-timer - These steps need to be performed on ALL nodes.

SUSE Linux include the hangcheck-timer with the kernel. You can check to see if your kernel contains the hangcheck-timer by running: **modinfo hangcheck-timer**

Load the hangcheck-timer kernel module using the following command as root user and add to /etc/init.d/boot.local:

 # /sbin/modprobe hangcheck-timer hangcheck_tick=30 hangcheck_margin=180

Repeat the above steps **on all** Oracle Real Applications Clusters nodes where the kernel module needs to be installed.

2.5 Install Version 10.1.0.2 of the Oracle Universal Installer

- **These steps need to be performed on ALL nodes.**

Download the 9.2.0.5 patchset (3501955) from MetaLink and Install on all node.

Place the file in a patchset directory on the node you are installing from. Example:

```
$ mkdir $ORACLE_HOME/9205
$ cp p3501955_9205_LINUX.zip $ORACLE_HOME/9205
```

Unzip the file: $ cd $ORACLE_HOME/9205

```
$ unzip p3501955_9205_LINUX.zip
Archive: p3501955_9205_LINUX
inflating: 9205_lnx32_release.cpio
inflating: README.html
inflating: ReleaseNote9205.pdf
```

Run cpio against the file:

```
$ cpio -idmv < 9205_lnx32_release.cpio
```

Run the installer from the 9.2.0.5 staging location:

$ cd $ORACLE_HOME/9205/Disk1

$ ./runInstaller

Respond to the installer prompts as shown below:

At the "Welcome Screen", click Next.

At the "File Locations Screen", Change the $ORACLE_HOME name from the dropdown list to the 9.2 $ORACLE_HOME name. Click Next.

On the "Available Products Screen", Check "Oracle Universal Installer 10.1.0.2. Click Next.

Press Install at the summary screen.

You will now briefly get a progress window followed by the end of installation screen. Click Exit and confirm by clicking Yes.

Remember to install the 10.1.0.2 Installer on ALL cluster nodes. Note that you may need to ADD the 9.2 $ORACLE_HOME name on the "File Locations Screen" for other nodes. It will ask if you want to specify a non-empty directory, say "Yes".

2.6 Run the 10.1.0.2 Oracle Universal Installer to patch the Oracle Cluster Manager (ORACM) to 9.2.0.5

- **These steps only need to be performed on the node that you are installing from(Node1)**

The 10.1.0.2 OUI will use SSH (Secure Shell) if it is configured. If it is not configured it will use RSH (Remote Shell). If you have SSH configured on your cluster, test and make sure that you can SSH and SCP to all nodes of the cluster without being prompted. If you do not have SSH configured, skip this step and run the installer from $ORACLE_BASE/oui/bin as noted below.

ssh Test: As oracle user, check for user equivalence for the oracle account by performing a secure copy (scp) to each node (public and private) in the cluster. Example:

RAC1:

$ touch /u01/sshtest
$ scp /u01/sshtest rac2:/u01/sshtest1
$ scp /u01/sshtest int-rac2:/u01/sshtest2

RAC2:

$ touch /u01/sshtest
$ scp /u01/sshtest rac1:/u01/sshtest1
$ scp /u01/sshtest int-rac1:/u01/sshtest2
$ ls /u01/sshtest*
/u01/sshtest /u01/sshtest1 /u01/sshtest2

RAC1:

$ ls /u01/sshtest*
/u01/sshtest /u01/sshtest1 /u01/sshtest2

Run the installer from the 9.2.0.5 oracm staging location:

$ cd $ORACLE_HOME/9205/Disk1/oracm

$ ./runInstaller

Respond to the installer prompts as shown below:
At the "Welcome Screen", click Next.
At the "File Locations Screen", make sure the source location is to the products.xml file in the 9.2.0.5 patchset location under Disk1/stage. Also verify the destination listed is your ORACLE_HOME directory. Change the $ORACLE_HOME name from the dropdown list to the 9.2 $ORACLE_HOME name. Click Next.
At the "Available Products Screen", Check "Oracle9iR2 Cluster Manager 9.2.0.5.0". Click Next.
At the public node information screen, enter the public node names and click Next.
At the private node information screen, enter the interconnect node names. Click Next.
Click Install at the summary screen.

You will now briefly get a progress window followed by the end of installation screen. Click Exit and confirm by clicking Yes.

2.7 Modify the ORACM configuration files to utilize the hangcheck-timer.

- ***These steps need to be performed on ALL nodes.***

Modify the $ORACLE_HOME/oracm/admin/cmcfg.ora file:
Add the following line: ***KernelModuleName=hangcheck-timer***

Adjust the value of the MissCount line based on the sum of the hangcheck_tick and hangcheck_margin values. (> 210) ***MissCount=210***

Make sure that you can ping each of the names listed in the private and public node name sections from each node.
Example: **$ ping rac2**

Verify that a valid **CmDiskFile** line exists in the following format:
CmDiskFile=file or raw device name
In the preceding command, the file or raw device must be valid. If a file is used but does not exist, then the file will be created if the base directory exists. If a raw device is used, then the raw device must exist and have the correct ownership and permissions.

Sample cmcfg.ora file:

```
ClusterName=Oracle Cluster Manager, version 9i
MissCount=210
PrivateNodeNames=int-rac1 int-rac2
PublicNodeNames=rac1 rac2
ServicePort=9998
CmDiskFile=/u04/quorum.dbf
KernelModuleName=hangcheck-timer
HostName=int-rac1
```

Note: The cmcfg.ora file should be the same on both nodes with the exception of the HostName parameter which should be set to the local (internal) hostname.

Make sure all of these changes have been made to all RAC nodes. More information on

ORACM parameters can be found in the following note: Note 222746.1 - RAC Linux 9.2: Configuration of cmcfg.ora

Note: At this point it would be a good idea to patch to the latest ORACM, especially if you have more than 2 nodes. For more information see: Note 278156.1 - ORA-29740 or ORA-29702 After Applying 9.2.0.5 Patchset on RAC / Linux

2.8 Start the ORACM (Oracle Cluster Manager)

- ***These steps need to be performed on ALL nodes.***

Cd to the $ORACLE_HOME/oracm/bin directory, change to the root user, and start the ORACM.

$ cd $ORACLE_HOME/oracm/bin
$ su root
 # ./ocmstart.sh
oracm </dev/null 2>&1 >/u01/app/oracle/product/9.2.0/oracm/log/cm.out &

Verify that ORACM is running with the following: # ps -ef | grep oracm

You should see several oracm threads running. Also verify that the ORACM version is the same on each node:

 # cd $ORACLE_HOME/oracm/log
 # head -1 cm.log
oracm, version[9.2.0.2.0.49] started {Fri May 14 09:22:28 2004 }

3. Installing RAC

The Real Application Clusters installation process includes four major tasks.

1. Install 9.2.0.4 RAC.
2. Patch the RAC Installation to 9.2.0.5.
3. Start the GSD.
4. Create and configure your database.

3.1 Install 9.2.0.4 RAC

- These steps only need to be performed on the node that you are installing from (typically Node1).

Note: Due to bug 3547724, temporarily create a symbolic link /oradata directory pointing to an oradata directory with space available as root prior to running the RAC install:
 # mkdir /u04/oradata
 # chmod 777 /u04/oradata
ln -s /u04/oradata /oradata

Install 9.2.0.4 RAC into your $ORACLE_HOME by running the installer from the 9.2.0.4 cd or your original stage location for the 9.2.0.4 install.

Use the following commands to start the installer: *cd to /stage/Disk1 and run ./runInstaller*

Respond to the installer prompts as shown below:
At the "Welcome Screen", click **Next**.
At the "Cluster Node Selection Screen", make sure that all RAC nodes are selected.
At the "File Locations Screen", verify the destination listed is your ORACLE_HOME directory and that the source directory is pointing to the products.jar from the 9.2.0.4 cd or staging location.
At the "Available Products Screen", check "Oracle 9i Database 9.2.0.4". Click **Next**.
At the "Installation Types Screen", check "Enterprise Edition" (or whichever option your prefer), click **Next**.
At the "Database Configuration Screen", check "Software Only". Click **Next**.
At the "Shared Configuration File Name Screen", enter the path of the CFS or NFS srvm file created at the beginning of step 2.3 or the raw device created for the shared configuration file. Click **Next**.
Click **Install** at the summary screen. Note that some of the items installed will say "9.2.0.1" for the version, this is normal because only some items needed to be patched up to 9.2.0.4.
You will now get a progress window, run root.sh when prompted.
You will then see the end of installation screen. Click **Exit** and confirm by clicking **Yes**.

Note: You can now remove the /oradata symbolic link: *# rm /oradata*

3.2 Patch the RAC Installation to 9.2.0.5

- These steps only need to be performed on the node that you are installing from.

Run the installer from the 9.2.0.5 staging location:

```
$ cd $ORACLE_HOME/9205/Disk1
$ ./runInstaller
```

Respond to the installer prompts as shown below:
At the "Welcome Screen", click **Next**.
View the "Cluster Node Selection Screen", click **Next.**
At the "File Locations Screen", make sure the source location is to the products.xml file in the 9.2.0.5 patchset location under Disk1/stage. Also verify the destination listed is your ORACLE_HOME directory. **Change the $ORACLE_HOME name from the dropdown list to the 9.2 $ORACLE_HOME name.** Click **Next.**
At the "Available Products Screen", Check "Oracle9iR2 PatchSets 9.2.0.5.0". Click **Next**.
Click **Install** at the summary screen.
You will now get a progress window, run root.sh when prompted.
You will then see the end of installation screen. Click **Exit** and confirm by clicking **Yes**.

3.3 Start the GSD (Global Service Daemon)

- ***These steps need to be performed on ALL nodes.***

Start the GSD on each node with:

```
% gsdctl start
```

Successfully started GSD on local node

Then check the status with:

% gsdctl stat

GSD is running on the local node

If the GSD does not stay up, try running '**srvconfig -init -f**' from the OS prompt. If you get a raw device exception error or PRKR-1064 error then see the following note to troubleshoot:
Note 212631.1 - Resolving PRKR-1064 in a RAC Environment

3.4 Create a RAC Database using the DBCA (Oracle Database Configuration Assistant)

- **These steps only need to be performed on the node that you are installing from(Node1)**

The Oracle Database Configuration Assistant (DBCA) will create a database for you. The DBCA creates your database using the optimal flexible architecture (OFA). This means the DBCA creates your database files, including the default server parameter file, using standard file naming and file placement practices. The primary phases of DBCA processing are:-

- Verify that you correctly configured the shared disks for each tablespace
- Create the database
- Configure the Oracle network services
- Start the database instances and listeners

Oracle Corporation recommends that you use the DBCA to create your database. This is because the DBCA preconfigured databases optimize your environment to take advantage of Oracle*9i* features such as the server parameter file and automatic undo management. The DBCA also enables you to define arbitrary tablespaces as part of the database creation process. So even if you have datafile requirements that differ from those offered in one of the DBCA templates, use the DBCA. You can also execute user-specified scripts as part of the database creation process.

Note: Prior to running the DBCA it may be necessary to run the NETCA tool or to manually set up your network files. To run the NETCA tool execute the command `netca` from the `$ORACLE_HOME/bin` directory. This will configure the necessary listener names and protocol addresses, client naming methods, Net service names and Directory server usage.

If you are using OCFS or NFS, launch DBCA with the **-datafileDestination** option and point to the shared location where Oracle datafiles will be stored.
Example:

% cd $ORACLE_HOME/bin ; % dbca -datafileDestination /ocfs/oradata

If you are using RAW, launch DBCA without the -datafileDestination option.
Example:

% cd $ORACLE_HOME/bin

% dbca

Respond to the DBCA prompts as shown below:

Choose **Oracle Cluster Database** option and select **Next**.
The Operations page is displayed. Choose the option **Create a Database** and click **Next**.
The Node Selection page appears. Select the nodes that you want to configure as part of the RAC database and click **Next**.
The Database Templates page is displayed. The templates other than New Database include datafiles. Choose **New Database** and then click **Next**.
Note: The **Show Details** button provides information on the database template selected.

DBCA now displays the Database Identification page. Enter the **Global Database Name** and **Oracle System Identifier (SID)**. The Global Database Name is typically of the form *name.domain*, for example ***mydb.us.oracle.com*** while the SID is used to uniquely identify an instance (DBCA should insert a suggested SID, equivalent to *name1* where *name* was entered in the Database Name field). In the RAC case the SID specified will be used as a prefix for the instance number. For example, ***MYDB***, would become ***MYDB1, MYDB2*** for instance 1 and 2 respectively.
The Database Options page is displayed. Select the options you wish to configure and then choose **Next**. Note: If you did not choose New Database from the Database Template page, you will not see this screen.
Select the connection options desired from the Database Connection Options page. Click **Next**.

DBCA now displays the Initialization Parameters page. This page comprises a number of Tab fields. Modify the **Memory settings** if desired and then select the **File Locations** tab to update information on the Initialization Parameters filename and location. The option **Create persistent initialization parameter file** is selected by default. If you have a cluster file system, then enter a **file system name**, otherwise a **raw device name** for the location of the server parameter file (spfile) must be entered. The button **File Location Variables**… displays variable information. The button **All Initialization Parameters**… displays the Initialization Parameters dialog box. This box presents values for all initialization parameters and indicates whether they are to be included in the spfile to be created through the check box, *included (Y/N)*. Instance specific parameters have an instance value in the instance column. Complete entries in the **All Initialization Parameters** page and select **Close**. **Note**: There are a few exceptions to what can be altered via this screen. Ensure all entries in the Initialization Parameters page are complete and select **Next**.
DBCA now displays the **Database Storage** Window. This page allows you to enter file names for each tablespace in your database.
The **Database Creation Options** page is displayed. Ensure that the option **Create Database** is checked and click **Finish**.
The **DBCA Summary** window is displayed. Review this information and then click **OK**. Once you click the OK button and the summary screen is closed, it may take a few moments for the DBCA progress bar to start. DBCA then begins to create the database according to the values specified.

During the database creation process, you may see the following error:
ORA-29807: specified operator does not exist
This is a known issue (bug 2925665). You can click on the "Ignore" button to continue.
Once DBCA has completed database creation, remember to run the 'prvtxml.plb' script from $ORACLE_HOME/rdbms/admin independently, as the user SYS. It is also advised to run the 'utlrp.sql' script to ensure that there are no invalid objects in the database at this time.

A new database now exists. It can be accessed via Oracle SQL*PLUS or other applications designed to work with an Oracle RAC database. Additional database configuration best practices can be found in the following note: Note 240575.1 - RAC on Linux Best Practices

4. Administering Real Application Clusters Instances

Oracle Corporation recommends that you use **SRVCTL** to administer your Real Application Clusters database environment. SRVCTL manages configuration information that is used by several Oracle tools. For example, Oracle Enterprise Manager and the Intelligent Agent use the configuration information that SRVCTL generates to discover and monitor nodes in your cluster. Before using SRVCTL, ensure that your Global Services Daemon (GSD) is running *after* you configure your database. To use SRVCTL, you must have already created the configuration information for the database that you want to administer. You must have done this either by using the Oracle Database Configuration Assistant (DBCA), or by using the srvctl add command as described below.

To display the configuration details for, example, databases racdb1/2, on nodes racnode1/2 with instances racinst1/2 run:-
$ **srvctl config**
racdb1
racdb2

$ **srvctl config -p racdb1 -n racnode1**
racnode1 racinst1 /u01/app/oracle/product/9.2.0
$ **srvctl status database -d racdb1**
Instance racinst1 is running on node racnode1
Instance racinst2 is running on node racnode2
Examples of starting and stopping RAC follow:-

$ **srvctl start database -d racdb2**
$ **srvctl stop database -d racdb2**
$ **srvctl stop instance -d racdb1 -i racinst2**
$ **srvctl start instance -d racdb1 -i racinst2**

For further information on srvctl and gsdctl see the Oracle*9i* RAC Administration manual.

5. Update History

03/30/2006	Initial Creation based on Metalink Note : 184821.1