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Installation Guide for Single Click Configurations of Oracle Database 11g with Oracle Linux 5 on Sun Fire x86 Servers

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Introduction

Oracle's industry-leading applications and database can be best utilized if they are hosted on Oracle hardware and managed by Oracle's management tools. Oracle's Single Click configurations for Oracle Database offer tightly integrated systems that deliver unmatched performance and scalability along with superior TCO. The configurations take advantage of Oracle technologies from applications to disk, greatly simplifying deployment and management.

This white paper goes through the process of preparing an Oracle Linux operating system for installation of Oracle Database 11g Release 2 Standard Edition One on an Oracle Sun Fire x86 two socket rack server, as well as the installation steps required to get Oracle Database 11g Release 2 up and running quickly based on Oracle best practices. By completing the steps described in this white paper, users can have their Oracle Sun Fire x 86 servers hosting a database running Oracle Database 11g Release 2 technology.

Installation Overview

The installation of Oracle Database 11g as described in this guide is to be performed on an Sun Fire x86 server from Oracle running Oracle Linux 5 (x86_64) Update 6. For installations of Oracle Database with hardware or software not listed in this guide, please refer to the Oracle Database 11g documentation library at: <http://www.oracle.com/technetwork/database/enterprise-edition/documentation/>.

The operating system was installed using the default Oracle Linux configurations and packages with the following details:

- Single LVM Volume Group VolGroup00 (Size: 475744 MB) with Logical Volume Partitioning as shown in Table 1.

TABLE 1. LOGICAL VOLUME PARTITIONING

DEVICE	MOUNT POINT	TYPE	SIZE
LogVol00	/	ext3	449664
LogVol01		swap	26080*

*Please see swap space sizing requirement under hardware pre-requisite check. This was left as default value and not changed for illustrative purposes described later.

- The Base Package Group, with no optional packages¹ or additional task support groups. The components of the Base Package Group are shown in Table 2.

TABLE 2. COMPONENTS OF THE BASE PACKAGE GROUP

GROUP	SUB-GROUPS
Desktop Environment	GNOME Desktop Environment
Applications	Editors Games and Entertainment Graphical Internet Graphics Office Productivity Sound and Video
Servers	Printing Support
Base System	Administration Tools Base Java Legacy Software Support X Windows System

- IPv4 Configured
- Firewall Enabled with SSH checked as a trusted service
- SELinux set to Permissive mode
- Registered operating system with Unbreakable Linux Network

Accessing the Installation System

There are several different ways to access the Oracle Linux operating system to perform the Oracle Database installation steps described in this document. For the purpose of this document, the installation system will be accessed using the Oracle Integrated Lights Out Manager (ILOM).

¹ Please refer to the Software Pre-Requisites: Operating System Package Requirements Check section for required OS packages needed for Oracle Database 11g Release 2.

The ILOM provides access to remotely monitor and manage Oracle Sun Fire servers without consuming operating system resources. ILOM provides fully featured interfaces, including a browser-based Web interface, a command-line interface, an SNMP interface, and an IPMI interface. These interfaces are based on industry standards and are intuitive to use. During this installation process, the ILOM's browser-based Web interface will be used to remotely access the system.

To access the ILOM's Web interface, open a Web browser and enter the ILOM's IP address. When prompted, enter the appropriate user name and associated password.

Select the Remote Control tab in the navigation tabs section. From the Redirection tab, click on the Launch Remote Console, this will open a Java-based interface to the console of the system.

Log into the operating system as a root user.

The majority of the installation procedures described in this document will be performed using the terminal unless otherwise noted. To open the terminal window, after logging into the system, right-click the Oracle Linux desktop and select Open Terminal from the menu.

Required Pre-Requisites Check

This section lists the hardware and software pre-requisites to be checked before installation.

Hardware Pre-Requisites

Before installing Oracle Database Standard Edition One for Linux x86-64, the system must meet the following minimum hardware requirement for physical memory, memory swap space, available disk space, and video resolution.

Physical Memory and Swap Space Requirement Check

Physical Minimum RAM: 4 GB

Swap Space recommendations are shown in Table 3.

TABLE 3. MEMORY AND SWAP SPACE RECOMMENDATIONS

RAM	SWAP SPACE
Between 4 GB and 8 GB	2 times the size of RAM
Between 8 GB and 32 GB	1.5 times the size of RAM up to 32 GB
More than 32 GB	32 GB

To check the available physical memory, use the following command:

```
# free
[Output]
```

	total	used	free	shared	buffers	cached
Mem:	24726300	4810596	19915704	0	119712	3709048
-/+ buffers/cache:		981836	23744464			
Swap:	26705912	0	26705912			

In this test environment, the server has 24 GB of memory and 26 GB Swap Space. If the memory size is less than required size, then please install more physical memory to get to at least the minimum level before continuing.

For the amount of physical RAM (24 GB), based off the above table, Swap Space is recommended to be at 32 GB. Currently Swap Space is only 26 GB, so the swap space should be increased by 6 GB. It is recommended to set the appropriate swap space size during the installation of Oracle Linux. However, if the swap space size needs to be increased after the operating system has already been installed, please refer to appendix A.1 on how to increase available swap space.

Physical Disk Space Requirement Check

For available disk space, please confirm the following space is available. Again, these numbers are based on Oracle Database 11g Release 2 Standard Edition on Oracle Linux 5 Update 6 x86-64 bit edition. For other configurations, please refer to the Oracle Database Installation Guide 11g Release 2 (11.2) for Linux.

TABLE 4. FREE DISK SPACE RECOMMENDATIONS

DISK SPACE RELATED TO	REQUIRED FREE SPACE
/tmp directory	1 GB
Software Files	3.73 GB
Data Files	1.48 GB

To check disk space, enter the following command:

```
# df -h
```

Depending on how the file system has been created, the output may appear as a single LogicalVolume or individual /boot, /swap, /, etc... file structure.

[Sample Output from df -h]

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/VolGroup00-LogVol100					
	426G	16G	389G	4%	/
/dev/sda1	99M	23M	71M	25%	/boot
tmpfs	12G	0	12G	0%	/dev/shm

Please confirm that under the / directory, there is enough space available. To confirm in this example, look at the volume mounted on /

/dev/mapper/VolGroup00-LogVol100	426G	16G	389G	4%	/
----------------------------------	------	-----	------	----	---

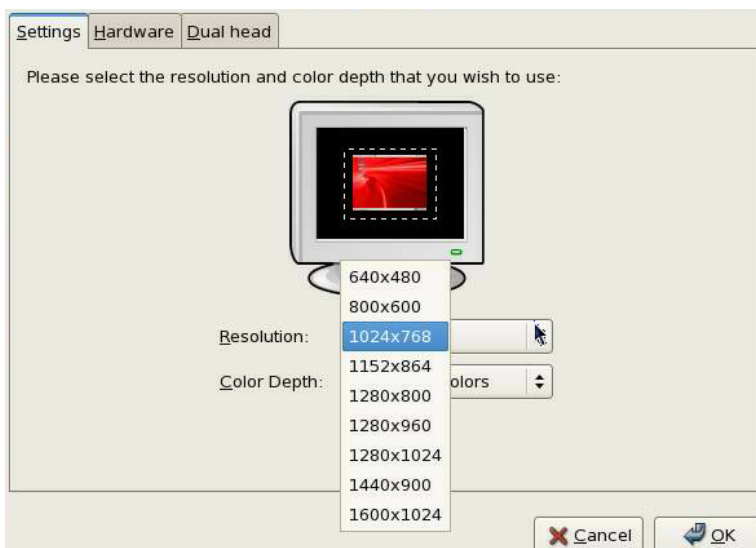
LogicalVolume mounted on / directory has 389 GB of available space, more than enough free space to continue with the installation.

Screen Resolution Requirement Check

The minimum resolution for Oracle Database 11g Release 2 (11.2) is 1024 x 768. Please check the current screen resolution by selecting System > Administration > Display.



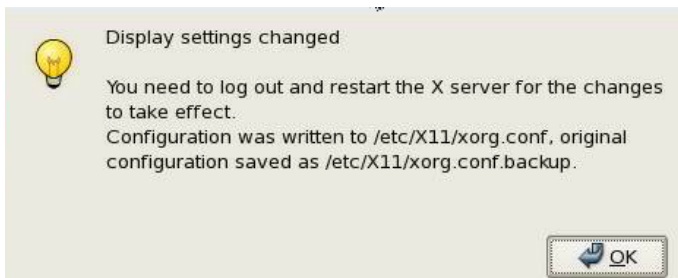
The screen resolution needs to be set to at least 1024 x 768. If not, please set this minimum resolution or higher.



If the minimum resolutions do not appear, please refer to Appendix A.2 on how to increase screen resolution options.

When completed, click “OK.”

The following warning screen may appear.



To apply the changes and restart the X server, press Ctrl+Alt+Backspace. This will restart the display with the new resolution. When completed, please log back into Oracle Linux as root and open the terminal again.

Software Pre-Requisites

The software pre-requisites listed in this section are for Oracle Database 11g Release 2 Standard Edition One for Linux x86-64 on Oracle Linux 5 (x86_64) Update 6. If an installation is being performed on anything other than what is listed, please refer to the Oracle Database 11g Release 2 (11.2) Installation Guide for Linux for details.

Operating System Package Requirements Check

Please note the following concerning RPM packages:

- Oracle recommends that the Oracle Linux operating system be installed with the default software packages (RPMs), unless you specifically intend to perform a minimal installation and follow the directions for performing such an installation to ensure that you have all required packages for Oracle software.
- Oracle recommends that the RPMs are not customized during a default operating system installation. A default installation includes most required packages and will help limit manual verification of package dependencies.
- Starting with Oracle Database 11g Release 2 (11.2.0.2), all the 32-bit packages, except for gcc-32bit-4.3, listed in Table 5 below are no longer required for installing a database on Linux x86-64. Only the 64-bit packages are required. However, for any Oracle Database 11g release prior to 11.2.0.2, both the 32-bit and 64-bit packages listed in the Table 5 are required. In this installation, Oracle Database 11g Release 2 (11.2.0.1) is used, so the 32-bit packages will be manually included.

For this installation of Oracle Database 11g Release 2, Table 5 shows the packages (or later versions) that need to be installed:

TABLE 5. PACKAGE INSTALLATION REQUIREMENTS

binutils-2.17.50.0.6	ksh-20060214
compat-libstdc++-33-3.2.3	libaio-0.3.106
compat-libstdc++-33-3.2.3 (32 bit)	libaio-0.3.106 (32 bit)
elfutils-libelf-0.125	libaio-devel-0.3.106
elfutils-libelf-devel-0.125	libaio-devel-0.3.106 (32 bit)
gcc-4.1.2	libgcc-4.1.2
gcc-c++-4.1.2	libgcc-4.1.2 (32 bit)
glibc-2.5-24	libstdc++-4.1.2
glibc-2.5-24 (32 bit)	libstdc++-4.1.2 (32 bit)
glibc-common-2.5	libstdc++-devel 4.1.2
glibc-devel-2.5	make-3.81
glibc-devel-2.5 (32 bit)	numactl-devel-0.9.8.x86_64
glibc-headers-2.5	sysstat-7.0.2

To check if a package is installed, please use the following command:

```
# rpm -q package_name
```

For example, for the sysstat-7.0.2 package, when already installed on the system, the following command will result in the subsequent system response:

```
# rpm -q sysstat
sysstat-7.0.2-3.e15_5.1
```

If the package name and version are returned, then the package is installed. If the package is not installed, please refer to Appendix A.3 on directions on how to install the needed packages.

Installing Recommended Additional Software

It is recommended to install ODBC (Open Database Connectivity) Driver Manager for Linux. ODBC provides a standard software API method for using database management systems. Download the ODBC Driver Manager for Linux RPMs from the following web site:

<http://www.unixodbc.org>

In order to use ODBC on Oracle Linux 5 (x86_64) Update 6, the following ODBC Linux packages are also required.

```
unixODBC-2.2.11 (32 bit) or later
unixODBC-devel-2.2.11 (64 bit) or later
unixODBC-2.2.11 (64 bit) or later
```

These can be installed using the yum command as previously mentioned in appendix A.3.

After installing the unixODBC packages and downloading the ODBC Driver Manager for Linux from unixodbc.org, the downloaded package name should be a compressed package labeled `unixODBC-version.tar.gz`. Uncompress this package using the tar command as follows:

```
# tar -zxvf unixODBC-<version>.tar.gz
```

This will create a `unixODBC-<version>` directory where the original file was located, unless otherwise specified. Go to this `unixODBC` directory. And run the following commands, please wait until each command has completed before running the next command:

```
# ./configure
# make
# make install
```

Creating Required Operating System Groups and Users

The following local operating system groups and users are required for installing Oracle Database 11g Release 2:

- The Oracle Inventory group (typically, oinstall)
- The OSDBA group (typically, dba)
- The Oracle software owner (typically, oracle)
- The OSOPER group (optional. Typically, oper)

First, determine if any of these groups or users are already created. To perform this run the following commands for the particular group or user and validate the command output:

For the Oracle Inventory group (typically, oinstall):

```
# more /etc/oraInst.loc
```

If the output of this command shows the oinstall group name, then the group already exists, if not then this group needs to be created.

For the OSDBA group (typically, dba):

```
# grep dba /etc/group
```

If the output from this command shows the dba group name, then the group already exists. If not then this group needs to be created.

For the Oracle software owner (typically, oracle):

```
# id oracle
```

If the oracle user exists, then this command displays information about the groups to which the user belongs, otherwise the message "id: oracle: no such user" will appear. In this case the user needs to be created. If the user exists, but does not belong to dba, or its primary group is not oinstall, the user needs to be added to these groups.

After checking if any of the groups or users exists, please proceed to create any of the users and groups as needed.

For the Oracle Inventory group (typically, oinstall):

To create the oinstall group, enter the following command:

```
# /usr/sbin/groupadd oinstall
```

For the OSDBA group (typically, dba):

To create the dba group, enter the following command:

```
# /usr/sbin/groupadd dba
```

For the Oracle software owner (typically, oracle):

- If the oracle user exists, but its primary group is not oinstall or it is not a member of the dba group, then enter the following command:

```
# /usr/sbin/usermod -g oinstall -G dba oracle
```

- If the oracle user does not exist, enter the following command to create it:

```
# /usr/sbin/useradd -g oinstall -G dba oracle
```

This command creates the oracle user and specifies oinstall as the primary group and dba as the secondary group.

Enter the following command to set the password of the oracle user:

```
# passwd oracle
```

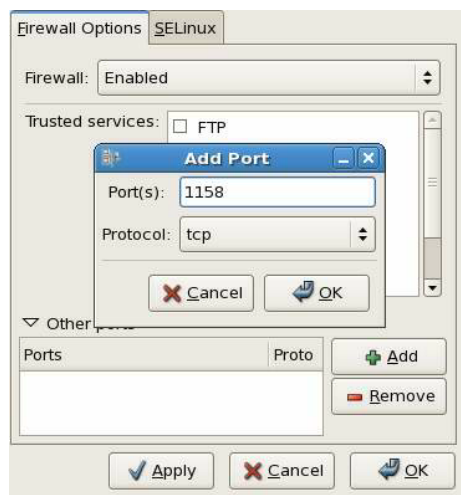
Opening Required Firewall Ports

In order to access the Oracle Enterprise 11g Database Control web interface after installing Oracle Database 11g Release 2 from a remote computer, the following ports and services need to be granted permission through the firewall:

- Web Interface Port: 1158/tcp
- RMI Port: 5520/tcp
- JMS Port: 5540/tcp
- Trusted Service: HTTPS

To grant these ports and service through the firewall, from the Oracle Linux desktop, select from the top menu System > Administration > Security Level and Firewall and scroll down the trusted services under the Firewall Options tab. Check Secure WWW (HTTPS) as a trusted service.

Next click on “Other ports” to expand this section. In this section, click the “Add” button and enter the port number 1158 and select protocol tcp as seen in the below image.



Click “OK” when completed. Perform this process for the other two ports 5520 and 5540, again both as protocol tcp. When completed, click the OK button in the Security Level Configuration window.

Configuring Kernel Parameters

For the installation of Oracle Database 11g Release 2, some kernel values need to be increased. Please refer to Table 6 for the minimum kernel parameter values. If the values currently set for any of the kernel parameters are at or above the recommended value, there is no need to change the value.

TABLE 6. KERNEL MINIMUM PARAMETER VALUES

PARAMETER	MINIMUM VALUE	COMMAND TO CHECK VALUE
semmsl	250	# /sbin/sysctl -a grep sem
semmns	32000	Output order:
semopm	100	kernel.sem =
semmni	128	<semmsl> <semmns> <semopm> <semmni>
shmmax	4294967295	# /sbin/sysctl -a grep shm
shmall	2097152	
shmmni	4096	
file-max	6815744	# /sbin/sysctl -a grep file-max
ip_local_port_range	Minimum: 9000 Maximum: 65500	# /sbin/sysctl -a grep ip_local_port_range
rmem_default	262144	# /sbin/sysctl -a grep rmem_default
rmem_max	4194304	# /sbin/sysctl -a grep rmem_max
wmem_default	262144	# /sbin/sysctl -a grep wmem_default
wmem_max	1048576	# /sbin/sysctl -a grep wmem_max
aio-max-nr	Set to 1048576	# /sbin/sysctl -a grep aio-max-nr

Please note which parameters did not meet the minimum values specified in Minimum Parameter Values table. To make any needed changes, open the sysctl.conf file using the vi editor:

```
# vi /etc/sysctl.conf
```

Add or edit any of the lines similar to the following:

```
fs.aio-max-nr = 1048576
fs.file-max = 6815744
kernel.shmall = 2097152
kernel.shmmax = 536870912
kernel.shmmni = 4096
kernel.sem = 250 32000 100 128
net.ipv4.ip_local_port_range = 9000 65500
```

```
net.core.rmem_default = 262144
net.core.rmem_max = 4194304
net.core.wmem_default = 262144
net.core.wmem_max = 1048586
```

NOTE: Include lines only for the kernel parameter values that are to change. For the semaphore parameters (kernel.sem), all four values must be specified. However, if any of the current values are larger than the minimum value, then specify the larger value. Also, even though the minimum value required for shmmx is 0.5 GB, Oracle recommends that setting the value of shmmx to 2.0 GB (2147483648) for optimum performance of the system.

After adding only the required lines and saving your changes, enter the following command to review the current values of the kernel parameters:

```
# /sbin/sysctl -p
```

Review the output from this command to verify that the values are correct. If the values are incorrect, edit the `/etc/sysctl.conf` file, then enter this command again.

Once all the values are correct, enter the following command to confirm the changes:

```
#!/sbin/sysctl -a
```

After updating these values, run the following command to make the changes made in the `/etc/sysctl.conf` file available in the active kernel memory:

```
# sysctl -p
```

Configure Name Resolution

An error may occur with Oracle Universal Installer if the database host name is not able to resolve itself. To avoid this, before installing Oracle Database 11g Release 2, confirm that the host names are resolved through the `/etc/hosts` files.

Verify that the `/etc/hosts` file is used for name resolution. Check the hosts file entry in the `nsswitch.conf` file running the following command:

```
# cat /etc/nsswitch.conf | grep hosts
```

The output of this command should contain an entry for files (for example: an output of hosts: files dns).

Next, verify that the hostname has been set by using the `hostname` command as follows:

```
# hostname
```

The output should be similar to the following

```
myhost.example.com or myhost.localhost
```

Confirm the domain name has not been set dynamically by using the domainname command as follows:

```
# domainname
```

The output should not return any results or return a value of (none)

Finally, verify that the hosts file contains the fully qualified host name and local host separately by running the following command:

```
# cat /etc/hosts
```

The output of this command should contain separate entries for the qualified host name and the local host. For example, the output should look similar to the following:

```
127.0.0.1          localhost.localdomain localhost
192.168.100.16     myhost.example.com   myhost #if on domain
192.168.100.17     myhost.localhost     myhost #if not on domain
```

If the output looks like the following, then the hosts file needs to be modified:

```
127.0.0.1          myhost.example.com myhost localhost.localdomain localhost
```

or

```
127.0.0.1          myhost.localhost myhost localhost.localdomain localhost
```

To modify the hosts file, open the hosts file with the vi editor.

```
# vi /etc/hosts
```

Separate out the two lines for local host and host name entries, like the following two examples:

[Example: on a domain]

```
127.0.0.1          localhost.localdomain localhost
192.168.100.16     myhost.example.com   myhost
```

[Example: not on a domain]

```
127.0.0.1          localhost.localdomain localhost
192.168.100.16     myhost.localhost     myhost
```

Exit out of the vi editor with wq, saving the changes.

Check Resource Limits for Oracle Software Installation Users

Login to the system as created user oracle and check the soft and hard limits for the Resource Shell Limit setting. Ensure that the results are in the recommended range based on the data in Table 7.

TABLE 7. INSTALLATION OWNER RESOURCE LIMIT RECOMMENDED RANGES

RESOURCE SHELL LIMIT	RESOURCE	SOFT LIMIT	HARD LIMIT
Open File Descriptors	nofile	At least 1024	At least 65536
Number of processes available to a single user	nproc	At least 2047	At least 16384
Size of the stack segment of the process	stack	At least 10240 KB	At least 10240 KB, and at most 32768 KB

To login as oracle user while currently logged in as root user, run the following command:

```
# su - oracle
```

To check the Open File Descriptors setting limits (-Sx for Soft Limit, -Hx for Hard Limit), run the following:

```
$ ulimit -Sn
$ ulimit -Hn
```

To check the number of processes available to a single user, run the following:

```
$ ulimit -Su
$ ulimit -Hu
```

To check the stack setting limits, run the following:

```
$ ulimit -Ss
$ ulimit -Hs
```

For any of the limits that are not in the recommended range, please update the resource limits in the /etc/security/limits.conf configuration file. To do this change user to root user

```
$ su - root
```

and change the limits.conf configuration file with the vi editor:

```
# vi /etc/security/limits.conf
```

Add the following lines as needed:

```
oracle soft nofile 1024
oracle hard nofile 65536
oracle soft nproc 2047
oracle hard nproc 16384
oracle soft stack 10240
oracle hard stack 32768
```

Save the changes by exiting the vi editor with the wq option, and change back to oracle user. Re-run the previous ulimit commands and confirm the appropriate changes were made. When completed, change back to root user.

Creating Required Directories

For the installation of Oracle Database, the following directories need to be created with specified owner groups and related permissions:

- Oracle base directory
- Oracle data file directory

The Oracle base directory must have at least 4 GB of free disk space and the Oracle data file directory should have about 2 GB of free space available. Please refer to the Physical Disk Space Requirement check under Hardware Pre-Requisites for exact required disk space.

First, check available disk space on all mounted file systems using the following command:

```
# df -h
```

The resulting output displays the physical device name, total/used/available amount of disk space, and the mount point for the file systems. From the displayed file system information, identify one or two file systems that meet the disk space requirements mentioned earlier.

Enter the commands similar to the following to create the recommended sub-directories in the file systems that you identified earlier and to set the appropriate owner, group, and permissions on the directories:

```
# mkdir -p /mount_point/app/
# chown -R oracle:oinstall /mount_point/app/
# chmod -R 775 /mount_point/app/
```

Example:

```
Using the root '/' file system as the mount point
# mkdir -p /home/oracle/app
# chown -R oracle:oinstall /home/oracle/app
# chmod -R 755 /home/oracle/app
```

To confirm, run the following command on the mount point.

```
# ls -l /mount_point/  
Example  
# ls -l /home/oracle/  
Output:  
drwxr-xr-x  2 oracle oinstall          4096 May 18 18:01 app
```

The entry for the app directory should appear as it does above, with a different date/time and directory identification number.

At this point, please log out of the system as root by selecting System > Log Out root... from the Oracle Linux desktop, log in as oracle user and open a terminal. Running the su – oracle command will not be sufficient, please completely log out of the operating system as root.

Configuring the Oracle User's Environment

Oracle Universal Installer must be run from the oracle account that was created earlier. Before Oracle Universal Installer is started, the environment for user oracle must be configured. The following needs to be performed:

- Set the DISPLAY environment variable.
- Set the ORACLE_BASE and ORACLE_SID environment variables
- Unset the ORACLE_HOME and TNS_ADMIN environment variables
- Enable cron permission

Set Up DISPLAY Environment Variable

Enter the following command to ensure that the X Window application can display correctly on your system.

```
$ xhost <ip_address_of_the_host_where_installation_is_run_from>
```

To determine the default shell for user oracle, enter the following command:

```
$ echo $SHELL
```

Next, run the shell startup script using the following bash command:

```
$ . ~/.bash_profile
```

If this installation is being run on a remote computer using a remote terminal (like Xterm) and not with the ILOM, then run the following command on the remote machine terminal to set the `DISPLAY` variable, otherwise skip this step:

```
$ export DISPLAY=remote_host:0.0
```

The `remote_host` variable is the fully qualified name or IP address of the local computer that you want to use to display Oracle Universal Installer.

Run the following commands on the remote machine to check that the shell and display environments are set correctly:

```
$ echo $SHELL
$ echo $DISPLAY
```

If running the installation from a remote server through a terminal application like Xterm, check if everything has been configured correctly to redirect the GUI, try running the following command to bring up the system clock to your desktop:

```
$ xclock
```

If the installation GUI redirection via the terminal session is running slow, it is recommended to utilize the Oracle ILOM to setup a remote connection to the database server GUI.

Set the ORACLE_BASE and ORACLE_SID Environment Variables

Enter commands similar to the following to set the `ORACLE_BASE` and `ORACLE_SID` environment variables:

```
$ ORACLE_BASE=/home/oracle/app/
$ ORACLE_SID=sales
$ export ORACLE_BASE ORACLE_SID
```

In this example, `/home/oracle/app/` is the Oracle base directory that was created earlier and `sales` is the name for the database, typically, the database name in no more than five characters.

Unset the ORACLE_HOME and TNS_ADMIN Environment Variables

Enter the following commands to ensure that the `ORACLE_HOME` and `TNS_ADMIN` environment variables are not set:

```
$ unset ORACLE_HOME
$ unset TNS_ADMIN
```

NOTE: If the ORACLE_HOME environment variable is set, the Oracle Universal Installer uses the value that it specifies as the default path for the Oracle home directory. However, if the ORACLE_BASE environment variable is manually set, Oracle recommends to unset ORACLE_HOME environment variable and choose the default path suggested by Oracle Universal Installer.

Enabling cron for Oracle Configuration Manager Installation

The Oracle Configuration Manager relies on the cron capabilities to schedule the collection of configuration data. If cron is disabled or not configured, the installation of the Oracle Configuration Manager fails. To enable cron, while still logged in as oracle user, enter the following commands:

```
$ CCR_DISABLE_CRON_ENTRY=TRUE
$ export CCR_DISABLE_CRON_ENTRY
```

Installation Process

The installation process includes obtaining the installation media and then installing Oracle Database as outlined in the subsections below.

Obtaining Oracle Database 11g Release 2 Installation Media

Open a Web browser and enter the following URL in the address bar:

<http://www.oracle.com/technetwork/database/enterprise-edition/downloads/112010-linx8664soft-100572.html>

In order to download Oracle software, please review the OTL License Agreement and click the radio button “Accept License Agreement”.

Click on the following items to download:

```
linux.x64_11gR2_database_1of2.zip
linux.x64_11gR2_database_2of2.zip
```

Place these files in a single directory on the server where Oracle Database 11g Release 2 will be installed.

Unzip the files using the following command:

```
$ unzip <file name>
```

Example

```
$ unzip linux.x64_11gR2_database_1of2.zip
```

After completing the unzip command for the files, the database directory should be created.

Installing Oracle Database 11g Release 2

Note: SELinux security settings can cause problems with the installation of Oracle Database 11g Release 2. If the SELinux security setting is set to Enforcing, the installation procedure will eventually fail at Oracle Net Configuration Assistant job. If SELinux security is not required, it is recommended to set SELinux to permissive or disabled, or set the current session to permissive. This may require a restart to perform. If a restart is performed, please repeat the steps described in Configuring the oracle User's Environment section to set the DISPLAY environment, ORACLE_BASE, ORACLE_SID, enable CRON, and unset ORACLE_HOME and TNS_ADMIN, as these values will be lost when a reboot occurs. If SELinux security is required to be set to Enforcing, configure SELinux to allow Oracle Database 11g Release 2 to install.

After configuring the oracle user's environment and being logged in as the oracle user, start the Oracle Universal Installer to install Oracle Database 11g Release 2 by running the following command:

```
$ /unzipped_database_directory/database/runInstaller
```

If running this installation command from the ILOM Remote Console, and receive the following message:

```
Checking monitor: must be configured to display at least 256 colors
>>> Could not execute auto check for display colors using command /usr/bin/xdpyinfo.
Check if the DISPLAY variable is set. Failed <<<
```

Please confirm that the DISPLAY setting has been correctly configured from the Configuring the oracle User's Environment section and that the oracle user is logged into the Oracle Linux desktop.

In the Oracle Database 11g Release 2 Installer, please perform the following:

Configure Security Updates

ORACLE 11g
DATABASE

Provide your email address to be informed of security issues, install the product and initiate configuration manager. [View details.](#)

Email:

Easier for you if you use your My Oracle Support email address/username.

I wish to receive security updates via My Oracle Support.

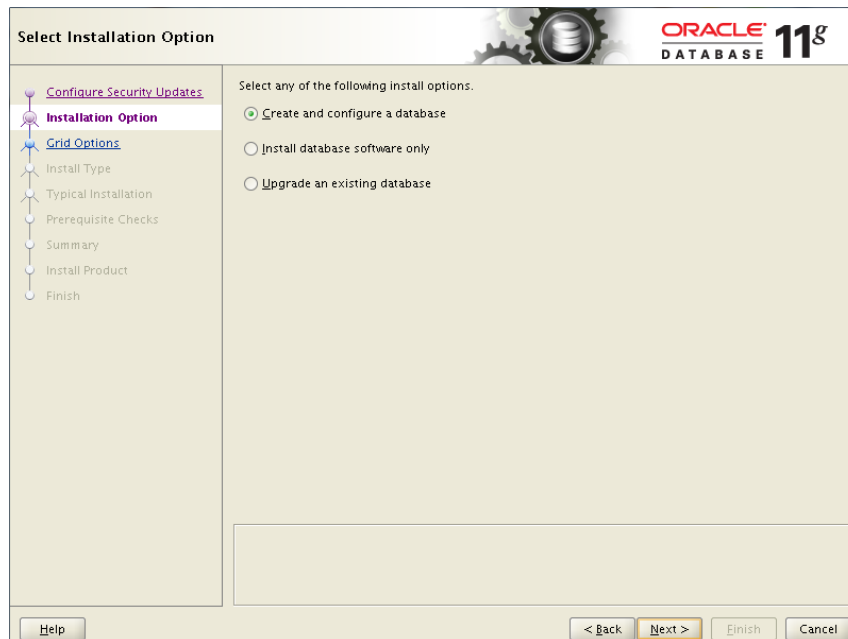
My Oracle Support Password:

Help < Back Next > Finish Cancel

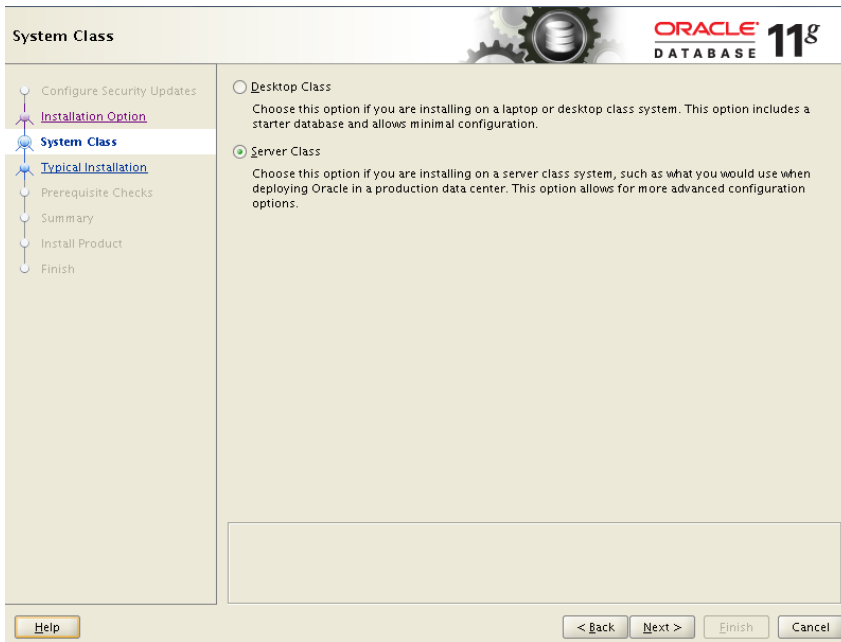
- Enter your e-mail address, preferably your My Oracle Support e-mail address or user name in the Email field.
- You can select the “I wish to receive security updates via My Oracle Support” check box to receive security updates if you have a My Oracle Support account.
- Enter your My Oracle Support password in the My Oracle Support Password field. If you do not have a My Oracle Support password, uncheck the “I wish to receive...”

NOTE: If you check this option, please ensure that you have a valid Oracle Support account and the password is entered correctly, if not, the installation will not be able to register with the Oracle Configuration Manager server and the installation of the optional tool Oracle Configuration Manager Configuration will fail. This tool, that is not necessarily required to run, automates a step of running the oraInstRoot.sh script. At the end of the installation, the installer will be prompted to manually run this script as well as the already required root.sh script.

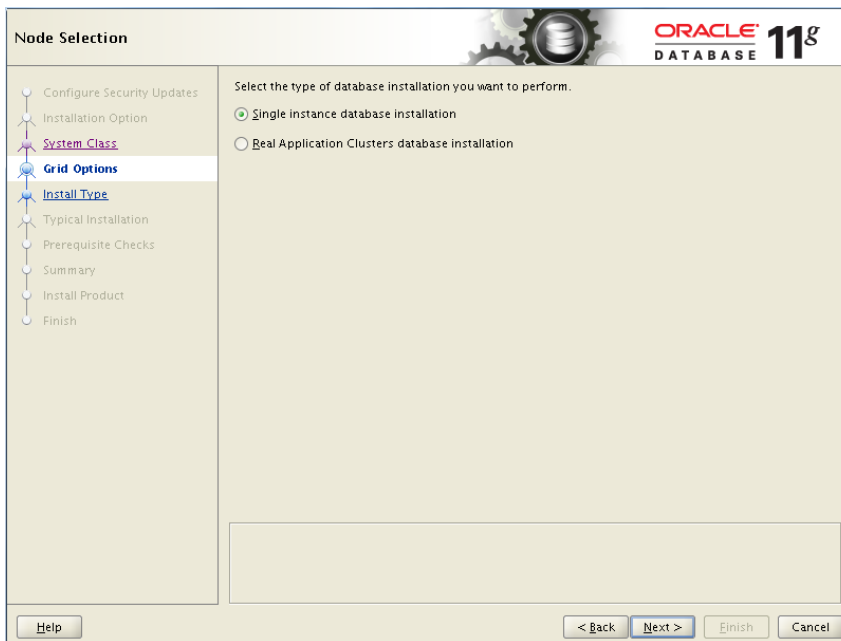
- Click Next.



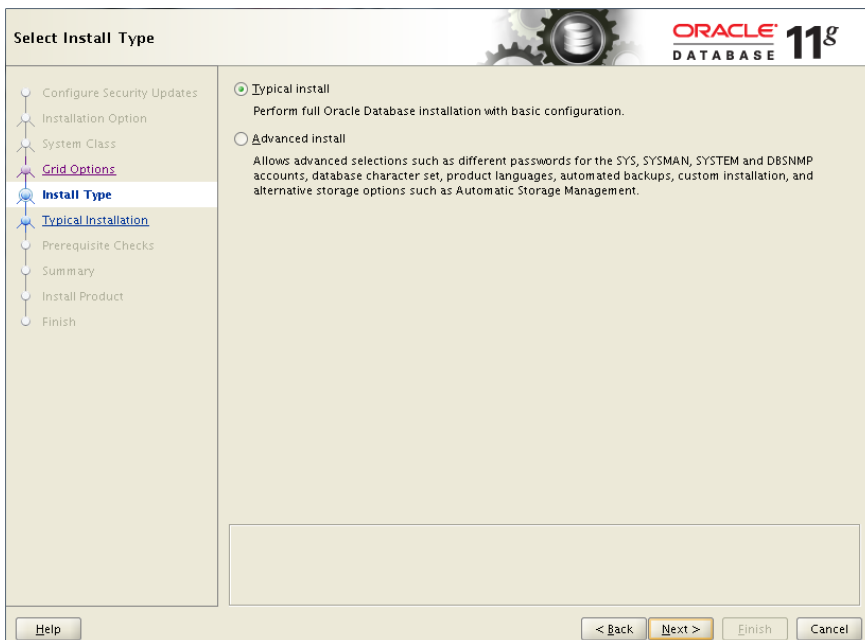
- Select “Create and configure a database” from the list of available options.
- Click Next.



- Select “Server Class” from the following options to install the database,
 - Desktop Class: Choose this option if you are installing on a laptop or desktop class system.
 - Server Class: Choose this option if you are installing on a server class system, such as what you would use when deploying Oracle in a production data center.
- Click Next.



- Select “Single instance database installation” for the type of database installation you want to perform:
 - Single instance database installation: This option installs the database and the listener.
 - Real Application Clusters database installation: This option installs Oracle Real Application Clusters and the listener.
- Click Next.



- Select Typical Installation as the installation type from the following options
 - Typical Installation: This installation method is selected by default. It lets you quickly install Oracle Database using minimal input.
 - Advanced Installation: This installation method enables to perform more complex installations.
- Click Next.

- Enter the following information as per your requirements:
 - Oracle base: The Oracle base path appears by default. You can change the path based on your requirement.
 - Software location: In the Software Location section, accept the default value or enter the Oracle home directory path in which you want to install Oracle components. The directory path should not contain spaces.
 - Storage Type: Select File System as the database storage option.
 - Database file location: If you select File System as your storage type, then click Browse and specify a database file location based on your requirements.
 - Database Edition: Select Standard Edition One.
 - OSDBA Group: The OSDBA group is selected by default. You can also select the OSDBA group from the list.
 - Global database name: Specify the Global Database Name using the following syntax:
 database_name.domain
 For example, sales.us.example.com or sales.localhost if server is not part of a domain
 - Administrative password: Enter the password for the privileged database account.
 - Confirm Password: Reenter, and confirm the password for the privileged database account.
- Click Next.



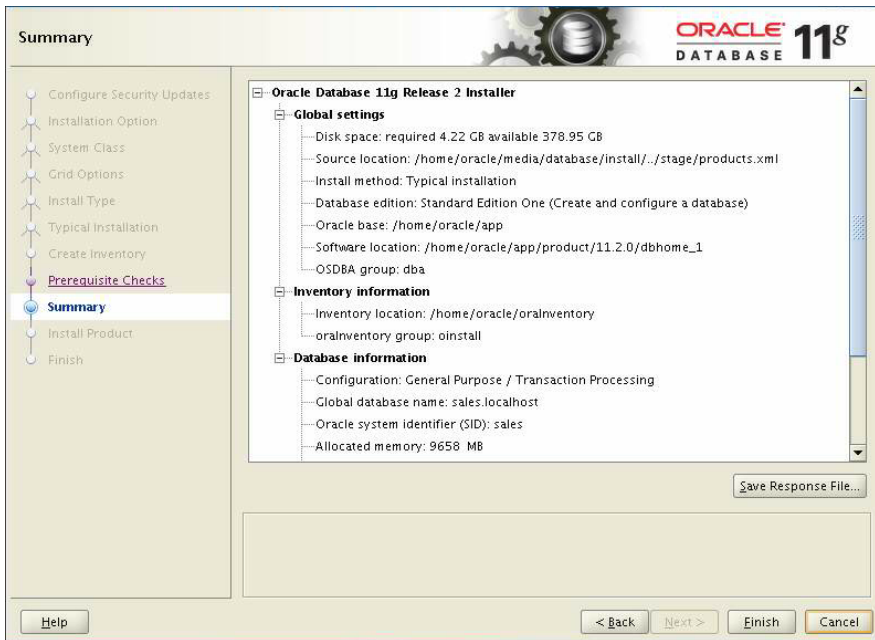
This screen is displayed only during the first installation of Oracle products on a system.

- Specify the full path of the Oracle Inventory directory. Ensure that the operating system group selected is oinstall.
- Click Next.

The Oracle Universal Installer checks the system to verify that it is configured correctly to run Oracle software. If you have completed all the pre-installation steps in this guide, all the checks should pass.

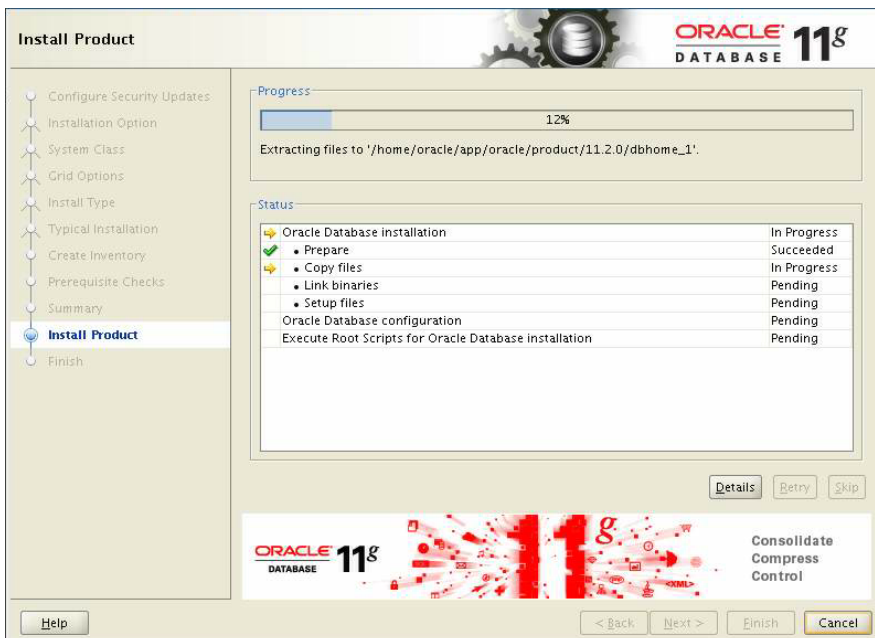
If a check fails, then review the cause of the failure listed for that check on the screen. If possible, rectify the problem and rerun the check. Alternatively, if you are satisfied that your system meets the requirements, then you can select the check box for the failed check to manually verify the requirement.

Note: Oracle recommends that you use caution in checking the Ignore All option. If you check this option, then Oracle Universal Installer may not confirm that your system is able to install Oracle Database successfully.



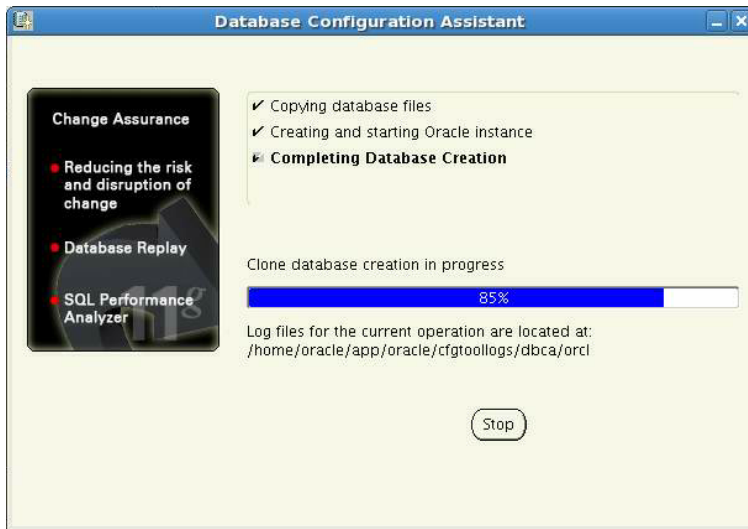
- Review the information displayed on this screen
- Click Finish.

Note: Starting with Oracle Database 11g Release 2 (11.2), you can save all the installation steps into a response file by clicking Save Response File. Later, this file can be used for a silent installation.

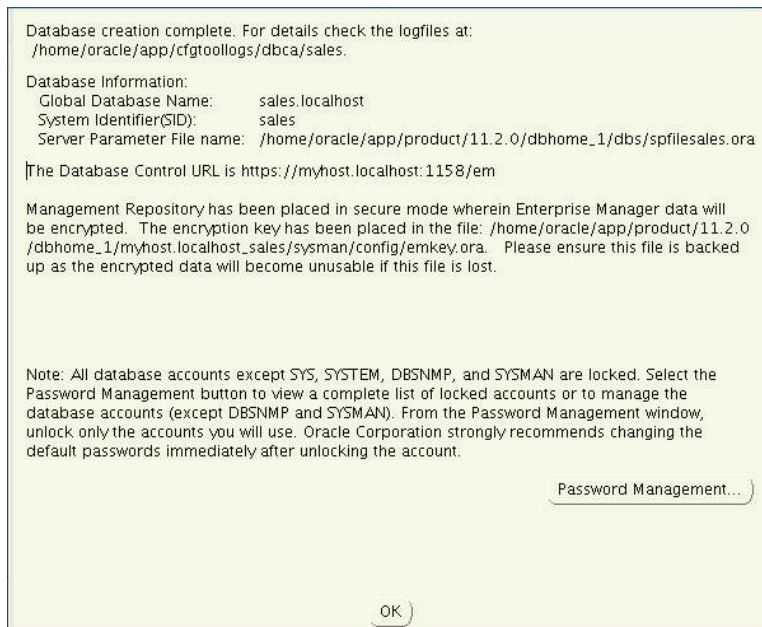


This screen states the progress of a database installation.

- After the database is installed, you are prompted to execute some root configuration script for new inventory as the root user.
 - Click Next.
- This screen then displays the status information for the configuration assistants that configure the software and creates a database instance as seen below:



- Finally, a message is displayed at the end of Database Configuration Assistant process as seen in the following screen:



- Click "OK."
- Follow the instructions from the Execute Configuration scripts screen

- Open a terminal window, and log in as root

```
$ su - root
```

- Run the following scripts and follow the necessary prompts:

```
/home/oracle/app/oracle/product/11.2.0/dbhome_1/root.sh
```

- # home/oracle/app/oracle/product/11.2.0/dbhome_1/root.sh
- Enter pathname for local bin directory if directed. Typically use the default provided directory /usr/local/bin/ unless local bin directory is known to reside in different location.

- Click “OK” in the Execute Configuration scripts window to close this screen.



- Note the Enterprise Manager Database Control URL that will be used to manage the Oracle Database.
- Click Close to finish the installation.

Post Installation Configuration

There are some required operations that need to be performed after installing Oracle Database 11g Release 2. Proceed to through the following sections for the required steps.

Accessing the Oracle Enterprise Manager Database Control

To access the Oracle Enterprise Manager Database Control, open a web-browser and enter the provided URL noted at the completion of the Oracle Database 11g Release 2 installation. The URL is typically either of the following:

```
https://<fully_qualified_DBHost_name>:1158/em  
https://<DBHost_IP_address>:1158/em
```

At the web interface log in screen, use SYSTEM for the User Name. For the password, use the password entered during Oracle Database 11g Release 2 installation at the Typical Installation Configuration screen for administration password.

Correcting Initial Critical Policy Violations

After installing Oracle Database 11g Release 2, some policy violations may be reported. Please refer to the following procedures to correct these initial policy violations.

Restricted Privileges for PUBLIC

Post Oracle Database 11g Release 2 installation, PUBLIC role needs to have its EXECUTE privileges revoked. This will be done using SQL*Plus which is automatically installed with Oracle Database 11g Release 2. To use SQL*Plus, the utility oraenv needs to be run in order to used commands such as sqlplus, exp, and other Oracle Database 11g Release 2 commands.

First, run the following command to run the oraenv utility (please note the space between . /usr...):

```
$ . /usr/local/bin/oraenv
```

When prompted for the ORACLE_SID, enter the name of the SID that was created earlier in the pre-installation steps.

After successfully running the oraenv utility, SQL*Plus can now be run to perform the revoke commands for PUBLIC. To perform this, log into SQL*Plus as SYSDBA with the following command:

```
$ sqlplus / AS SYSDBA
```

At the SQL prompt enter the following command for the different policies to revoke execute privileges for PUBLIC.

```
SQL > REVOKE EXECUTE ON package_name FROM public;
```

ex:

```
SQL> REVOKE EXECUTE ON utl_tcp FROM public;
```

Perform this command for all packages that are in violation of Oracle Database policy.

To exit out of SQL*Plus, enter the command

```
SQL> exit
```

Profiles with Excessive Failed Login Attempts

Profiles with failed login attempts set greater than 10 will be reported as a policy violation. At initial installation of Oracle 11g Release 2, only two profiles will be created, DEFAULT and MONITORING_PROFILE. Profile DEFAULT should already have the setting for number of failed login attempts to lock at either 10 of DEFAULT, the DEFAULT value is also equal to 10. The MONITORING_PROFILE profile failed login before lock setting will most likely be set to UNLIMITED. This value needs to be corrected in order to clear the excessive allowed failed login attempted policy violation.

To set this value, log into the Oracle Enterprise Manager 11g Database Control web interface and log in as SYSTEM.

From the main Home screen, select Server from the menu bar.

Under the Security listing, select Profiles.

Select the radio button next to the profile MONITORING_PROFILE and click the Edit button.

Click on the Password link at the top of the Edit Profile page.

The last section of the password page is the Failed Login section. For the option “Number of failed login attempts to lock after”, click on the flashlight icon and select any of the desired options other than UNLIMITED (DEFAULT = 10) and click the Select button.

Click on the Apply button in the Edit Profile screen to apply this setting.

Password Complexity Verification Function Usage

Password complexity should be set for the server profiles except for DEFAULT profile, which is not set by default. To set this value, log into the Oracle Enterprise Manager 11g Database Control web interface and log in as SYSTEM.

From the main Home screen, select Server from the menu bar.

Under the Security listing, select Profiles.

Select the radio button next to the profile to change and click the Edit button.

Click on the Password link at the top of the Edit Profile page.

Under the Complexity section, for Complexity function click on the flashlight icon and select DEFAULT. When completed click select to complete the DEFAULT selection.

Click on the Apply button in the Edit Profile screen to apply this setting. Perform this setting for all profiles that have Complexity function set to NULL.

Creating a Backup of the root.sh Script

Oracle recommends creating a back up of the root.sh script after the installation of Oracle Database 11g Release 2 is completed. If there are any installations of other products in the same Oracle home directory, then Oracle Universal Installer updates the contents of the existing root.sh script during the installation. If information contained in the original root.sh script is required, then you can recover it from the backed up root.sh file.

Generating the Client Static Library

The client static library (libclntst11.a) is not generated during installation. If applications will be linked to the client static library, the library needs to be generated first.

To do this, first be logged in as user oracle.

Set the ORACLE_HOME environment variable to specify the Oracle home directory used by the Oracle Database installation if the ORACLE_HOME variable has not already been set. For example:

```
$ ORACLE_HOME=/home/oracle/app/oracle/product/11.2.0/dbhome_1
$ export ORACLE_HOME
```

Generate the client static library by running the following command:

```
$ $ORACLE_HOME/bin/genclntst
```

Configuring New Databases

It is recommended to run the utlrp.sql script after creating a database. This script recompiles all PL/SQL modules that might be in an invalid state, including packages, procedures, and types. This is an optional step but Oracle recommends that this is performed right after installation and not at a later date.

To run the utlrp.sql script, first switch user to oracle if not already logged in as user oracle.

Next, use the oraenv script to set the environment for the database where the utlrp.sql script is set to run.

Run the following command to run the oraenv utility (please note the space between ./usr...):

```
$. /usr/local/bin/oraenv
```

When prompted for the ORACLE_SID, enter the name of the SID that was created earlier in the pre-installation steps.

After successfully running the oraenv utility, SQL*Plus can now be run to perform the revoke commands for PUBLIC. To perform this, log into SQL*Plus as SYSDBA with the following command:

```
$ sqlplus / AS SYSDBA
```

Run the utlrp.sql script:

```
SQL> @?/rdbms/admin/utlrp.sql
```

Conclusion

The installation of Oracle Database 11g Release 2 Standard Edition One can be performed fairly quickly and easily especially when utilizing the Oracle stack. Support of Oracle applications, operating systems, and hardware is available from one location, as well as patches, software updates, and driver updates. This simplifies not only the installation and setup of the Oracle stack, but reduces the complication of maintaining the environment as well. For further information and available product feature details, please visit the Oracle Web sites listed in the table below.

TABLE 8. LINKS TO ADDITIONAL INFORMATION

GROUP	SUB-GROUPS
Oracle's Sun Fire x86 servers:	http://www.oracle.com/us/products/servers-storage/servers/x86/
Oracle Linux:	http://www.oracle.com/us/technologies/linux/
Oracle Database 11g:	http://www.oracle.com/us/products/database/
Oracle Database 11g Release 2 Quick Installation Guide for Linux x86-64	http://www.oracle.com/pls/db112/to_pdf?pathname=install.112/e16768.pdf
Oracle Database 11g Release 2 Installation Guide for Linux	http://download.oracle.com/docs/cd/E11882_01/install.112/e16763.pdf
Oracle Database Documentation Library	http://www.oracle.com/pls/db112/portal.portal_db

Appendix

A.1 Increasing Swap Space Process

Check the current available Swap Space by running the following command:

```
# free
```

From the output:

[Ex. Output]

	total	used	free	shared	buffers	cached
Mem:	24726300	4810596	19915704	0	119712	3709048
-/+ buffers/cache:		981836	23744464			
Swap:	26705912	0	26705912			

There is about 26 GB (26705912 kilobytes) of Swap Space as seen in the following line:

```
Swap:      26705912          0          26705912
```

In this example, the Swap Space will be increased by 11 GB. To do so, a supplementary Swap File needs to be created. This file can be created by using the data dump command (dd). This command can only be run under root, so if not already logged in as root, please do so or enter super user role with the command:

```
# su - root
```

And enter the root password when prompted.

When ready, carefully type in the dd command:

```
# dd if=/dev/zero of=<outfile_location_and_filename> bs=<bit_size>
count=<#_of_times_ran>
```

In the following data dump command:

```
# dd if=/dev/zero of=/moreswap bs=1G count=10
```

[Ex. Output]

```
10+0 records in
10+0 records out
10737418240 bytes (11 GB) copied, 104.207 seconds, 103 MB/s
```

An outfile titled moreswap in the / directory will be created with zeros written to the output file. This moreswap file will be 11 GB in size since bit size was specified as 1G and run times were 10 (0 – 10). To prepare this output file as a swap file, the command mkswap is run against the moreswap file to assign the file as a swap-consumable for the Linux kernel.

```
# mkswap /moreswap
```

[Ex. Output]

```
Setting up swapspace version 1, size = 10737414 kB
```

After the moreswap file is assigned as swap space, the supplemental swap file needs to be enabled. To do this, run the swapon command on the new swap file

```
# swapon /moreswap
```

Confirm that the swap space has been increased by running the free command again.

```
# free
```

[Ex. Output]

```

      total        used        free      shared    buffers  cached
Mem:   24726300   14518900   10207400          0     82316   13165320
-/+ buffers/cache: 1271264   23455036
Swap:   37191664          0   37191664
```

In order for this swap space to remain available after a system reboot, the fstab file needs to be modified to mount this swap space at boot. Be careful when modifying the fstab file, as mistaken changes can render the OS unbootable. It is also recommended to create a backup of the fstab file before making any modifications.

To modify the fstab file, open the file with the vi editor

```
# vi /etc/fstab
```

Locate the line that references your previously existing swap file

[Ex. Line Entry]

```
/dev/VolGroup00/LogVol01 swap                    swap    defaults          0 0
```

Under this line, enter a similar entry pointing to the newly created swap file

[Ex. New Line Entry]

```
/moreswap                    swap                    swap    defaults          0 0
```

So the fstab file should appear something like the following:

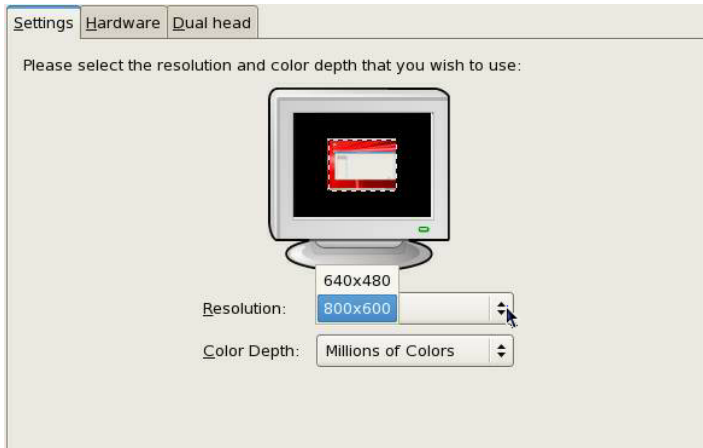
[Ex. Line Entry]

```
/dev/VolGroup00/LogVol01 swap                swap    defaults    0 0
/moreswap                swap                swap    defaults    0 0
```

Exit the fstab file saving the needed changes with the “wq” command.

A.2 Increasing Screen Resolution

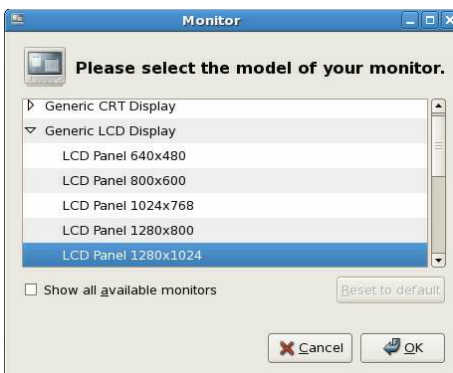
To increase the screen resolution size, please select from the resolution drop down menu the desired resolution.



If the desired resolution is not displayed as an option from the drop down menu, the monitor type needs to be modified. To change the monitor type, select the Hardware tab, and in the Monitor Type Section, click on the “Configure...” button.

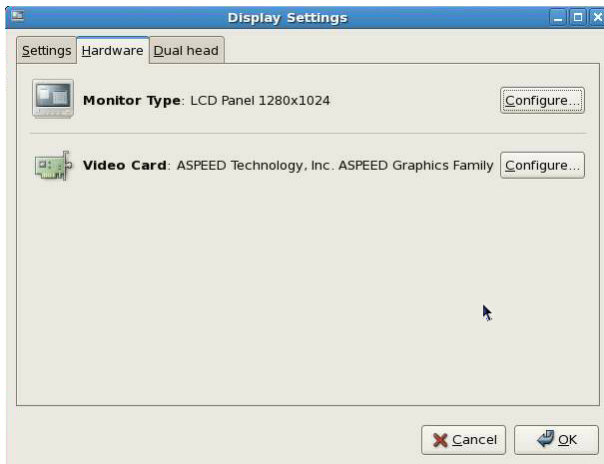


Expand on either the Generic CRT Display or Generic LCD Display and select one of the generic displays with the desired resolution.



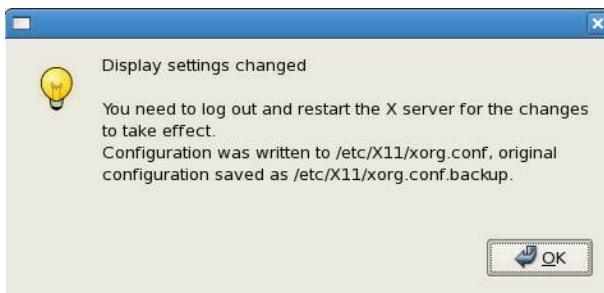
When completed click the “OK” button.

The Monitor Type should now reflect the type of monitor that was selected.



Click the “OK” button to confirm.

The following system setting changed window will appear to remind the user to restart the X server to apply the new monitor changes.



Click the “OK” button to continue.

At this point, go back to System > Administration > Display and more resolution options should now be available.

Select the required resolution and click OK.

Again, the following system setting changed window will appear to remind the user to restart the X server to apply the new monitor changes.



To apply the changes and restart the X server hit the Ctrl+Alt+Backspace. This will restart the display with the new resolution.

A.3 Installing Packages

To install Oracle Linux packages, it is recommended to have added the server to the Oracle Support Network. This will allow the download and installation of the latest Linux packages and patches. To install the packages, the following command is used:

```
# yum install package_name
```

Example: This example demonstrates the installation of the `elfutils-libelf-devel.x86_64` package. If this package is already installed and is at the latest level, yum installer will state this and exit out of the installation. If not, yum will continue with the installation of the package as well as other package dependencies.

```
# yum install elfutils-libelf-devel.x86_64
Loaded plugins: rhnplugin, security
Setting up Install Process
Resolving Dependencies
--> Running transaction check
---> Package elfutils-libelf-devel.x86_64 0:0.137-3.el5 set to be updated
--> Processing Dependency: elfutils-libelf-devel-static-x86_64 = 0.137-3.el5 for
package: elfutils-libelf-devel
--> Running transaction check
---> Package elfutils-libelf-devel-static.x86_64 0:0.137-3.el5 set to be updated
--> Finished Dependency Resolution
```

Dependencies Resolved

```
=====
Package                                Arch      Version           Repository        Size
=====
Installing:
elfutils-libelf-devel                   x86_64    0.137-3.el5      localinfo        24 k
Installing for dependencies:
elfutils-libelf-devel-static            x86_64    0.137-3.el5      localinfo        64 k
```

Transaction Summary

```
=====
Install      2 Package(s)
Upgrade     0 Package(s)
```

Total download size: 88 k

Is this ok [y/N]: y

Downloading Packages:

```
-----  
Total                               57 MB/s | 88 kB    00:00  
Running rpm_check_debug  
Running Transaction Test  
Finished Transaction Test  
Transaction Test Succeeded  
Running Transaction  
  Installing      : elfutils-libelf-devel                1/2  
  Installing      : elfutils-libelf-devel-static         2/2  
  
Installed:  
  elfutils-libelf-devel.x86_64 0:0.137-3.el5  
  
Dependency Installed:  
  elfutils-libelf-devel-static.x86_64 0:0.137-3.el5  
Complete!
```



Installation Guide for Single Click
Configurations of Oracle Database 11g with
Oracle Linux 5 on Sun Fire x86 Servers
October 2011, Version 1.0

Oracle Corporation
World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065
U.S.A.

Worldwide Inquiries:
Phone: +1.650.506.7000
Fax: +1.650.506.7200

oracle.com



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Hardware and Software, Engineered to Work Together