



Installation Instructions for
Oracle 9i Release 2 (9.2.0.1)
on
SuSE Linux Enterprise Server 7^(*)

(*) May be used for Oracle 9.2 on other SuSE Linux versions as well - in conjunction with the support pages at <http://www.suse.com/oracle/>.

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Preface

This document describes the step-by-step installation process of Oracle 9i R2 (9.2) on the **SuSE Linux Enterprise Server 7**. For detailed Oracle instructions see the Oracle Installation Guide and the Oracle Administration Guide, both very good documents, that come with Oracle 9i. For more Oracle books see <http://technet.oracle.com/>, where they are made available online.

The Oracle Installation Guide provides a much more comprehensive overview over **all** the possible installation options. This document on the other hand uses only one typical installation method as an example. If you want to know all the details about the Oracle installer and the Oracle tools like the Database Creation Assistant, see the Oracle documentation.

This document is based on the Oracle Installation Guide provided by Oracle. It leaves out all the things that unnecessary because it is the default in SuSE Linux Enterprise Server anyway. An example is the creation of an Oracle user and groups, or the *umask* setting for this user, which are already provided by SuSE Linux Enterprise Server 7 in exactly the way Oracle recommends it.

There are two sections: A very short, text-only one for (somewhat) experienced users, and a much longer and more detailed one. The Quick Installation section is at the end of this document.

You will find additional information online at the SuSE support pages for Oracle located at <http://www.suse.com/oracle/>

Support & Download > Installation Tips

ORACLE at SuSE

Oracle Products on Linux - SuSE/Oracle support matrix (see bottom of page)

→ **Logfile of Changes:** Last Change: 26 November, 2001

→ **Valuable Information**

SuSE Linux Enterprise Server for Oracle
For information about SuSE Linux Enterprise Server - SuSE's core product for running production Oracle servers.

Oracle Certification
For information about SuSE-Oracle product certification strategy.

Oracle	SuSE Linux					SLES-7
	6.4	7.0	7.1	7.2	7.3	
Database						
Oracle 8i						
8.1.6 (8i R2)	✓	✓	✓	✓	☐	✓ X
8.1.7 (8i R3)	☐	✓	✓	✓	✓	✓ C
Oracle 9i						
9i	X	X	✓	✓	✓	✓ C

Requirements

Hardware

For a detailed description of hardware- and space requirements see the generic Oracle Installation Guide that comes with Oracle 9i for Linux.

- Any Intel- or AMD- based PC with a 32bit CPU
- At least 256 MB of RAM, more if you use the Java VM in the Oracle database
- We recommend at least 4 GB of free disk space for Oracle and a demo database

Software

: SuSE Linux Enterprise Server 7

We recommend that during OS installation you select the *Default* installation option in the SuSE Linux Enterprise Server 7 software selection screen and go from there.

These are not unbreakable rules. If you know what and why you want to break them it can be okay to do so.

Must Install:

- ✓ Make sure that **X-Window** is installed and running, or that at least the X-Window libraries are present for a remote installation.
- ✓ You will also need to have the basic developments tools installed, like **make**, **gcc**, and the **binutils** package.
- ✓ To view the Oracle documentation you need a **web browser** (e.g. Netscape or Konqueror) and a **PDF reader** (e.g. Adobe Acrobat Reader™, gv/ghostscript or xpdf).
- ✓ You may need to install package **pdksh**, which provides a Korn shell. Some Oracle scripts require this shell.
- ✓ You should install the **Java Development Kit (JDK)** 1.1.8v3 or 1.3.1. SuSE Linux Enterprise Server comes with JDK 1.1.8v3 in package *java (Group Development)*. Sun's JDK 1.3.1 is available on the patch CD. See the Oracle 9i release notes document (a PDF) for information when to use which JDK version. Different components like BC4J or the HTTP webserver's JServ module require different JDK versions. The Java GUI tools Oracle comes with use their own JRE (Java Runtime Environment) bundled with Oracle.
- ✓ You may need to have the package **OpenMotif** installed for certain Oracle components that require Motif libraries.

Must NOT Install:

- x Do not install any webserver, like Apache. Oracle already comes with Apache.
- x Do not install OpenLDAP, an LDAP directory server, if you do not plan to use it or if you plan to use Oracle Internet Directory (OID), which is Oracle's LDAP service.
- x We recommend you do not install any other server software. Production Oracle servers should run only Oracle and nothing else. One exception could be a Mail Transfer Agent (MTA) like sendmail or postfix.
- x Do not replace any core components of the Linux system with packages from outside sources. Oracle is supported and certified only with the original SuSE Linux Enterprise Server 7, plus SuSE patches and patchsets. This is especially true for key components like the kernel. You lose certification and support if you use anything but the kernels SuSE provides. You can compile your own, but you must use the SuSE kernel sources.

• Oracle 9i CD or archive

You either need an Oracle 9i CD or the archive you can download for free from OTN (<http://technet.oracle.com/>). The OTN archive is exactly the same version you get from Oracle on CD, the limitation is the Oracle Technet Evaluation License you have to acknowledge before getting to the download area. The binaries themselves are not limited in any way.

• Patches/Patchsets for SuSE Linux Enterprise Server 7

See the SuSE Maintenance Web. You must be a SuSE Maintenance customer to have access. Install the SuSE patches after the operating system installation, and before or after the Oracle installation, it does not matter for the installation process. When we created this document we did the installation on a pristine SuSE Linux Enterprise Server 7 without any additional patches installed.

• Patches/Patchsets for Oracle 9i R2

See Oracle Metalink. You must be an Oracle support customer to have access. The Oracle patches must be installed after the Oracle installation, obviously. You install patchsets using the Oracle Universal Installer. Each patch and each patchset comes with detailed installation instructions.

• SuSE Support Website for Oracle: <http://www.suse.com/oracle/>

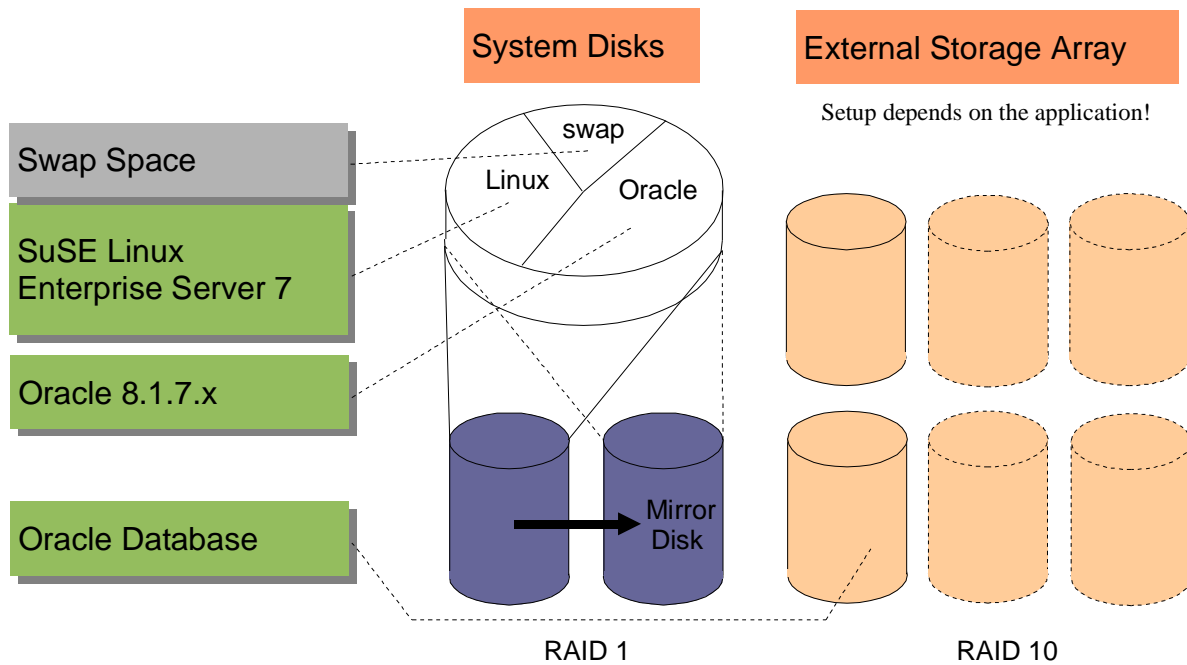
Please check the page for *Oracle 9i on SuSE Linux Enterprise Server 7*, reachable directly from the main page location above by clicking on the appropriate icon in the support matrix (direct URL: http://www.suse.com/en/support/oracle/db/9iR2_sles7.html) for any latest updates and additional information.

Pre-Installation

Tips for the OS Installation

Partitioning: Ideally you have partitioned your system in a way that allows you to install Oracle and the database file on different partitions than the OS. The advantage is that when you have to update the operating system at some point you can do a complete new, fresh installation and reformat the OS partition without losing your Oracle installation and/or data. We recommend to place the Oracle installation in */opt/oracle*, for the only reason that this is what our add-on package *orarun9i.rpm*, described below, has as a default.

Here is an example for a setup we would recommend for a production system:



The hardware consists of two main systems: A computer system (the server) with one or better two internal disks and a hardware RAID controller, and an external storage unit with lots of space, typically connected via an external SCSI cable or a fiber channel cable (more robust).

This document only considers the server unit, the configuration of the external array where the database contents will be stored on depends on the application. There are Oracle performance guides available - in bookstores and for free from Oracle on OTN as online books and whitepapers - that deal with that database administration topic. We do not need to concern ourselves with it at this point.

We suggest that you have at least two internal drives in the server unit, configured in a RAID-1 (mirroring) configuration in the hardware RAID controller of the server to protect us against the loss of one of the drives. There should be three main areas (partitions) on the disk (the virtual disk the SuSE Linux installer sees as provided by the hardware RAID controller). One is the swap space, the other one is for the operating system - possibly further divided e.g. to put logfiles and the temporary directory in a different partition - and the third one is for the Oracle installation.

You should give ca. 1.5-4 GB to Linux, at least 1 GB for swap and the rest is for Oracle.

Memory requirements: We recommend a total of at least 512 MB total RAM (physical RAM and swap space). How much you actually need and how much of it should be physical RAM completely depends on how you are going to use the database and how many users are going to connect to it, and how your application works (does it do a lot of computing in the database, or does it pull the data to another tier, e.g. an application server, and does the processing there?). The extremes go from 128MB physical RAM for a slow demo database doing some swapping to a big server system with several GB of RAM. Oracle provides sizing studies. This is an Oracle issue and not really a Linux issue.

After the OS Installation

Remote access: After the OS installation the only way to access the system remotely is via Secure Shell (*ssh*). Anything else, e.g. *telnet*, *ftp*, or *rsh*, will not work. For security reasons SuSE Linux by default does not activate the *inetd* daemon providing those services, they have to be enabled explicitly either by setting *START_INETD* in */etc/r.config* to "yes" and (as *root*) calling "*rcinetd start*" or by using the YaST2 Control Center (call "yast2" - works with and without X-Window - go to "Network/Basic" and select option "Start/Stop services (inetd)" (which does the same thing). See the SuSE Linux Enterprise Server documentation for details.

Special Partitioning: It is now time to setup the space for the Oracle installation. At least the database files should be on different disks than the operating system, but the Oracle installation should also go in a partition different from the operating system, see above, we recommend a clean separation. Read the Oracle Administration Guide that comes with Oracle 8.1.7 about the Oracle Flexible Architecture (OFA), the disk- and mount point setup Oracle recommends.

Since there are many different methods and all have their use, and depend a lot on how the database is going to be used, we will not make any suggestions. A small demo/test system can very well have everything, OS, Oracle and data files in one partition, but a big production database on a server with many disks may have a very different setup.

Logical Volume Management and possibly also using raw I/O are more sophisticated methods to manage space. These make sense for larger systems and databases. See the Logical Volume Manager Whitepaper at <http://www.suse.com/en/support/whitepapers/lvm/>. Note that the PDF version there may be slightly more up-to-date since the conversion to HTML is done separately.

Kernel parameters are something you do not need to worry about, we will set them dynamically later during runtime. You can and should use the kernel the SuSE installer installed in your system, unless you are really familiar with the process of compiling a new kernel. If you do compile your own please use the SuSE kernel sources. Check if there is an official SuSE update kernel available for SLES-7 on the Maintenance web.

If you use a 2.2 kernel and not a 2.4 one (the SuSE Linux Enterprise Server 7 also features a 2.2.19 based kernel): In this case you *may* have to recompile the kernel to adjust the semaphore settings, the shared memory ones do not need to be changed since we do this later during runtime. Install the kernel sources, you will find the variables for the semaphore settings in *linux/include/linux/sem.h*. Refer to either the *Oracle Installation Guide for Linux* for which variables to set to what values, or simply read on, install the *orarun* package (see Appendix), and take that information from the file */etc/rc.config.d/oracle.rc.config*. For the installation you do not need to do this in any case, only for actually running Oracle.

Users and groups for Oracle (user *oracle*, groups *oinstall*, *dba*) are already there in SuSE Linux.

Environment variables are another subject we will take care of during the installation, by installing a package SuSE created to make these things easier.

Detailed Installation Instructions

Starting point: SuSE Linux Enterprise Server 7 has been installed and all partitioning has been done. You have Oracle 9i R2, as CD or as tar archive (which you already unpacked to some location).

1. Depending on if you have a GUI login window or are on a text console:
Start X-Window and login (as yourself, the user you setup during the system installation). Or the other way around, depending on if you booted into the *xdm* runlevel 5 (X-Window is always on) or into the *console* runlevel 3 (X-Window is off by default, console login).

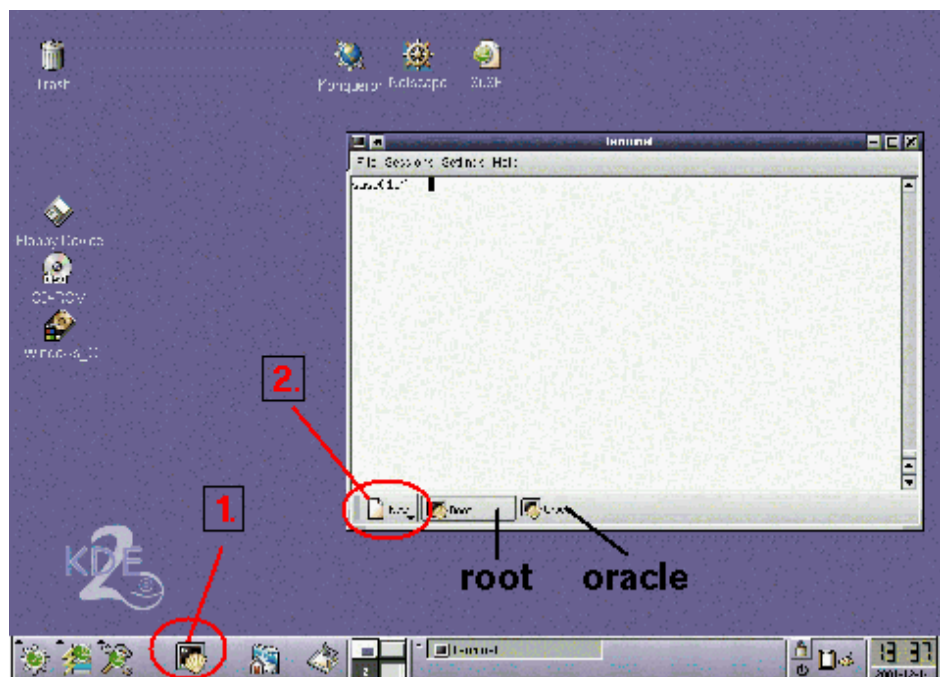
The picture shows the default SuSE login screen which you get if you configured X-Windows during the installation process **and** included the KDE packages in the installation (the *Default* software selection does that, the *Minimum+X11* does not and looks slightly different).



Click on the icon representing the user, or enter the user name manually. Then enter the password - note that you will not see anything you type for security reasons (someone might be looking over your shoulder, for example). We suggest to keep *KDE*, then press *GO*.

2. Open two *xterms* or KDE *konzoles*, or simply anything that provides a *shell* (a command line prompt).

See the picture, this is how your screen should look like afterwards. First (1.) you open a KDE *Terminal*, then you press the *New* button (2.) to open a second shell, and within the terminal window you can switch between the two shells by pressing the two buttons, marked *root* and *oracle* in the picture.



Shell #1 (root):

3. To become user *root*, execute this command and enter the *root* password when prompted for it. Note that you will not see what you type at the password prompt, as always in a Unix system.

```
su -
```

Now you are logged in as the administrator - but only in this shell, everywhere else you are still the regular user you logged in as.

4. **Tip, optional:** The Oracle 9i R2 Java based installer uses lots of memory! You may not need that much space at any other time. If you do not have that much (physical RAM **plus** swap space) here is a way to get it. This is meant for people installing Oracle for their own testing and for learning mostly, if you really deploy it on a server you will have enough RAM anyway (we hope).

To provide enough space just for the installation you could temporarily increase your total memory you can use the following procedure, which creates a swapfile which you can delete again after use. You can temporarily add a swapfile (that you can deactivate and delete afterwards:

```
#create a 1GB file (or any value for "count")
dd if=/dev/zero of=/swapfile bs=1k count=1048576
# make it a swapfile
mkswap /swapfile
# activate
swapon /swapfile
```

Don't forget to deactivate it (`swapoff /swapfile`) before you delete the file again.

5. Get package *orarun* and install it. You can use any web browser to download it, or you can also use the command below if you have *wget* installed (ignore the line break in the URL, the paper this is printed on is just not wide enough!).

```
wget ftp://ftp.suse.com/pub/suse/i386/supplementary/
commercial/Oracle/orarun.rpm
rpm -Uvh orarun.rpm
```

6. Optional, since the defaults are okay for the installation process and for running a demo database): Check and edit file `/etc/rc.config.d/oracle.rc.config`

A description of this file is in the appendix of this document.

7. Check the two files `/etc/profile.d/oracle.[c]sh`

There are two files for setting environment variables. The one ending in *.csh* is for C-shell users, the other one ending in *.sh* for Bourne shell users. Default in SuSE Linux is a Bourne shell.

The three most important variables are ORACLE_BASE, ORACLE_HOME and ORACLE_SID.

- ORACLE_BASE is the base for everything Oracle installs, like the product itself, the Java Runtime Environment (JRE) used to run the GUI tools, the documentation, the inventory directory where the Oracle Universal Installer keeps track of what components are installed, the Oracle Universal Installer itself, and by default it is also the base for the database files, logfiles and parameter files - but you can select a completely different location when you create your own database.
- ORACLE_HOME is a directory below ORACLE_BASE (at least it should be!) where the Oracle product, in this case the database, is installed. If you install multiple Oracle products they all get their own ORACLE_HOME, but we recommend you use the same ORACLE_BASE directory.
- ORACLE_SID is an identifier for a database instance. Your Oracle installation can run several different databases on one machine, simultaneously, and they all get a different SID. We suggest to use only four characters for the SID, although more are possible. The default is *orcl*. For example, if you run Oracle Parallel Server each instance on each node gets a different SID but they all work on the same database.

By default SuSE points ORACLE_BASE to the directory `/opt/oracle`, so if you do not change this setting this is where Oracle will get installed.

8. Prepare the Oracle user. To set password for the *oracle* user execute the command:
passwd oracle

Recommended but optional: Create extra `/home/oracle` for oracle user. By default it is in `/opt/oracle` and no dot-files like `.profile` exist since we, SuSE, by universally accepted standards are not allowed to install anything into the `/home` directory. Execute the following commands to create a full home directory:

```
cp -a /etc/skel/ /home/oracle
chown -R oracle:oinstall /home/oracle
usermod -d /home/oracle oracle
```

9. If you have an Oracle CD, mount CD-ROM, insert it into the CD-ROM drive and mount it by positioning your mouse pointer over the CD-ROM icon on your KDE desktop, then press the right mouse button and select *Mount* in the menu that appears.

Alternatively, just execute this command in the *root* shell that does the same:

```
mount /cdrom
```

Shell #2 (*oracle*):

10. Switch to the other shell and become user *oracle* by executing the command (do not use "su", "sux" takes care of the X-Window environment):

```
sux - oracle
```

11. Make sure the NumLock key on your keyboard is OFF. If it is not, pressing any of the buttons in the Oracle Universal Installer with the mouse will have no effect. This is a bug in Java or the Oracle Universal Installer. (It is possible that the installer of 9i R2 does not have that bug.)

12. Do **not** change into the Oracle source directory (e.g. /cdrom), remain in user *oracle*'s home directory. Start the installer (assuming you have a CD, otherwise adapt the path to wherever your Oracle installation source is located if it is not a CD):

```
/cdrom/runInstaller
```

If it does not start:

There is an installation problem on non-i686 architectures, when running the Oracle installer on any system where the `arch` command returns anything else but "i686". This is not a problem with the processor itself, just with the name. For background info see the SuSE support webpages for Oracle 9i on SuSE Linux.

To workaroud this problem do this: Start the installer and wait for the error, which will be something like "jre not found".

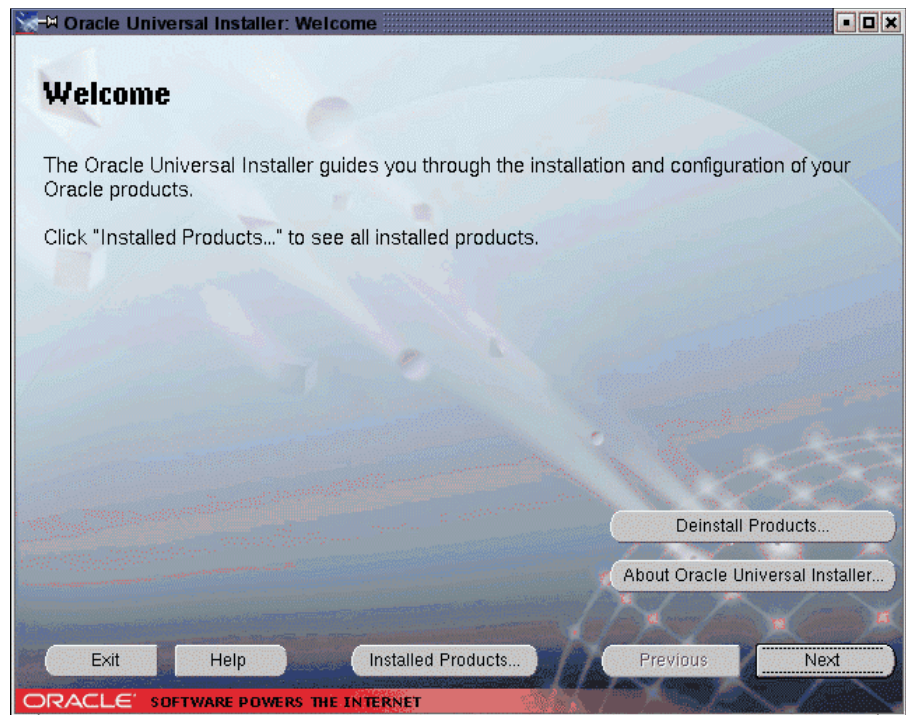
After getting the error the installer aborted, and you execute the commands below (no need to switch to root) and afterwards just restart the `runInstaller`, which this time will work:

```
cd /tmp/OraInstall/jre/bin/  
ln -s i686 i586  
cd ../lib/  
ln -s i686 i586
```

Oracle Universal Installer:

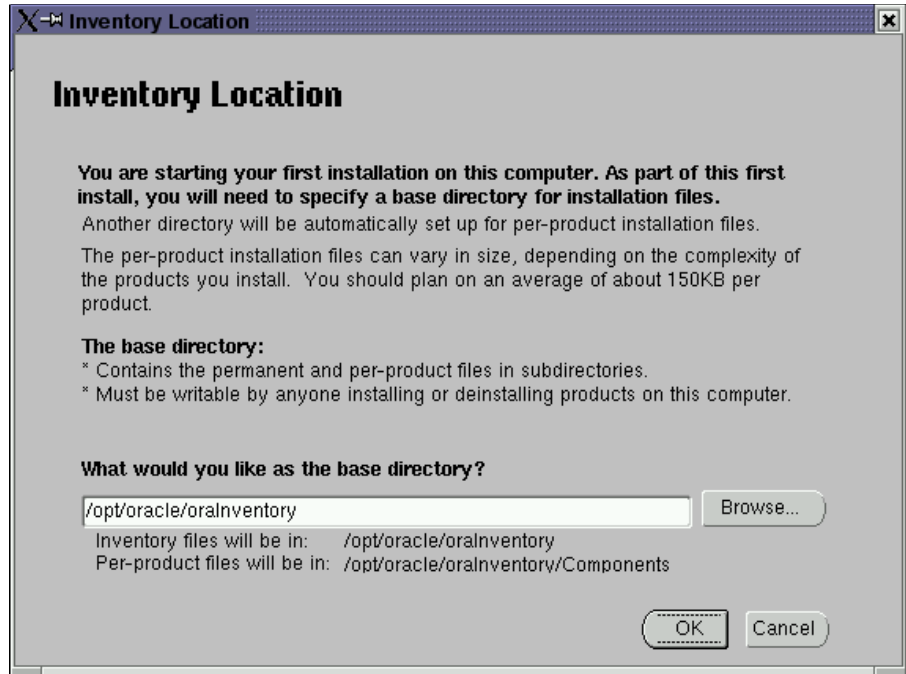
13. This is the welcome window of the Oracle Universal Installer and what you should see after starting it.

Press *Next*.



14. You will see this window only if no Oracle inventory exists yet (e.g. first installation of any Oracle product on this machine).

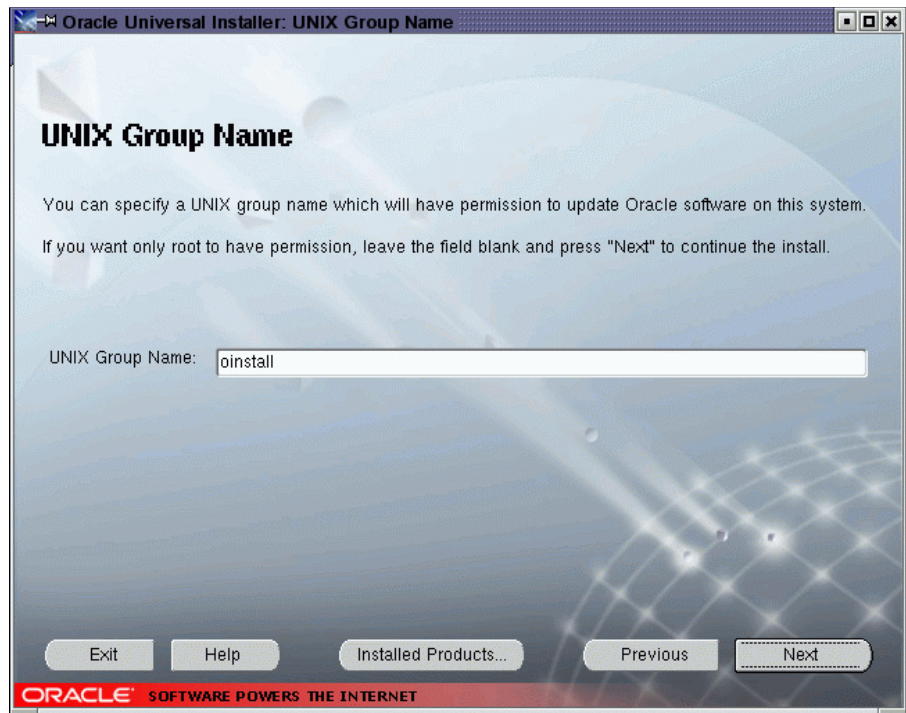
Inventory location: The text in this window is somewhat confusing. This is **not** about where to install Oracle software, this is only about the inventory database for the Oracle Universal Installer, so that it can keep track of which Oracle software and which components are installed and where.



The suggested place is just under ORACLE_BASE. We recommend to accept the default.

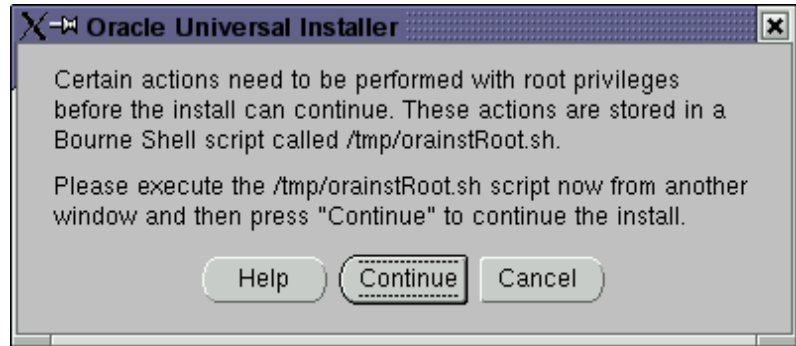
15. You will see the following two windows **only if there is no file /etc/orainst.loc** yet on your machine, which this step will create.

The second sentence in this window is useless, since you should **never** start the Oracle Universal Installer as *root*. What it should say is that if you leave the field blank only the user you are running the installation as will be able to update the Oracle software.



We put the group *oinstall* in the field, but since only user *oracle* is a member of this group by default this is equivalent to leaving it blank, but leaves you with the flexibility to add user names to this group later should you wish so.

When this gray window pops up after you pressed *Next* in the previous screen *UNIX Group Name*, switch to the *root* shell window temporarily:



Shell #1 (root):

Just run the script as told. Type the location - which depends on your setting of \$ORACLE_HOME - as it appears in the window you see.

After running the script Press *Continue* in that gray Oracle Installer window to continue with the installation.

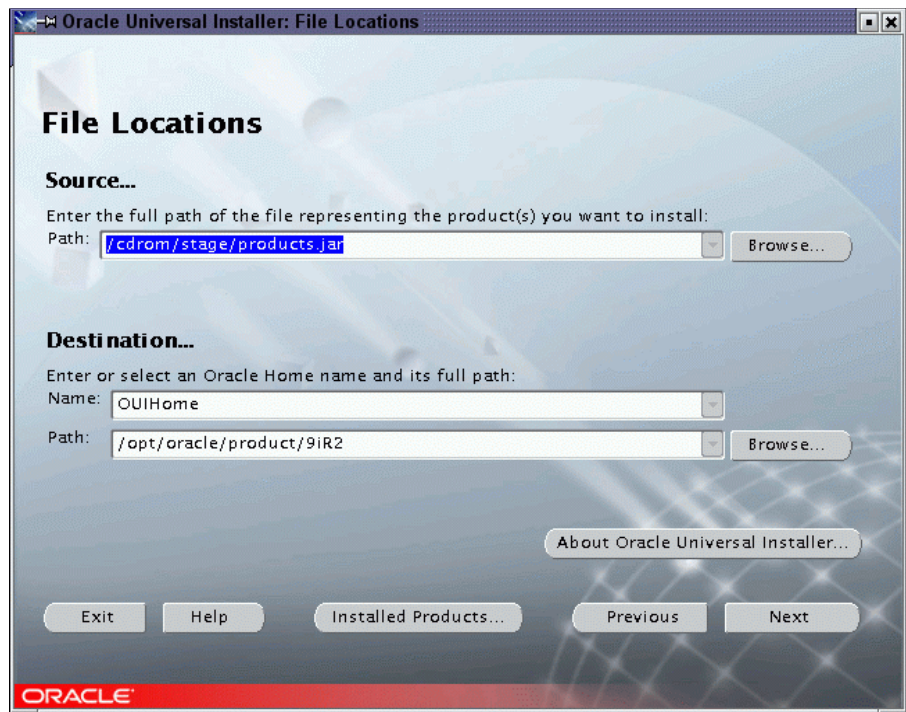
This is the end of this optional step, which creates a global Oracle configuration file /etc/orainst.loc with only two entries which will be used by any Oracle Universal Installer for any other Oracle product as well. If this file exists this step does not exist.

Oracle Universal Installer:

16. The destination for the installation is already okay, the installer simply takes the value of ORACLE_HOME.

Should you want a different value you should edit the setting for the variable ORACLE_HOME as well.

Press *Next*.

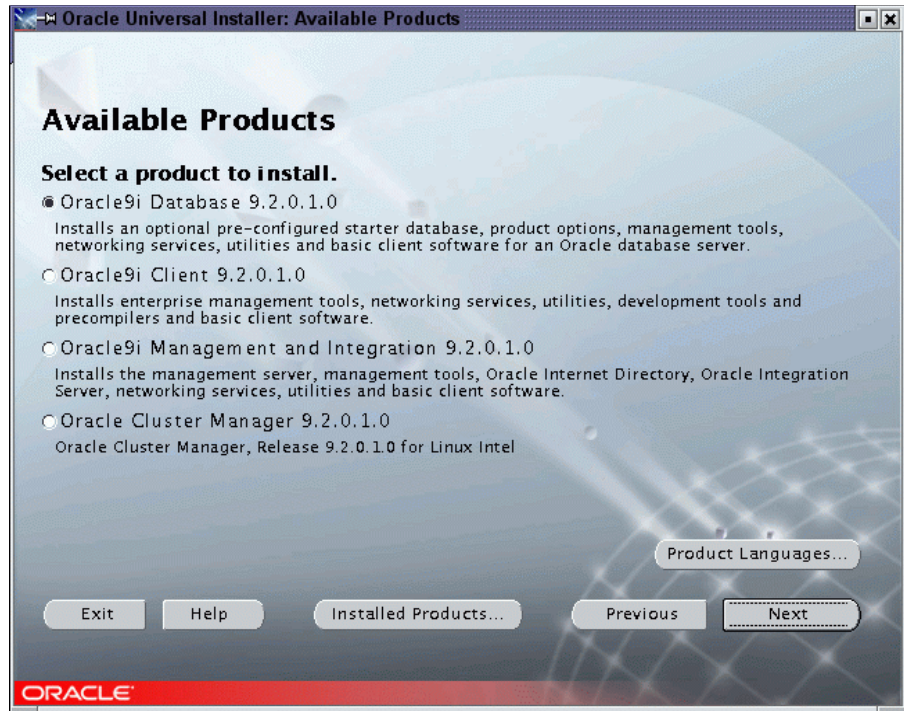


17. Select the installation type.

Info: The client tools (second item) are included when you select any of the other options.

For these instructions we selected the first item, the **database server installation**.

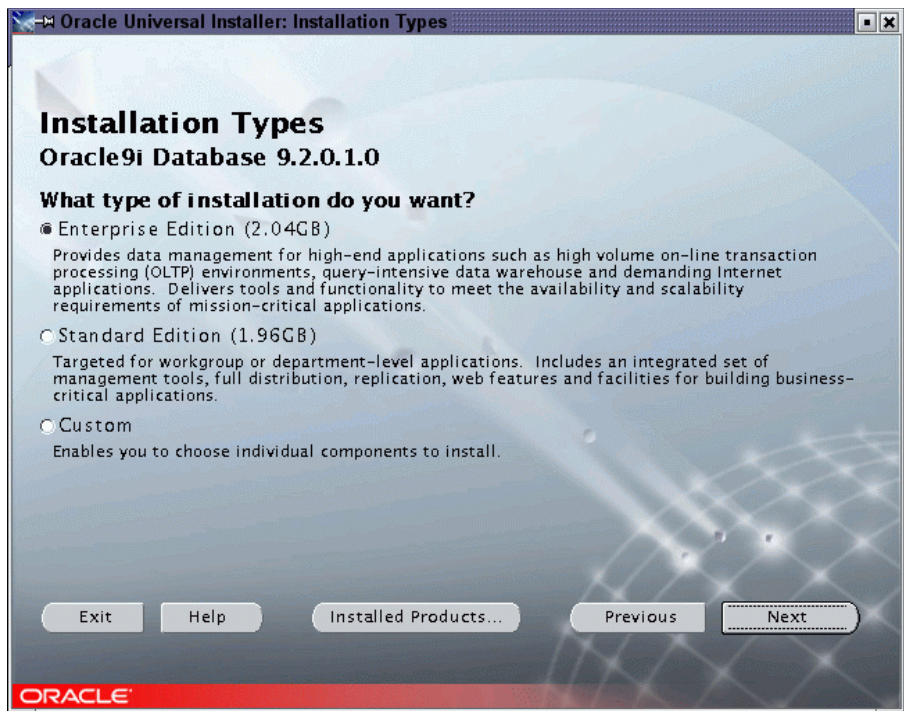
Press *Next*.



18. You get three more choices now.

(If you want to install Real Application Cluster you have to select *Custom*.)

Tip: If you select *Custom* or not will also have significance at the end of the installation process when the Network Assistant and the Database Creation Assistant are run. In a *typical* installation those tools will perform a default operation, in a *custom* installation they will be much more interactive and will let you set a lot of parameters.

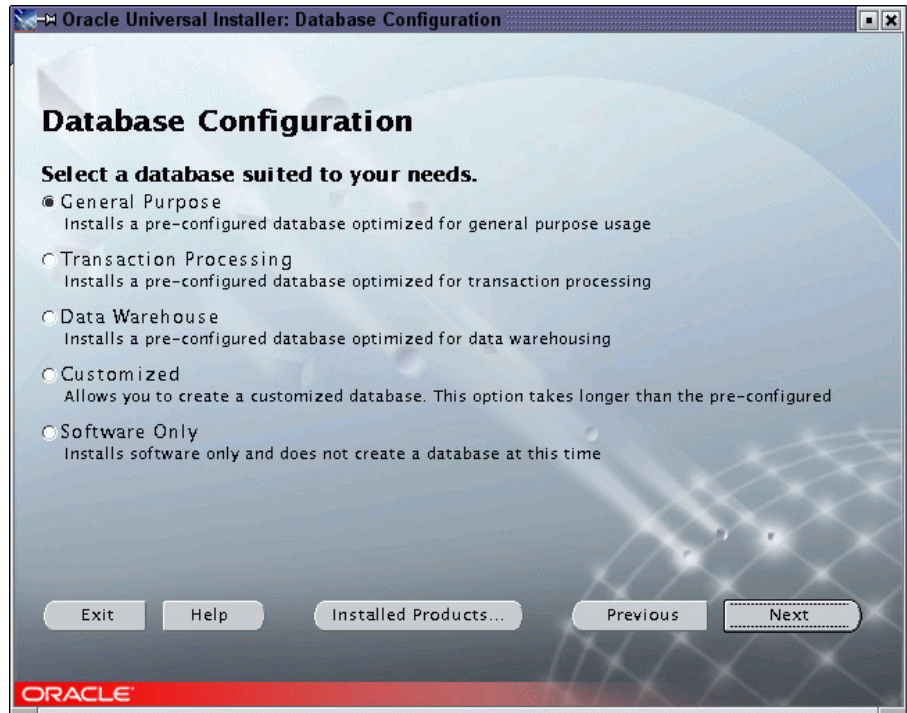


19.Database configuration.

At this place you can select what kind of database will be installed as the demo database.

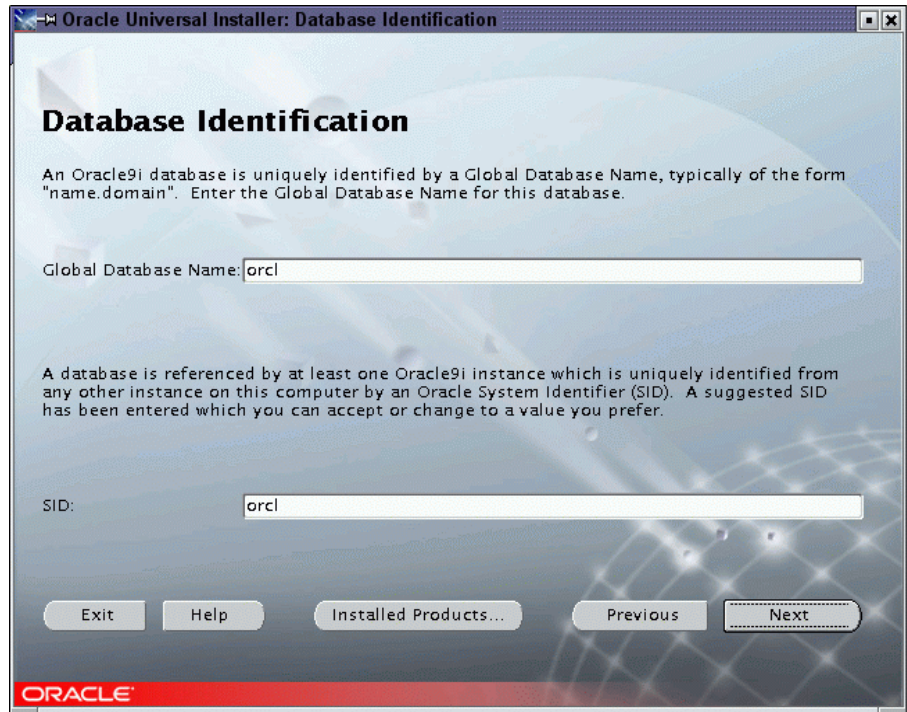
Customized will allow the selection of a lot of options and at the end of the software installation process will start the Database Creation Assistant which allows almost total customization.

Software Only will skip the database creation entirely.



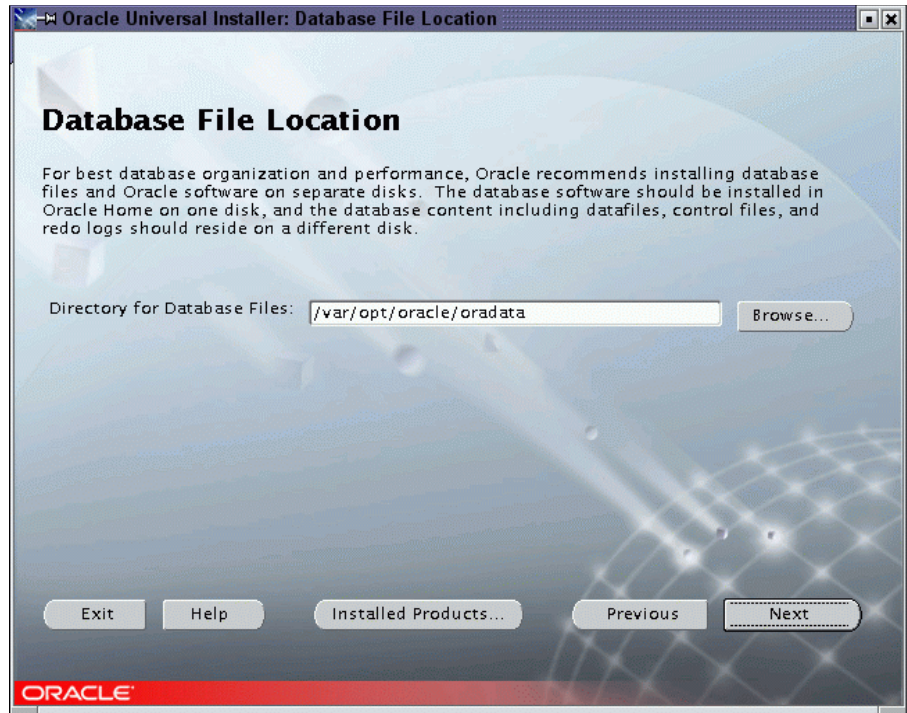
20.Database identification.

Select the name and the system identifier.



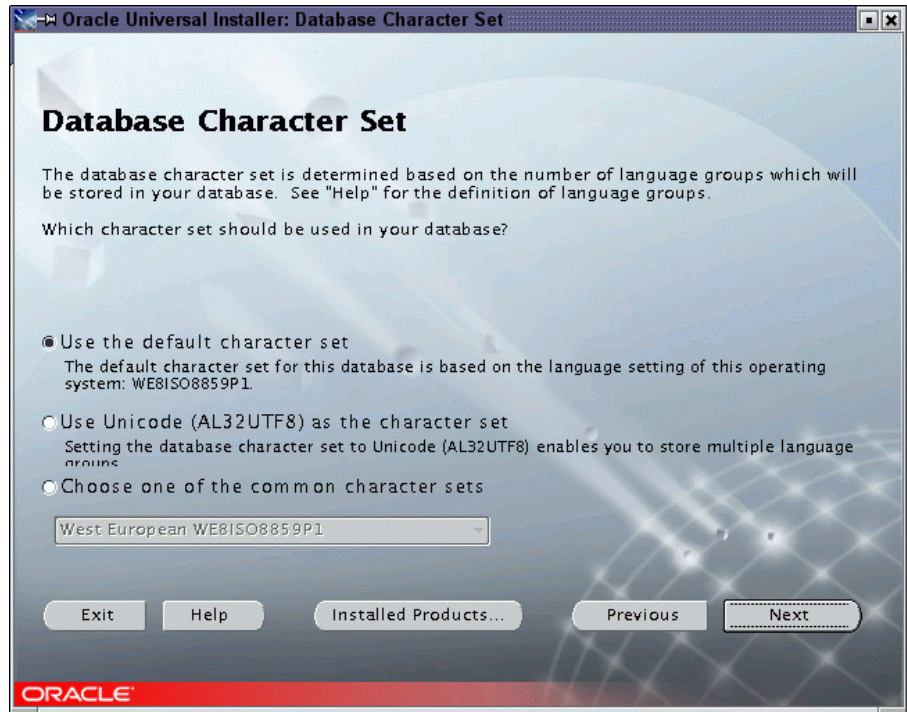
21.Database file location

All the database files will be stored in this location.



22.Database character set.

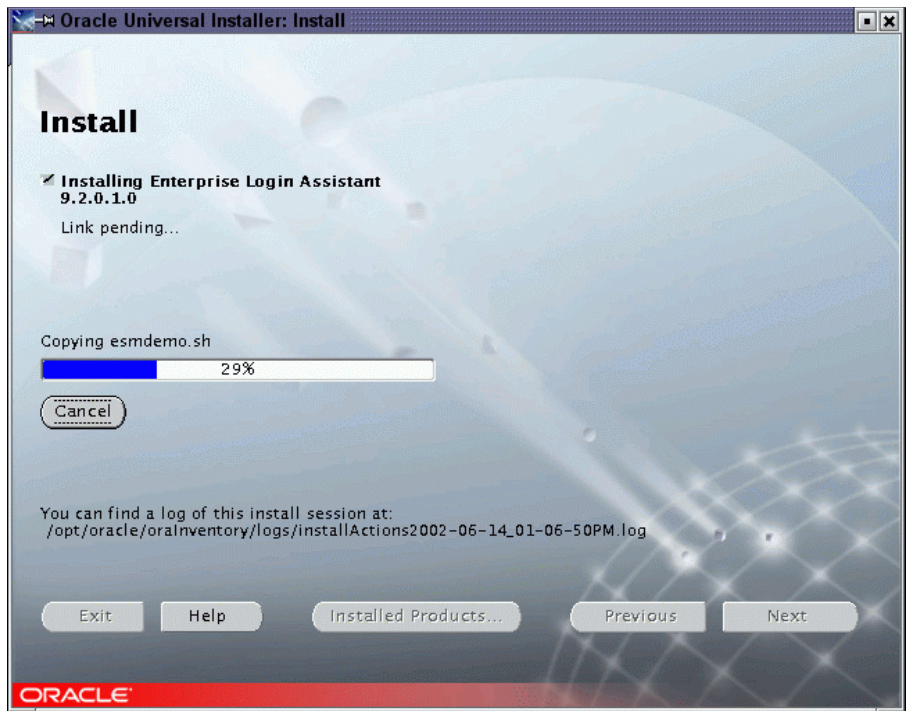
This choice is important since after database creation the character set can not be changed any more.



23. Summary screen - review your settings and press *Install* and go and have a cup of coffee, this will take quite a few minutes.

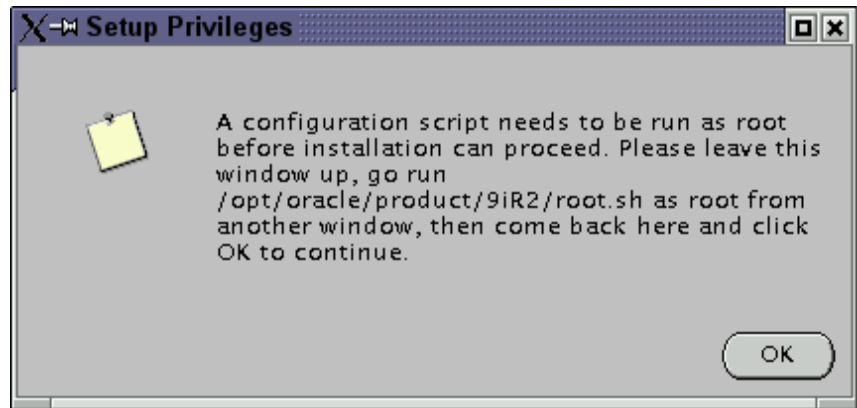


This can take a few minutes or a half hour, depending on how fast your system is.



24. After some time:

When the gray window with the message that tells you to run *root.sh* pops up we have to do a few things in the two terminals before we can continue with the Oracle Installer.



Shell #1 (root):

25. Run the script as the Oracle Installer says:

```
$ORACLE_HOME/root.sh
```

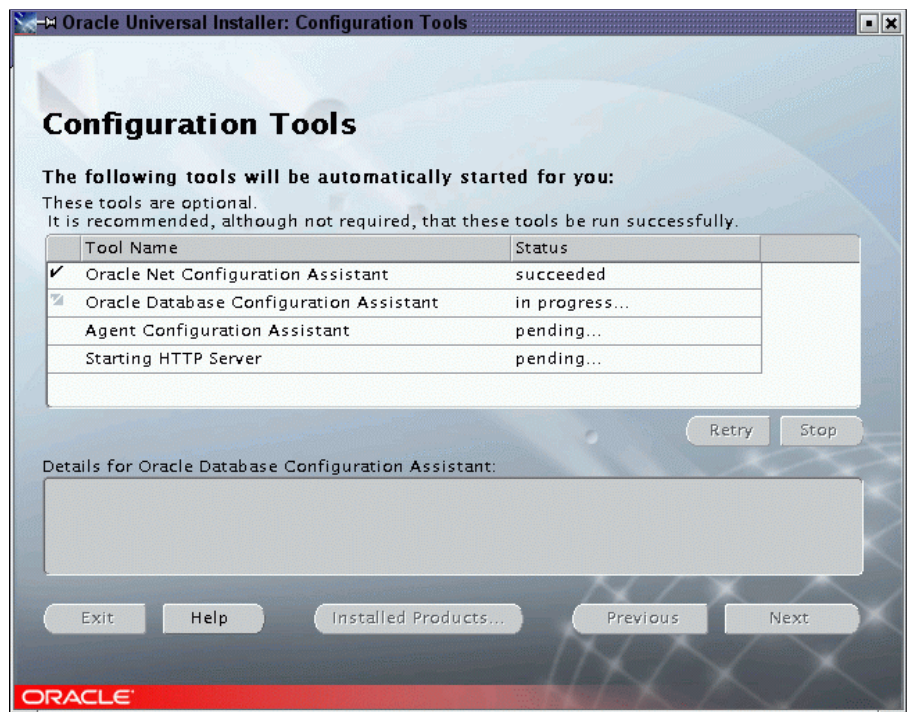
Wait until it is finished, which may take several minutes.

Oracle Universal Installer:

26. Close the gray message window by pressing *OK*.

27. The Oracle Installer will now configure Net8, create a demo database, and start the Apache webserver that comes with Oracle.

At this point Oracle is **fully installed** and if any of these tools fail it does not really matter. You can always call them on the command line manually (*netmgr* to create or edit a Net8 configuration (for experts), *netca* to create a Net8 configuration using a wizard (easier), *dbca* to create a database).



Net8 Configuration Assistant (*netca*)

Configure Net8. Usually, in a *Typical Installation* (vs. *Custom*), the installer will start the *netca* tool to do a *Typical Configuration* and it will just do that, no window is displayed. The connect string to use to connect to the database through Net8 will be the name of the database selected at the beginning - not the SID, the name! - plus the machines DNS domainname).

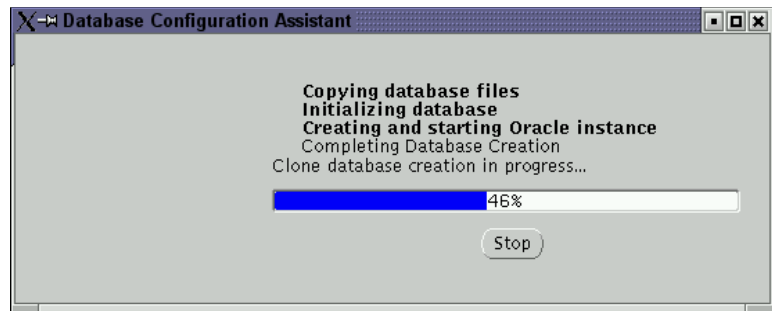
Example for db-name=orcl and domain=us.oracle.com: connect to the database using
sqlplus scott/tiger@orcl.us.oracle.com

Database Configuration Assistant (*dbca*)

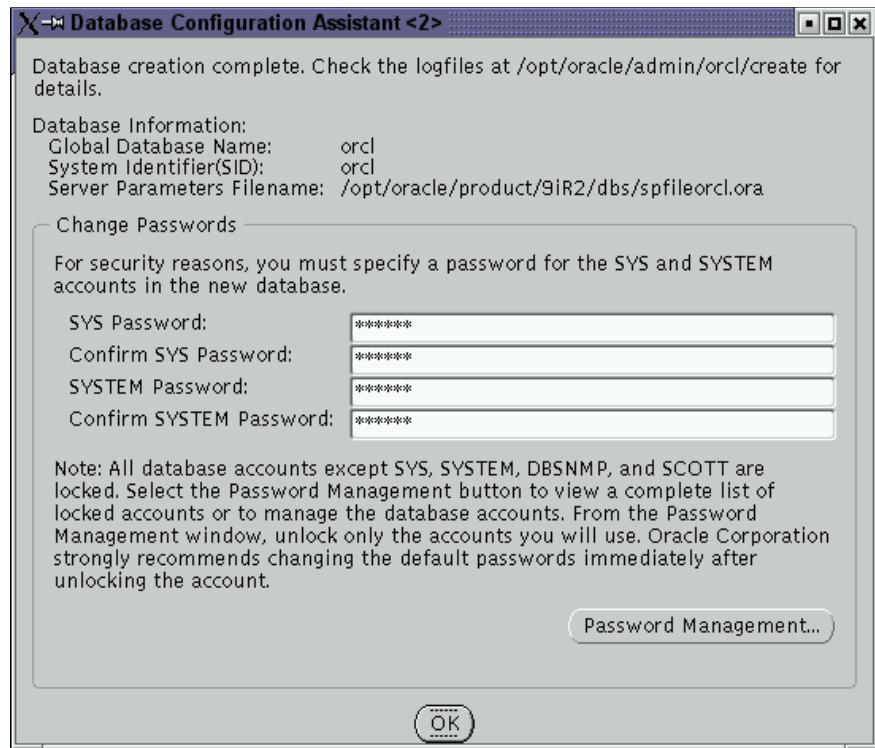
Create a demo database.

If you selected a *Typical* configuration at the beginning you are not asked any (more) questions.

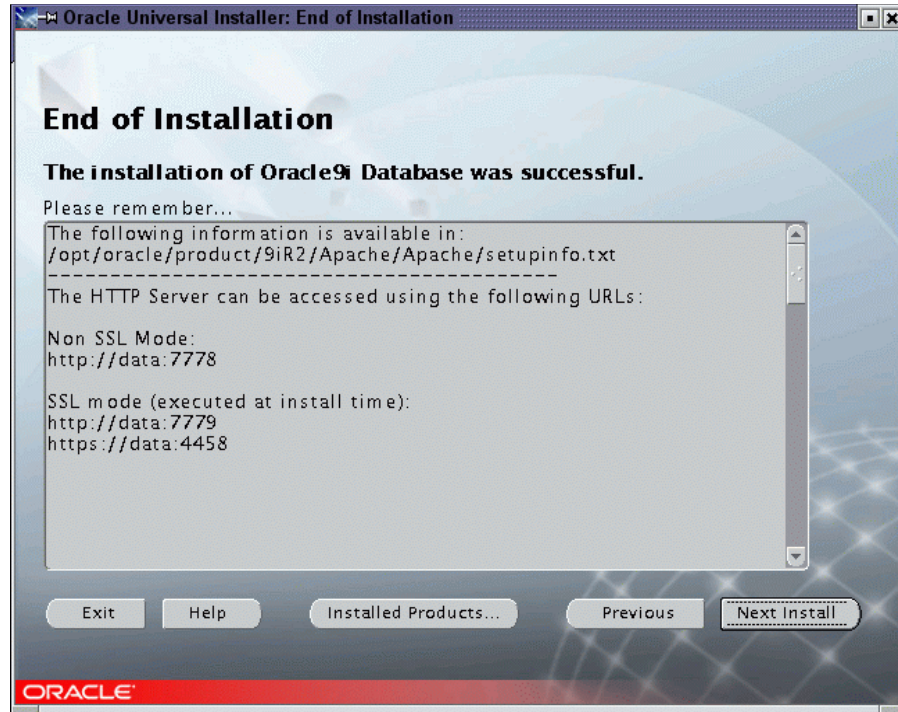
Since we selected a *Typical* installation we get a default database copied into the system, already created and ready to be used immediately. No parameters like tablespace sizes can be set. In a *Custom* installation or when started from the command line this tool will offer a **lot** of dialogboxes!



At the end we get a summary of the database name and the system identifier, and we get to choose some passwords for the database administration.



28.The end. Select *Next Installation* e.g. to install Pro-C/C++, or exit the installer.



END

Appendix – SuSE Package orarun.rpm

Package information

Name : orarun
License : GPL

Summary: Environment for running Oracle products

Description: This package

- sets the Oracle environment variables for each user, like ORACLE_HOME and PATH
- sets the recommended kernel parameters, e.g. SHMMAX
- provides for automated start/stop of Oracle processes at system startup/shutdown

You may want to or even have to edit `/etc/profile.d/oracle.[c]sh` (environment variables), `/etc/rc.config.d/oracle.rc.config` (which components to start/stop, values for kernel parameters).

File list:

Shell script: `/etc/init.d/oracle`
Shell variables: `/etc/profile.d/oracle.csh`
C-Shell variables: `/etc/profile.d/oracle.sh`
Link (in *root*'s PATH): `/usr/sbin/rcoracle -> ../../etc/init.d/oracle`
Shell variables: `/etc/rc.config.d/oracle.rc.config`
Documentation: `/usr/share/doc/packages/orarun/README`

1.) It provides the environment variables for running Oracle. It does so for all users, by placing it in the `/etc/profile.d/` directory, and it provides a file each for Bourne shell users and for C shells (SuSE Linux default shell is *bash*, a Bourne shell). Some administrators may not like to have an Oracle environment set for all users, they can simply place those files somewhere else and ignore any errors rpm produces later when it finds that the two files that are part of the `orarun8i` package are not there.

2.) The package also provides a script for **automated startup and shutdown** (when the system starts up or shuts down) of the Oracle database and of other Oracle components like the Apache webserver or the listener. Which components should be started by the script can be controlled by setting certain variables to *yes* or *no* in the text file `/etc/rc.config.d/oracle.rc.config`.

3.) The startup script also takes care of **setting the kernel parameters** for running Oracle. This requires a 2.4 kernel (default in SuSE Linux Enterprise Server 7, but a 2.2 kernel is also available) to work, with a 2.2 kernel only one parameter (SHMMAX) can be set this way. This is because as of kernel 2.4 all the parameters that need to be set according to the Oracle recommendations are dynamically (during runtime) adjustable, so no kernel rebuilding is necessary! The file storing the values is `/etc/rc.config.d/oracle.rc.config`. Have a look and edit it according to the instructions contained in that text file! For small to medium databases no values need to be adjusted at all since SuSE already provides reasonable defaults, only for bigger production systems might it become necessary.

Note that the startup script does its two tasks - setting kernel parameters and starting/stopping Oracle processes - independent of one another.